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Newport, R.I.

NON-LETHAL WEAPONS: APPLICATIONS IN MARITIME INTERDICTION OPERATIONS

By

Mark D. Henderson
Lieutenant Commander, United States Navy

A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Military Operations.

The Contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

Signature: Mark D. Henderson

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Faculty Advisor
CDR Leonard W. Wildemann, USN
Joint Military Operations Department

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With the line between war and peace becoming increasingly vague, U.S. forces face a growing number of operations which require the controlled application of force, and among these are MIO. Restraint, born of moral and ethical considerations, coupled with the need to maintain public support for military action, has brought a growing emphasis on the development and employment of non-lethal weapons (NLW). These weapons bridge the gap between presence with the threat of force and the application of deadly force. Non-lethal weapons offer key advantages to the Operational Commander which warrant their consideration in the planning and execution of any military mission.

As a measure between force and no force, NLW are ideally suited to missions between peace and war. When applied with rules of engagement which are clear, concise, and mission appropriate, NLW provide increased flexibility and enhanced mission effectiveness to forces conducting MIO.

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Table of Contents

Abstract ii

Introduction 1

Background 2

What is Meant by Non-lethal? 2

History of MIO 3

Combining Non-lethal Technologies and MIO 4

Operational Considerations 5

Advantages 5

Disadvantages 7

Rules of Engagement 9

Non-lethal Applications in MIO 11

Recommendations 13

Conclusions 14

Appendix A: Types of Non-lethal Weapons 16

Bibliography 18

Non-lethal Weapons: Applications in Maritime Interdiction Operations

"Readiness to employ the novel and new, as well as to utilize the old, Is a prime qualification for command."
Sound Military Decision, NWC, 1942[1]

Introduction

Today, more than ever, the line between war and peace has become increasingly vague. As crises throughout the world develop, a limited response, designed to prevent escalation and keep the peace, is the order of the day. Non-lethal weapons (NLW) offer the means to apply this limited response without the destabilizing effects of lethal force. The United States' Armed Forces have been involved in more than 40 Military Operations Other Than War (MOOTW) since 1990.[2] Despite limited applications in Desert Storm, Operation United Shield (Somalia, 1995) marked the first significant employment of non-lethal technology by U.S. forces.[3] In doing so, General A. C. Zinni, USMC, pioneered the NLW movement that continues today with an ever expanding role, and arguably a requirement for more sophisticated non-lethal technology.

Questions facing today's Operational Commander are: How best to use the existing technology, and how best to guide limited research and development towards critical future capabilities? For the Navy, one area with exciting NLW potential is Maritime Interdiction Operations (MIO). This paper will address the advantages and disadvantages of this application, and present a compelling case that NLW and procedures increase the effectiveness of the Navy's Maritime Interdiction mission.

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[1] Sound Military Decision, (Newport, RI: Naval War College, 1942), 91.
[2] U.S. Military Operations." Defense, January, 1999, 41. (Defense Almanac Issue)
[3] Frederick M. Lorenz, "Less-lethal Force in Operation United Shield", Marine Corps Gazette, September 1995, 69-70.

Background

"For to win one hundred victories in one hundred battles is not the acme of skill. To subdue the enemy without fighting is the acme of skill"
Sun Tzu[4]

What is Meant by Non-lethal?

The term non-lethal has been defined and applied in a variety of ways. In describing this new concept some have used the phrases less-than-lethal, pre-lethal, sub-lethal, and nondestructive. The Department of Defense (DOD) defines non-lethal weapons as: "Weapons that are explicitly designed and primarily employed so as to incapacitate personnel or material, while minimizing fatalities, permanent injury to personnel and undesired damage to property and the environment."[5] Regardless of the term used, it is important to remember that while the effects are designed to be non-lethal and nondestructive, there are no guarantees. A second distinction is that NLW are intended to be discriminate in nature, and their effects either temporary or reversible. These characteristics make NLW particularly applicable to MOOTW where a response short of lethal force is usually most appropriate.

