CANADIAN FORCES COLLEGE - COLLÈGE DES FORCES CANADIENNES
AMSC 7 - CSEM 7

Non-lethal Weapons – Contributing To Psychological Effects In Operations Other Than War

By/par LCol H. Colin MacKay

Abstract of

Non-lethal Weapons – Contributing To Psychological Effects In Operations Other Than War

Non-lethal weapons provide operational commanders an array of valuable military force capabilities that fill the gap between demonstrating a show of force and the application of deadly force. In the highly politically sensitive context of operations other than war, with military forces operating in such close contact with the non-combatants, they provide the capability to conduct operations with a minimum level of force, controlling the level of violence and preventing unwanted collateral casualties and damage. This provides commanders the opportunity to more precisely shape the psychological effects of military actions by limiting undesired effects on the attitudes, beliefs and perceptions of the belligerents and other observers, whether local noncombatants or global audiences.

The development and use of non-lethal weapons has experienced controversies related to their safety, efficacy and legal standing in relation to international weapons conventions. In order to gain greater acceptance of these weapons and to optimize their effects, these controversies must be addressed. This will require strategic policy decisions regarding the nature of weapons to develop and standardized thorough analysis of the weapons physical and psychological effects to enable the development of sound concepts of operation, training, tactics, techniques and procedures.

Non-lethal Weapons – Contributing To Psychological Effects In Operations Other Than War

Kind-hearted people might of course think there is some ingenious way to disarm or defeat an enemy without too much bloodshed, and might imagine this is the true goal of the art of war. Pleasant as it sounds, it is a fallacy that must be exposed: war is such a dangerous business that the mistakes that come from kindness are the very worst.
Carl Von Clausewitz[1]

Generally, in war, the best policy is to take a state intact; to ruin it is inferior to this. To capture the enemy's army is better than to destroy it; to take intact a battalion, a company or a five-man squad is better than to destroy them. For to win one hundred victories in one hundred battles is not the acme of skill. To subdue the enemy without fighting is the acme of skill.
Sun Tzu[2]

Introduction

In the above quotes Clausewitz and Sun Tzu are certainly advocating two very different approaches to resolving armed conflict. Is Clausewitz correct or can we move toward the more humane approach advocated by Sun Tzu? It is likely that a balance of these approaches will be necessary for success in the future,[3] and non-lethal weapons will have a role to play.

Military forces increasingly face normative and political asymmetries as they engage in more complex contingency operations, primarily in failed or failing state environments. The move toward intrastate interventions has increased the importance of building coalitions in order to gain international legitimacy and support. The operations often occur in urban terrain, bringing military forces into much closer contact with the

[1]Carl Von Clausewitz, *On War*, ed. and trans Michael Howard and Peter Paret (Princeton University Press, 1984), 75.

[2]Sun Tzu, *The Art of War*, trans. Thomas Cleary (Shambhala Publications, 1988).

civilian population where it is increasingly difficult to distinguish between non-combatants and belligerents or an enemy that is often prepared to use human shields for their protection. These military interventions are also receiving intensive global multimedia news coverage[4] that is contributing to the increasing sensitivity to friendly and collateral casualties and destruction. These factors have led to increasing pressure on militaries to limit collateral casualties and damage, while reaching speedy conflict resolution in order to limit the effect of these asymmetries. Within the context of these highly visible low intensity operations other than war (OOTW) the capability for full dimensional precision may facilitate the achievement of these goals. In addition to the physical precision of targeting and munitions, military strategists and commanders must consider achieving psychological precision in campaign design, limiting undesired effects on the attitudes, beliefs and perceptions of the belligerents and other observers, whether local noncombatants or global audiences.[5]

Traditionally militaries have been limited to the threat and use of lethal force to exert psychological pressure to change the behavior of adversaries, defeating their will to continue their undesirable behavior.[6] Regrettably this use of lethal force may also result in the unintentional deaths of non-combatants and friendly forces. These deaths will have

---

[3]Russell W. Glenn et al, *Conference Proceedings - Ready For Armageddon – Proceedings of the 2001 RAND Arroyo-Joint ACTD-CETO-USMC Non-lethal and Urban Operations Program Urban Operations Conference*, RAND, 2002, 27.

[4]National Defence University, Strategic Assessment 1996: Elements of U.S. Power, National Defence University Press, 1996. www.ndu.edu/inss/Strategic%20Assessments/sa96/sa96ch12.html; Internet; accessed 6 November.

[5]Steven Metz and Douglas V. Johnson, *Asymmetry and US Military Strategy: Definition, Background, and Strategic Concepts*, US Army War College, Carlisle PA, January 2001, 25-26.

a psychological impact on non-combatants, friendly forces, homeland and international communities, as every gory detail can be delivered into their homes by a seemingly ubiquitous media. Non-lethal weapons technology can provide future militaries a positive asymmetry to achieve greater psychological precision by limiting the extent of death and destruction of their actions, particularly within the highly sensitive context of OOTW.[7] These weapons provide greater flexibility and scale of military force to defeat the will of the enemy, without killing so many of the enemy or noncombatants that the enemy's spine will be stiffened rather than broken or public support destroyed.[8] There are may advocates for non-lethal weapons, some go so far as to see them as the central element in future armed conflict.[9]

Despite the seemingly inherent good and desirability of preserving life, the development and use of non-lethal weapons continues to be very controversial.[10] It is essential to address these controversial issues in order to gain legitimacy of this technology and acceptance by the military. Without legitimacy, adversaries can turn the use of these weapons into a psychological disadvantage for the user. The psychology of conflict is very complex; therefore success in achieving precise psychological effects will

---

[6]Douglas C. Lovelace Jr. and Steven Metz, *Nonlethality and American Land Power: Strategic Context and Operational Concepts*, Final Report, (Strategic Studies Institute, U.S. Army War College, Carlisle Barracks, PA, 15 Jun 1998).

[7]Edward P. O'Connell and John T. Dillaplain, "Nonlethal Concept", Airpower Journal 8, no. 4 (Winter 1994). http://search.epnet.com; Internet accessed; 6 November 2004.

[8]Steven Metz and Douglas V. Johnson, *Asymmetry and US Military Strategy: Definition, Background, and Strategic Concepts*, US Army War College, Carlisle PA, January 2001, 25-26.

[9]John B. Alexander, *Future War: Non-lethal Weapons in Twenty-First Century Warfare* (NewYork: St. Martins Press, 1999).

[10]Nick Lewer, "Non-lethal weapons: operational and policy developments", *THE LANCET Extreme Medicine*, 362 (December 2003), s20-21.

require careful consideration of the strategic development and integration of this technology in military campaign design.

Non-lethal weapons provide a capability that can contribute to the psychological precision of a campaign. The following discussion will provide a brief discussion of non-lethal weapon technologies and consider the current controversies, their historical use and the precision of psychological effects this capability can provide at the operational level of complex contingency OOTW.

Discussion

Non-lethal Weapons

There is debate over the correct terminology to use to describe weapons systems not intended to be lethal when correctly employed. Some believe the term non-lethal is inaccurate because almost any weapon can result in a lethal effect, depending on how it is used. The term less than lethal incorrectly suggests the weapon cannot be used in a lethal manner. Perhaps a more accurate term would be less lethal, to account for the much reduced possibility of lethal effects.[11] The Canadian Forces continue to use the term Non-lethal weapons, defined as follows:

> 'those weapons, munitions and devices that are explicitly designed and primarily employed so as to incapacitate personnel or materiel, while minimizing fatalities, permanent injury to personnel and undesired damage to property and the environment. This definition does not include information operations (e.g.

[11]Col Frederick M. Lorenz, "Less-Lethal Force in Operation UNITED SHIELD", *Marine Corps Gazette*, September 1995, 69-76.

jamming, psychological operations, etc.) or any other military capability not designed specifically for the purpose of minimizing fatalities, permanent injury to personnel, and undesired damage to the environment, even though these capabilities may have non-lethal effects (e.g. smoke and illumination).'[12]