The Marine Corps was designated as the lead agency in the NLW program by the Department of Defense on July 9, 1996.[6] A year later the Joint Non-lethal Weapons Directorate (JNLWD) was established to consolidate existing non-lethal advances and coordinate research and development efforts. "The Marine Corps along with the other Services and the U.S. Special Operations command, has embarked on a challenging and ambitious journey to bring focus, organization, and direction to the development of this

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[4] Sun Tzu, The Art of War, trans. Samuel B. Griffith (New York: Oxford University Press, 1963), 77.
[5] Defense Department, Policy for Non-lethal Weapons, DOD Dir. 3000.3 (Washington: 1990), 2.
[6] Ibid, 1.

critical warfighting capability for our joint forces."[7] The JNLWD faces a daunting task in light of the diverse and ever increasing work in the field of non-lethal technology.

Non-lethal weapons can generally be categorized as anti-personnel or anti-material. Increasingly, technologies from information and electronic warfare, to deception and "smart bombs" have also been included in discussions of non-lethals. Appendix A provides an overview of existing non-lethal technologies and some relevant applications. This is an ever changing list as new technologies are explored and developed.

History of MIO

Much has been written about the various mechanisms for controlling or inhibiting commerce on the seas.[8] Examples of blockade, visit and search, quarantine and pacific blockade are common throughout the 20th century. Each of these maritime tactics challenge the long standing concept of *mare liberum* or free seas.[9] Blockade, and visit and search constitute a portion of belligerents' rights during armed conflict, while quarantine and pacific blockade seek to resolve conflict or coerce compliance through peaceful means.[10] MIO have evolved from these concepts and represent today's maritime vehicle for coercive diplomacy, with the aim to resolve conflict at the lowest level and forestall the need for open hostilities.

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[7] M.R. Steele, Leiutenant General, U.S. Marine Corps, in a letter dated, 5 January, 1998, as part of "Joint Concept for Non-lethal Weapons", United States Marine Corps Warfighting Concepts for the 21st Century, (Quantico, VA), XII-1.

[8] For an in-depth discussion on the application of International Law to naval practices, see, Navy Department, The Commander's Handbook on the Law of Naval Operations, (NWP 1-14M) (Washington: 1989) [hereinafter referred to as NWP 1-14M].

[9] D. P. O'Connell, The International Law of the Sea, ed. I. A. Shearer, vol. 1 (Oxford: Clarendon Press 1982) 9.

[10] NWP 1-14M, para. 7.7.

Three examples of MIO during the past 10 years include: Operations in the Red Sea and Arabian Gulf as part of Desert Shield/Desert Storm, which continue today; Adriatic MIO efforts to facilitate peace in the former Yugoslavia; and coercive interdiction efforts directed against Haiti to restore the democratically elected government. Each of these operations was authorized through U.N. Security Council Resolutions, and enforced by a multinational interdiction force (coalition).

Combining Non-lethal Technologies and MIO

Economic sanctions and embargo are long accepted means of coercion used to guide the actions of nation states. Numerous historical examples with varying degrees of success indicate that MIO is a necessary part of sanction and embargo enforcement. Indications are clear that today's geographical Commanders in Chief will continue to be called upon to provide the "teeth" (via MIO) to these international undertakings. At the same time, public opinion and moral considerations have placed a growing emphasis on the development and employment of non-lethal technologies. Non-lethal weapons bridge the gap between presence with the threat of force and the application of deadly force, greatly increasing the options available to an operational commander. This unique capability cannot be ignored and should be used to enhance the operational effectiveness of today's armed forces across the spectrum of conflict. Accepting that MIO requirements are a reality, this paper will show MIO as an ideal situation for the application of non-lethal technologies, and address the operational considerations facing commanders.

Operational Considerations

"The United States must prepare to face a wider range of threats, emerging unpredictably, employing varying combinations of technology, and challenging us at varying levels of intensity."[11] To do this, Operational Commanders must exploit every advantage to increase the efficiency and effectiveness of today's military across the spectrum of conflict.

Advantages

Flexibility, providing the capability to respond to a wide variety of situations without resorting to lethal force, is a key factor in the employment of NLW. These weapons bridge the gap between presence and the threat of force, and the application of deadly force. This graduated response has been referred to as a "Force Continuum,"[12] and provides an increased ability to control the situation and prevent escalation. The discriminate nature, controlled application, and temporary effects that embody non-lethal technologies, help reduce or eliminate unintended casualties and collateral damage. A vehicle or vessel stopped by means of non-lethal force does not present the same problems as would its destruction. The possibility of oil spills, fires, or wreckage blocking narrow channels can be greatly reduced when the MIO mission can be accomplished without the use of disabling fire.