These weapons can be divided into antipersonnel and antimateriel categories. Within each category they have been further subdivided by technology; physical, chemical, directed energy and biological. There are a large number of these weapons either currently available or in development; some examples in each of these technology fields are as follows:[13]

a. Antipersonnel

1. Physical; rubber/plastic and beanbag rounds, foam batons, nets, water cannon, etc.
2. Chemical; CS gas, pepper spray, sticky foams, olfactory agents, calmatives, etc
3. Directed energy; flash-bang grenade, stun gun, eye-safe laser, loud audible, etc
4. Biological; no legal antipersonnel agents

b. Antimateriel

1. Physical; vehicle nets, fiber and wire entanglements, caltrops, etc
2. Chemical; sticky foams, combustion modifiers, metal fibres, friction reducers, filter cloggers, super-corrosives, super adhesives, etc
3. Directed energy; pulsed power, high-power microwave, particle beams, infrasound, ultrasound, etc
4. Biological; biodegrading agents for petroleum products, rubber, explosives, etc

---

[12]Department of National Defence, B-GL-300-001/FP-001, *Firepower* (Ottawa: DND Canada, 1999), Chapter 5.

[13]John B. Alexander, *Future War: Non-lethal Weapons in Twenty-first Century Warfare* (New York: St. Martin's Press, 1999), Appendix B.

The majority of non-lethal weapons used to date have been the less sophisticated physical and chemical antipersonnel weapons used by police and military forces. The research community is continuously adding new technologies, promising second-generation capabilities, such as directed energy, calmative, and acoustic weapons for further development. Regrettably the benefit these current and future technologies afford commanders is frequently speculative in nature and based on limited measured data and analysis,[14] which contributes to the uncertainty and controversy.

Non-lethal weapons are unconventional weapons that fill the gap in military force options between providing a military presence and the application of lethal force. Although their capabilities may prove useful across the spectrum of conflict, they will likely be most useful in low intensity operations other than war (OOTW)[15], where there is generally a reduced level of lethal force involved. They provide capabilities to reduce collateral casualties and damage in operations that must occur in close proximity to noncombatants, enable live capture, deny access, clear buildings and disable or neutralize critical infrastructure and equipment. For deployed humanitarian and peace support operations, they provide an especially useful capability to protect a force or group from a hostile and aggressive mob or crowd and to separate belligerents while controlling and reducing the level of violence.[16]

---

[14] Brian Rappert and Steve Wright, "A Flexible Response? Assessing Non-lethal Weapons," *Technology Analysis & Strategic Management* 12, no. 4 (December 2000). http://search.epnet.com; Internet; accessed 22 September 2004.

[15]Douglas C. Lovelace Jr. and Steven Metz, *Nonlethality and American Land Power: Strategic Context and Operational Concepts*, Final Report, (Strategic Studies Institute, U.S. Army War College, Carlisle Barracks, PA, 15 Jun 1998).

These capabilities provide commanders additional options to meet the principles of the laws of armed conflict and international humanitarian law, military necessity, humanity and chivalry, and the operational principles of distinction, proportionality and reciprocity.[17] This capability to more closely balance military necessity against humanity and proportionality will enable commanders to more readily shape the attitudes, beliefs and perceptions of the parties affected by the conflict.

Limitations of NLW

Non-lethal weapons are not designed nor intended to replace lethal weapons; rather they are intended for use in situations where the use of lethal force would be considered excessive or collateral damage would be unacceptable. When faced with the threat of lethal force, although it may be possible to counter it by other means, it is critical that sufficient lethal force be available to counter it as necessary, particularly to ensure the ability of troops to defend themselves. Enemy forces must not be left with the perception there is a lack of resolve or strength to resort to lethal means that they will be tempted to exploit.

Many of the non-lethal weapons have a limited stand off range that necessitates friendly forces to come into close proximity to the target, reducing defensive response time and increasing their risk from attack. There is also a concern that the use of non-

---

[16]Department of National Defence, B-GL-300-001/FP-001, *Firepower* (Ottawa: DND Canada, 1999), Chapter 5.

[17]Department of National Defence, B-GG-005-027/AF-021, *The Law of Armed Conflict at the Operational and Tactical* (Ottawa: DND Canada, 5 September 2001), Chapter 2.

lethal weapons will add to the increasingly complex decision matrix within which soldiers operate, delaying the use of lethal force when it is required, putting friendly soldiers' lives at stake and potentially jeopardizing mission success.[18] This very situation occurred in Haiti when a Special Forces soldier was killed when pepper spray, rather than lethal force, was unsuccessfully used to respond to a sudden attack.[19] An incident such as this is certainly concerning, however it should be preventable with appropriate training, tactics, techniques and procedures (TTPs).

U.S. police data suggests there is not an increased risk to officers, as there was a reduction in injuries to police officers and suspects and complaints about use of excessive force, after pepper spray was introduced.[20] In another police study the use of non-lethal impact munitions permitted officers to resolve violent situations without resorting to lethal force in ninety percent of the cases. Lethal force was required as a back up, because of the less than one hundred percent success rate, however there were no reported injuries to officers as a result of deploying the non-lethal weapons.[21] In order to resolve this question regarding the risk to friendly forces, there is a need for a thorough assessment of the effectiveness and results of employing non-lethal weapons across a broad spectrum of military operational scenarios.

---

[18]Major Kyle E. Garland, "Nonlethal Weapons: Impact and Utility Concerns for Operational Commanders in Future Conflicts" (Newport: Navy War College Joint Military Operations, February 1998).

[19]Rex D. Sheldon, "Nonlethal Policy, Nonlethal Weapons, and Complex Contingencies" (Newport: Navy War College Joint Military Operations, February 1999).

[20]U.S. National Institute of Justice, Research for Practice Report, *The Effectiveness and Safety of Pepper Spray* (Washington, D.C.: Office of Justice Programs, National Institute of Justice, April 2003). http://www.ojp.usdoj.gov/nij; Internet accessed; 6 November 2004.

Just as with kinetic munitions, non-lethal weapons may suffer from imprecision of delivery. It is very difficult to imagine that many of the antimateriel non-lethal weapons, particularly chemical and biological, will have limited human. Innocent civilians or friendly forces that find themselves below or downwind from the release of some of these so-called 'non-lethal' antimateriel weapons, such as super-corrosives or super adhesives, may suffer significant injury or death.[22] Extreme care must be taken to avoid incidents of this type through weapon design and targeting procedures. Even so, if one considers the recent controversy surrounding depleted uranium, despite how well it is understood both scientifically and medically, it becomes apparent that achieving acceptance of these more complex weapons will present a challenge.

Psychological Effects

The commander's principle means of achieving military objectives is through the demonstration and application of force. Historically, this force has predominately been lethal in nature, producing significant injuries or loss of life along with their inherent psychological effects. Although it is acknowledged that some psychological effects will be seen at the individual and local level, the following discussion will focus on the psychological effects of primary concern to operational level commanders:

---

[21]U.S. National Institute of Justice, Research for Practice Report, *Impact Munitions Use: Types, Targets, Effects* (Washington, D.C.: Office of Justice Programs, National Institute of Justice, October 2004). http://www.ojp.usdoj.gov/nij; Internet accessed; 6 November 2004.

[22]Lt Col Gerald W. Norbut, "Non-lethal Weapons: Force Enabler For The Operational Commander Conducting Peace Operations," (Newport: Navy War College Joint Military Operations, February 2001).

a. Defeating the will of belligerents and combatants;
b. Winning the hearts and minds of noncombatants;
c. Maintaining the confidence and commitment of friendly forces; and
d. Establishing and maintaining international and homeland public support, including coalition support.

Predicting the psychological effects of both lethal and non-lethal weapons is difficult because they are based on the interaction of complex factors such as the value of the cause, societal values, cultural norms, and historical context for each of the affected groups. The literature search conducted in the preparation of this paper identified very limited data to assist commanders with this prediction of psychological effects. There is a need to address this information gap and initiate cross cultural research to support the assessment of the psychological impact operational decisions and the spectrum of military force options will have upon differing cultural groups.[23,24]

A significant factor influencing the psychological effects of using military force must be addressed at the strategic level prior to entering the conflict and re-evaluated throughout the conflict. Jus ad bellum, the determination that the expense in blood and treasure for all parties to a conflict is outweighed by the good that will result from the conflict, provides legitimacy to the use of military force. This legitimacy is critical for the commanders to secure support for military actions[25] and enable the shaping of the desired

---

[23] Douglas C. Jr. and Steven Metz, *Nonlethality and American Land Power: Strategic Context and Operational Concepts*, Final Report, (Strategic Studies Institute, U.S. Army War College, Carlisle Barracks, PA, 15 Jun 1998).

[24]Steven Metz and Douglas V. Johnson, *Asymmetry and US Military Strategy: Definition, Background, and Strategic Concepts*, US Army War College, Carlisle PA, January 2001, 25-26.