Acceptability: "Non-lethal technologies are beginning to emerge from the laboratories, global opinion demands it, and this will have a revolutionary impact."[13] This "global opinion" refers to the political acceptability and public acceptance of NLW based on

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[11] Joint Chiefs of Staff, Joint Vision 2010: America's Military Preparing for Tomorrow, (Washington: 1995), 11.
[12] Origin of term unknown, appears in a number of books and articles without reference to source.
[13] David A. Morehouse, Non-lethal Weapons, War Without Death, (Westport, CT: Praeger, 1996), 122.

their perceived promise of reduced civilian casualties and limited collateral damage. Any operation that results in civilian casualties will draw immediate media attention. "Adversaries are acutely aware that the best way to defeat the U. S., or to change our strategy, is to inflict American casualties and allow the media to do the rest."[14] Termed the "CNN effect," this phenomenon points to the need for measured restraint at all levels of force application. The Army Field Manual 100-5 stresses this need for restraint stating, "The use of excessive force could adversely affect efforts to gain legitimacy and impede the attainment of both short and long-term goals."[15] It is difficult if not impossible to maintain public support for peacekeeping when the effort results in civilian casualties. For MIO, where the intended effects may take years, public support is essential to sustain the operations long enough to be effective.

Operational Effectiveness: Using NLW and techniques to augment lethal force provides a force multiplier for today's military. With scarce resources and limited funding, there is no room for inefficiencies in military operations of any kind. For MIO to be most effective, it must be universal in its application and sustainable. Even a few vessels getting through can greatly undermine mission effectiveness. Non-lethal weapons can help ensure the integrity of the interdiction umbrella, without the unduly jeopardizing critical mission elements (legitimacy, international opinion and coalition unity).

[14] Kyle E. Garland, "Nonlethal Weapons: Impact and Utility Concerns for Operational Commanders in Future Conflicts", Unpublished Research Paper, U.S. Naval War College, Newport, RI: 1998, 7.
[15] Army Department, Field Manual 100-5, Operations, (Washington: June 1993), 13-4.

Disadvantages

Some of the very features that make NLW most attractive also lead to their biggest drawbacks. Operational Commanders must be aware of the possible negative implications associated with NLW.

The flexibility that allows an increased array of responses for an operational commander may cause confusion at the user level. Faced with more choices than ever before, the potential exists to respond inappropriately. Confronted with lethal force, a non-lethal reaction may put U.S. lives at risk. "A commander should never be bound by a policy that requires the use of NLW as a step before lethal force."[16] Similarly, "Our reluctance to impose our will through the use of lethal weapons creates a critical vulnerability which our adversaries quickly discern."[17] Effective training, proper doctrine and thoroughly developed ROE can help ensure our forces are best prepared to respond to any contingency.

The very term "non-lethal" may raise public expectations to unrealistic levels. As mentioned previously, there are no guarantees, all the designs and intentions will not always prevent unintended casualties. Additionally, "Even though they are designed to minimize fatalities and serious injuries, some NLW or their effects might prove so offensive to allies or important neutrals that their use would be counterproductive."[18] Permanent disabilities, such as the loss of sight or hearing due to the use of lasers or acoustic devices, will not play well on CNN. A properly educated public (both domestic and international), as to the means and effects of NLW, coupled with proper employment, can help overcome these factors. This

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[16] Harold C. Bass, "Non-lethal Weapons and Conventional War: Facing The Commander's Issues", Unpublished Research Paper, U.S. Naval War College, Newport, RI: 1998, 12.
[17] "A Joint Concept for Non-lethal Weapons", XII-10.
[18] Ibid, XII-13.

knowledge and understanding are crucial to maintaining the political acceptability and public support of these new and far-reaching capabilities.

Non-lethal weapons may give the false impression of a lack of resolve, which opposing forces may view as weakness. Similarly, if the deterrent nature of NLW fails, the opposing forces may feel they have no option but to respond with lethal force. In either case, an attempt to control the situation without resorting to lethal force, may lead to a possible escalation of hostilities. To avoid unintended escalation and to provide for adequate force protection, non-lethal force must not be employed as a stand-alone option. While the concepts of necessity and proportionality must guide our use of force, a clear and evident resolve to use lethal force may prevent its use altogether.