[25]Lt Col Gerald W. Norbut, "Non-lethal Weapons: Force Enabler For The Operational Commander Conducting Peace Operations," (Newport: Navy War College Joint Military Operations, February 2001).

psychological effects. Jus in bello, the expected military gain of actions outweighs the expected collateral casualties and damage, must then be the guide for military commanders to maintain this legitimacy.[26] Non-lethal weapons provide facilitate this through increased flexibility in the application of military force, providing greater control over the extent of death and human suffering, sending a message of humanity and establishing a reputation for proportionate use of force.[27]

Defeating the will of belligerents and combatants. Non-lethal weapons can provide greater freedom of action to engage belligerents and combatants, as a result of the reduced risk of collateral casualties and damage, permitting an accelerated tempo that overwhelms the enemy.[28] Incapacitating their personnel and equipment, with limited loss of life, reduces their ability to fight and their desire to resist or avenge the death of their comrades. The demonstration of compassion could also facilitate an enemy's willingness to surrender or accept the terms for termination of a conflict.[29] Within the context of complex OOTW, belligerents often seek to create a situation in which they are viewed as victims,[30] portraying the opposition as excessively aggressive with no regard for its

---

[26]Gary D. Brown, "Proportionality and Just War," *Journal of Military Ethics* 2, Issue 3 (November 2003), p171.

[27]James B. Linder, "A Case For Employing Nonlethal Weapons", *Military Review* 76, no. 5 (Sep/Oct 1996); http://search.epnet.com; Internet; accessed 22 September 2004.

[28]Sid Heal, "Crowds, Mobs and Nonlethal Weapons," *Military Review* 80, no. 2 (March/April 2000). http://search.epnet.com; Internet; accessed 6 November 2004.

[29] John B. Alexander, *Future War: Non-lethal Weapons in Twenty-first Century Warfare* (New York: St. Martin's Press, 1999), 205.

[30]Sid Heal, "Crowds, Mobs and Nonlethal Weapons," *Military Review* 80, no. 2 (March/April 2000). http://search.epnet.com; Internet; accessed 6 November 2004.

victims and inflaming the populace to build their critical support. Non-lethal weapons provide a means to defeat this strategy and break the cycle of increasing violence.[31]

Care must be taken to ensure the use of non-lethal weapons is not perceived as a lack of resolve or weakness that the enemy can take advantage of, or lower the cost of their continued undesirable actions to a level they are prepared to accept. In the case of fundamentalist terrorists seeking martyrdom, there is the risk non-lethal weapons may stimulate them to adopt more aggressive and lethal means in order to force the use of lethal force against them. Any requirement to apply lethal force in support of the operation or back up non-lethal weapons will likely threaten the psychological advantage of using non-lethal weapons.

Winning the hearts and minds of noncombatants. Non-lethal weapons can contribute to winning the hearts and minds of noncombatants by demonstrating compassionate application of military force along with reducing collateral casualties and damage to critical community infrastructure.[32] Due to the difficult and often volatile social conditions resulting from conflicts, crowd control, requiring the use of force, is frequently an important aspect of OOTW.[33] Non-lethal force can be stabilizing and de-escalate these situations, winning the respect of the people. Discretion is still required to ensure this use of force is not perceived as either excessive or indiscriminate. Failure to

---

[31] Janet Morris and Chris Morris, "Nothing is So Strong as Gentleness," *Proceedings of the United States Naval Institute* 130, no. 7 (July 2004); http://search.epnet.com; Internet; accessed 6 November 2004.

[32]Department of National Defence, B-GL-300-001/FP-001, *Firepower* (Ottawa: DND Canada, 1999), Chapter 5.

[33]Lexi R. Alexander and Julia L. Klare, "Nonlethal Weapons: New Tools for Peace," *Issues in Science and Technology* 69 (Winter 1995-96), 67-74.

do so could produce mixed results, perhaps providing successful tactical control of the situation, while precipitating a sense of ill-will or distrust and potentially stimulating further civil unrest. Care must also be taken to protect against accidental collateral casualties through the inappropriate use of non-lethal weapons.

There is a risk the effects and use of non-lethal weapons will not be well understood by local noncombatants and could be perceived as a lack of resolve or an inability to provide the protection they require. Therefore it is important to ensure Information Operations provide the civilian population with an appropriate understanding of the nature and effects of these weapons to dispel fears and mis-perceptions as well as reassure them of the availability and will to use lethal force as necessary.[34] Consideration should also be taken of cultural or societal norms that may make the incapacitating effects of a non-lethal weapon unacceptable within certain cultures or societies.[35]

Maintaining the confidence and commitment of friendly forces. Many of non-lethal weapons are quite novel, compared with conventional weapon systems, so there will be a need for a thorough understanding of their capabilities and effects, with extensive education and training in order to build confidence in their use. Once this is achieved, they can contribute to maintaining the confidence and commitment of friendly forces by providing more freedom of action and a means to effectively respond in situations where

---

[34] James B. Linder, "A Case For Employing Nonlethal Weapons", *Military Review* 76, no. 5 (Sep/Oct 1996); http://search.epnet.com; Internet; accessed 22 September 2004.

[35] LtCol Jonathan T. Pasco, "Operational Planning Considerations For The Deployment of Nonlethal Weapons: A Commanders Guide," (Newport: Navy War College Joint Military Operations, May 1999).

lethal force would be considered excessive,[36] such as quelling unarmed mobs. They permit the application of force at lower thresholds, enabling forces to maintain the initiative while diffusing tensions, thereby reducing the risk to own troops[37] and boosting confidence. Improved relations with local noncombatants and the reduced risk for collateral casualties will also facilitate their commitment to the operation.

There are concerns regarding non-lethal weapons that could threaten the confidence and commitment of friendly forces. They will have to be certain the rules of engagement account for the limitations of non-lethal weapons and provide them the necessary flexibility to achieve mission success, as well as protect themselves[38], their comrades and the community with lethal force as necessary. It is important to guard against any perception of increased risk for friendly casualties as a result of using lethal force. The presence of non-lethal weapons must not be permitted to unnecessarily delay the use of lethal force when it is warranted, exposing friendly forces to excessive risk.[39] A concern has also been raised that prolonged use of non-lethal weapons may cause friendly forces to loose the ability to revert to lethal force, even if their lives are threatened. It is estimated that up to six months may be required to retrain troops to

---

[36] Ethan Mollick, "A Gentler War," *Harvard International Review* 18, no. 4 (Fall 1996); http://search.epnet.com; Internet accessed; 22 September 2004.

[37]LtCol Jonathan T. Pasco, "Operational Planning Considerations For The Deployment of Nonlethal Weapons: A Commanders Guide," (Newport: Navy War College Joint Military Operations, May 1999).

[38]Lt Col Gerald W. Norbut, "Non-lethal Weapons: Force Enabler For The Operational Commander Conducting Peace Operations," (Newport: Navy War College Joint Military Operations, February 2001).

[39] Douglas C. Lovelace Jr. and Steven Metz, *Nonlethality and American Land Power: Strategic Context and Operational Concepts*, Final Report, (Strategic Studies Institute, U.S. Army War College, Carlisle Barracks, PA, 15 Jun 1998).

appropriately apply lethal force.[40] These concerns are speculative in nature and should be proven or refuted, through appropriate testing, and mitigation strategies developed as necessary.

Establishing and maintaining international and homeland public support, including coalition support. It is important to ensure International, coalition and homeland publics continue to consider that military intervention is appropriate and worthwhile in order to maintain their support. Non-lethal weapons can facilitate this by minimizing the human and material costs of conflict.[41] In doing so these groups must be reassured their use will not compromise strategic objectives, the success of the intervention or unnecessarily jeopardize the lives of their military forces.

The concern regarding how the use of non-lethal weapons affects the threat against friendly forces versus the preservation of noncombatant and belligerent lives raises a potential friction with the desired psychological effects. Studies involving American and British university students, using the context of Operation Iraqi Freedom, indicated that when considered alone Iraqi lives were valued and participants wished to avoid certain deaths for Iraqis. However, when compared with a threat to American or allied lives, students chose certain Iraqi deaths over the possibility of American or allied deaths.[42] This nationalist influence suggests that not all lives will be considered equal.

---

[40]Robert J. Bunker and T. Lindsay Moore, "Nonlethal Technology and Forth Epoch War: A New Paradigm of Politico-Military Force," Land Warfare Paper No. 23, Institute of Land Warfare (Arlington, VA: Association of the United States Army February 1996).