Legality: Non-lethal weapons must not violate international or customary law, and must conform to international treaties. All weapons fielded by the U.S. Armed Forces (whether lethal or non-lethal in nature) must undergo legal review to ensure they meet the aforementioned criteria. The legal basis for this review is rooted in the following three international law principles: First, "the right of belligerents to adopt means of injuring the enemy is not unlimited;" Second, "it is especially forbidden…to employ arms, projectiles, of material calculated to cause unnecessary suffering;" Third, "indiscriminate attacks are prohibited. Indiscriminate attacks are…those which employ a method or means of combat which cannot be directed at a specific military objective."[19] This process takes time and must be a consideration if the desired NLW has not been previously employed.

[19] Duncan, 27. A synthesis of multiple legal foundations for the weapons review process.

Rules of Engagement

The use of force, whether lethal or non-lethal, must be clearly delineated in the Rules of Engagement (ROE). Joint Doctrine defines ROE as "Rules which delineate the circumstances and limitations under which United States forces will initiate and/or continue combat engagement with other forces encountered."[20] The two primary purposes for ROE are to "provide implementation guidance on the inherent right and obligation of self-defense and the application of force for mission accomplishment."[21] "Non-lethal capabilities offer commanders more flexibility, allowing adoption of permissive rules of engagement without necessarily increasing casualties."[22] This flexibility will allow subordinates more freedom in the employment of measured force to accomplish their mission, while minimizing the likelihood of unintended casualties.

Rules of Engagement must be crafted that are appropriate to the mission, consistent with the authorizing basis (U.N. Sanctions, Presidential Directives) and in full compliance with international law. Under the Law of Armed Conflict, the use of force must be both necessary and proportionate. Additionally, force must not be applied which is indiscriminate or causes undue suffering or destruction.[23]

While nothing shall preclude or limit the right of self-defense, NLW pose a unique challenge with regard to mission-accomplishment ROE. Every effort must be made to tailor the MIO to minimize the effect of sanction enforcement upon other nations' legitimate use of

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[20] Joint Chiefs of Staff, Joint Pub. 1-02, Department of Defense Dictionary of Military and Associated Terms, (Washington, 1994), 329.
[21] James C. Duncan, "A Primer on the Employment of Non-Lethal Weapons," Naval Law Review, Vol. 45, 1998, 22.
[22] "A Joint Concept for Non-lethal Weapons", United States Marine Corps Warfighting Concepts for the 21st Century, (Quantico, VA, 1998), XII-15.
[23] NWP 1-14M, para. 6.2.

the seas. With this in mind, supplemental measures should be implemented which offer flexibility and freedom of employment, while allowing for the possible use of NLW. The following excerpts are from a draft copy of Atlantic Command's supplemental ROE measures related to MIO:

> -The offensive use of force during maritime interception operations should be considered the last resort.
>
> -Minimum force to carry out assigned task(s) is permitted.
>
> -Minimum force to cause designated units to stop and submit to search is permitted.
>
> -Disabling fire will be employed in a manner least likely to sink the vessel, and will not be directed at the persons on board.
>
> -Collateral damage to civilian objects and incidental injury or death to civilians is to be kept to the minimum possible.
>
> Regarding boarding parties:
>
> -Any use of force by boarding parties must be limited to the minimum necessary and designed to achieve the desired result with minimum injury to persons and property.
>
> -Boarding parties may use deadly force only to protect themselves or others from an imminent threat of death of serious bodily injury, or to protect U.S. property which is inherently dangerous to others.[24]

As supplemental ROE, these measures are designed to provide guidance for the application of force in the accomplishment of the MIO mission.

In conjunction with sound ROE, another critical factor for the employment of NLW is accurate intelligence. Enemy intentions and historical responses are a vital clue to future actions. Timely intelligence allows our forces to anticipate enemy courses of action, helping to ensure the safety of the interdiction force.

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[24] U.S. Atlantic Command, draft instruction, dated 5 June 1995, copy on file with Oceans Law and Policy Division, Naval War College, Newport, RI.

Non-lethal Applications in MIO

The following example incorporates operational considerations discussed earlier and demonstrates how the application of non-lethal technologies can greatly enhance the ability of MIO forces to safely and effectively accomplish their mission.

A target vessel (neutrally flagged oil tanker), known through historical intelligence reports to have violated UN sanctions in the past, enters the Arabian Gulf riding high in the water. The vessel is tracked northward through the gulf, allowed to proceed as it is empty and has stated its destination as a neutral oil docking station in the northern gulf. Monitored by U.S. and coalition naval vessels in coordination with maritime patrol aircraft, the vessel enters neutral territorial waters where it rendezvous with two small tankers that have recently departed the denied country's waters. Following cargo transfer the target vessel proceeds south, avoiding international waters and the waiting MIO enforcement vessels.

Hours later, when the opportunity presents itself, the target vessel attempts to cut across international waters toward the territorial waters of a willing recipient of its cargo. MIO vessels direct the target vessel to stop to allow boarding and inspection, but to no avail. The crew of the target vessel knows, that despite threats of disabling fire, the risks are too great. They are not the first vessel to ignore such threats. Then without warning, a small, slow flying aircraft circles their position. The MIO vessels again direct their compliance, this time with a warning that their vessel will be rendered inoperable if they continue. Moments later, the aircraft (an Unmanned Aerial Vehicle (UAV) launched from one of the MIO vessels) triggers an Electro-Magnetic Pulse (EMP) directed at the target vessel. Moments later the target vessel's engine sputters and stops. As the target vessel slows, the on-scene MIO Commander is faced with a number of possible scenarios.

Having been forced to stop, the crew may concede the situation and offer no resistance to the boarding. If continued resistance is evidenced or anticipated, additional non-lethal measures may be employed. Incapacitative measures ranging from calmative agents (similar to tear gas) to pulsing lights, microwaves or acoustic energy could be used to subdue the crew prior to boarding.

A second option would resemble a tradition "takedown" modified by the use of lethal and non-lethal weapons in concert. As the take down progresses, resistance could be countered with a variety of NLW, including 12 gauge bean bags, rubber bullets or batons, electrical stunners or sticky foam.

At every step throughout this evolution the MIO forces must carefully evaluate the situation, retaining the ability and obligation to use lethal force in self-defense. The boarding party would have lethal force as cover while attempting to conduct their mission with non-lethal means. During the Gulf War, SH-60B helicopters were used as gunships to provide this lethal cover. This show of potential lethal force, whether by the boarding party or by the cover team, should be clearly evident, to capitalize on its deterrence effects and dissuade possible escalation.

This example presents a number of possible non-lethal applications in a MIO scenario. Some of these capabilities exist today, and still others may be fielded in the near future. It is important to stress the increased flexibility and diverse options available to the operational commander with the inclusion of non-lethal technologies.

Recommendations

"Let us not hear of generals who conquer without bloodshed. If a bloody slaughter is a horrible sight, then that is a ground for paying more respect to War, but not for making the sword we wear blunter and blunter by degrees from feelings of humanity, until some one steps in with one that is sharp and lops off the arm from our body."[25] *Carl Von Clausewitz*

"The development of the full possibilities of new weapons is an important source of forward thinking."[26] To fully realize the force multiplying effects of non-lethal technologies we must capitalize on their inherent advantages and avoid the possible pitfalls they present. A number of challenges must be overcome to ensure the most effective use of this emerging capability. The following areas, when fully explored, will help ensure successful employment, and ultimately provide the foundation for increased operational effectiveness through the use of non-lethal technologies:

- **Doctrine:** Develop joint and combined doctrine stressing the use of non-lethal weapons and techniques in a manner which augments and enhances lethal force.

- **Tactics:** Refine tactics to best employ NLW with emphasis on force protection.

- **Development:** Continue development and refinement of existing technologies, addressing moral and legal issues to ensure their acceptability.

- **ROE:** Develop comprehensive ROE that stress the appropriate application of force throughout the force continuum, while never inhibiting the right of self-defense.

- **Training:** Structure training that emphasizes meaningful scenarios, and address realistic ROE

- **Logistics:** Tailor systems to limit the additional burden placed on the existing force logistics capabilities.

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[25] Carl Von Clausewitz, On War, translated and edited by Michael Howard and Peter Paret, (Princeton, NJ: Princeton UP, 1976), 345.
[26] Sound Military Decision, 91.

Conclusions

"The competent commander
does not wait for history to be made;
he makes it."
Sound Military Decision, NWC, 1942[27]

Non-lethal technologies present a tremendous potential for increasing military effectiveness in Operations Other Than War. As the above example illustrates, numerous non-lethal applications to MIO provide great promise, not only for the future, but for today's forces as well. These applications do not come without risks. Improperly fielded or applied, these non-lethal advances present the risk of jeopardizing military objectives and undermining their growing public support.