[41]Margaret-Anne Coppernoll, "The Nonlethal Weapon Debate," *Naval War College Review* 52, no. 2, (Spring 1999); http://search.epnet.com; Internet; accessed 22 September 2004.

Therefore if the use of non-lethal weapons were considered to save noncombatant lives, but threaten friendly force lives, the commander will be in the difficult position of having to decide between winning the hearts and minds of the locals, perhaps achieving mission success, and losing the confidence of friendly forces and popular support at home and abroad. This again points to the importance of understanding the effects and limitations of non-lethal weapons, as well as ensuring weapon design, training and TTPs protect against an increased threat to friendly forces.

Non-lethal Weapon Controversies

Despite all the potential benefits of non-lethal weapon technology, the development and use of these weapons is not without controversies[43] that may impact the psychological effects they can achieve. In general there is a poor understanding of the effects and operational advantages non-lethal weapons may offer, contributing to these controversies. Efforts to characterize their effects, concept of operations, and operational advantages are necessary to develop acceptance for this new technology.[44]

The name non-lethal creates some expectation the weapons will never produce lethal or significant injuries, which is not realistic, and perhaps masks the fact they can

---

[42]Felicia Pratto et al, "Who's life is it anyway? How group interests and group values shape what violence is considered moral," (paper prepared for the conference on War and Peace: Social Psychological approaches to armed conflicts and humanitarian issues, Geneva, Switzerland, 9-11 September, 2004).

[43]Margaret-Anne Coppernoll, "The Nonlethal Weapon Debate," *Naval War College Review* 52, no. 2, (Spring 1999); http://search.epnet.com; Internet; accessed 22 September 2004.

[44] National Research Council, *An Assessment of Non-lethal Weapons Science and Technology* (Washington DC: National Academy Press, 2003).

have devastating effects.[45] Testing for the acute and chronic human effects from exposure to non-lethal weapons is very difficult to achieve as operationally relevant exposure of humans to these weapons can pose significant ethical issues.[46] Developers therefore have to rely on animal or other forms of simulation data, under laboratory conditions, to assess the weapon effects. This can result in unpredicted results in the operational setting. Unfortunately several of the currently available non-lethal weapons have produced lethal results or caused significant permanent injury, raising doubts regarding the validity of their assessment as non-lethal and the overall value of fielding them.[47]

The rubber bullets used by Israel to respond to riots in October 2000 caused injuries requiring hospital care in 152 people. These injuries ranged from significant bruising to blindness and three deaths. Although the legs are supposed to be the intended target for rubber bullets, only fifteen percent of the injuries were on the legs. Following this incident, Israeli physicians concluded that these munitions should not be considered safe for crowd control.[48] Incidents such as this will diminish user confidence in the weapon, given its inaccuracy and a potential tendency toward an escalation of the violence.

---

[45] Ethan Mollick, "A Gentler War," *Harvard International Review* 18, no. 4 (Fall 1996); http://search.epnet.com; Internet accessed; 22 September 2004.

[46]Dennis B. Hebert, "Non-lethal Weaponry: From Tactical to Strategic Applications," Joint Force Quarterly, no. 21, (Spring 99), http://search.epnet.com; Internet; accessed 22 September 2004.

[47]Brian Rappert and Steve Wright, "A Flexible Response? Assessing Non-lethal Weapons," *Technology Analysis & Strategic Management* 12, no. 4 (December 2000). http://search.epnet.com; Internet; accessed 22 September 2004.

[48]Ahmad Mahajna et al, "Blunt and Penetrating Injuries Caused by Rubber Bullets during the Israeli-Arab Conflict in October, 2000: a Retrospective Study," *The Lancet* 359 (May 25, 2002): 1795-1800.

Russian authorities faced an incredibly difficult situation starting 23 October 2003, when 50 Chechen terrorists seized a music theatre along with 800 people inside. They appeared to be in a no-win situation with a group of terrorists determined and willing to kill everybody, including themselves. A decision was made to use a 'non-lethal' incapacitating agent that regrettably resulted in the death of 117 hostages and the 50 terrorists, while allowing for the rescue of the majority of the hostages. Despite the number of deaths there appeared to be general support in Russia for the action.[49] Although this may have been the best that could be expected given the situation at the time, it certainly highlights the difficulty in using these technologies and the need for thorough testing and appropriate operating procedures.