Operational Commanders must be forward thinking and exploit every advantage that non-lethal technologies present. While not a universal panacea, NLW will greatly expand the options available to commanders at every level. Forces armed with a combination of lethal and non-lethal weapons are not restricted to death and destruction to obtain military objectives. These forces will no longer face the "black and white" choices of response or no response (lethal force or no force). Non-lethal technologies provide the "color" and complete the "Force Continuum" essential to allow a flexible response to the ever changing challenges facing today's armed forces.

Innovation, sound judgment and moral restraint have ushered in a new era in modern warfare. The United States must continue its efforts in the field of Non-lethal technologies to ensure a leadership role as new capabilities are explored. Only then, can our forces realize the tremendous potential NLW have to offer.

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[27] Sound Military Decision, 91.

As a likely first step in future conflicts, MIO operations are an invaluable measure to bring control and stability to a region. These operations will be judged on their effectiveness, and as such must make use of every possible advantage available to the on-scene commander. Unintended casualties and unnecessary collateral damage will not be tolerated. Non-lethal weapons offer the tools necessary to enhance the effectiveness and increase the impact of future interdiction missions. As a measure between force and no force, NLW are ideally suited to this important mission between war and peace.

Appendix A

Types of Non-lethal Weapons[28]

Type	Description	Operations	Target
Acoustic			
Infrasound beam	Disorientate Disrupt material structures	Vehicle mounted Vehicle mounted	Personnel Structures
Bullet/pulse	Physical force weapon	Vehicle mounted	Personnel
Biological			
Biodeterioration	Degrade materials	Direct/vehicle mounted	Equipment
Chemical			
Fuel/combustion modifiers	Degrade fuel in acft/tanks	Direct employment by military personnel	Equipment
Supercorrosives/ Supercaustics	Degrade materials	Direct/air-launched	Equipment
Embirttling	Degrade /crack materials	Direct/mortar/artillery	Equipment
Superadhesives	Produces Rapid adhering of materials	Artillery/vehicle/aircraft	Equipment
Superlubricant	Produces loss of traction	All	Roads/ airfields
Foams	Sticky and/or dense	Vehicle/direct by personnel	Personnel
Calmatives/ incapacitants	Affect human behavior	Direct/vehicle mounted	Personnel
Lasers			
High-energy	Destroy optical sensors	Vehicle/aircraft mounted	Equipment

[28] Nick Lewer and Steven Schofield, Non-Lethal Weapons: A Fatal Attraction?, (Atlantic Highlands, NJ: Zed Books Ltd., 1997), 8-9. As modified by Michael W. Douglass, "Rules of Engagement for Non-lethal Weapons", Unpublished Research Paper, U.S. Naval War college, Newport, RI: 1998, 17-18.

Low-energy	Flash-blind people and disable optical sensors	Hand-held/vehicle/aircraft	Personnel & equipment
Pulsed-chemical	Produce high-pressure shock wave	Vehicle/aircraft mounted	Equipment/ structures
Microwave			
Repeat pulse	Disrupt electronic equipment	Vehicle/aircraft	Equipment
Single pulse/ EMP	Short out power generation and electronic equipment	Cruise missiles	Equipment
Optical munitions			
Uni-directional	Flash-blind people	Artillery/air-launched	Personnel
Isotropic	Flash-blind people	Artillery/air-launched	Personnel
Pulsing light	Disorientate people	Vehicle-mounted	Personnel
Others			
Entanglers	Nets, cables, chains etc. to trap vehicles &personnel	Direct/vehicle-mounted	Personnel/ equipment
Conductive ribbons/wires/ particles	Shorts out electrical systems and power generation equipment	Cruise missile/other guided missiles	Equipment
Stun weapons	Variety of hand-held electrical stunners	Direct	Personnel
Bullets	Wooden, rubber, etc.	Direct/vehicle mounted	Personnel
Computer virus	Alter/crash computer systems	Direct/network	Equipment
Disinformation/ deception	Political propaganda	Broadcast/leaflets etc.	Personnel
Obscurants	Obscure sensors & vision (smoke-like substances)	Vehicle/aircraft	Personnel/ equipment
Optical coating	Materials applied to optics and/or windows	Direct/small arms	Equipment

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