Commanders require a quantitative definition of the risk for lethality and permanent disability for these weapon systems so they will have an understanding of the impact of their use. Responsible development programs require specifications against which to design and test. The U.S. DoD has established a Human Effects Center of Excellence and a review process to guide weapon development. [50] This is an important demonstration of due diligence for any nation developing or fielding non-lethal weapons to help eliminate or reduce controversies regarding present or future non-lethal weapons and to achieve global acceptance and legitimacy.

In addition to the technical concerns there are also several political and legal concerns that have been raised regarding non-lethal weapons. There is concern the

---

[49]Chemical and Biological Weapons Nonproliferation Program, "The Moscow Theater Hostage Crisis: Incapacitants and Chemical Warfare" (Monterey Institute of International Studies, 4November 2002), cns.miis.edu/pubs/week/02110b.htm; Internet; accessed 5 October 2004.

availability of non-lethal weapons will make it easier to commit military forces to resolve conflicts, removing the pressure to address the root causes of conflict through the use of other sources of national power such as diplomacy and economics. They may allow leadership to substitute technology for decision.[51] Overuse or abuse of these weapons in this manner risks the loss of their psychological value to commanders.

The International Committee of the Red Cross raised concerns related to the Inhumane Weapons Convention (IWC) prohibition of the development and use of blinding laser weapons,[52] as well as initiating the Superfluous Injury or Unnecessary Suffering project,[53] in response to non-lethal weapon developments. The European Parliament's Science and Technology Options Assessment Panel found that the biomedical research necessary to justify the deployment of certain crowd control technologies (all considered as non-lethal weapons) was either absent or incomplete and that the quality control at production level was insufficient to ensure that adverse or even lethal effects were avoided. They recommended the deployment of pepper spray be halted, that energy limits be set on kinetic weapons, and that a moratorium be placed on second generation weapons being developed by the U.S. until an independent testing and licensing control is established.[54]

---

[50]Susan D. Levine and Maj. Noel Montgomery, "Non-lethal Weapon Human Effects – Establishing a Process for DoD Program Managers," *PM* (July-August 2002): 50-54.

[51] Rex D. Sheldon, "Nonlethal Policy, Nonlethal Weapons, and Complex Contingencies" (Newport: Navy War College Joint Military Operations, February 1999).

[52] John B. Alexander, *Future War: Non-lethal Weapons in Twenty-first Century Warfare* (New York: St. Martin's Press, 1999), 193.

[53]Nick Lewer, *The Future of Non-lethal Weapons: Technologies, Operations, Ethics and Law* (Portland: Frank Cass, 2002), 158.

It has been suggested that the U.S. DoD is undertaking non-lethal weapons projects that go beyond the bounds of good sense, are illegal under international law and are dangerous and irresponsible.[55] The 1925 Geneva Protocol, 1993 Chemical Weapons Convention (CWC) and 1972 Biological Weapons Convention (BWC) prohibit or strictly limit the stockpiling and use of chemical and biological substances. Some argue that these treaties were not intended to limit the development of technologies being developed to reduce casualties and that there is a need for some form of change to permit non-lethal weapon development and use.[56, 57, 58] Others argue that re-opening these treaties will threaten their ability to control weapons of mass destruction and have strongly advised on the necessity to reaffirm the U.S. commitment to the BWC and CWC, and that only non-lethal weapon systems that conform with these conventions be pursued.[59] Although CS gas and pepper spray are considered riot control agents (RCA) under the CWC and are prohibited from use against combatants in armed conflict, they may be used in other operations such as peacekeeping, humanitarian or disaster relief, non-combatant evacuation, hostage rescue, and law enforcement.[60]

---

[54]Omega Foundation, "Crowd Control Technologies (An appraisal of technologies for political control)," (European Parliament, Director General for Research, June 2000).

[55]Lev Grossman and Mark Thompson, "Beyond the Rubber Bullet," *Time*; July 29,2002, 46-47.

[56]Colonel Harmon A. Stockwell, "Beyond Sticky Foam: The Operational Employment of Non-lethal Technologies," (Newport: Navy War College Joint Military Operations, May 2001).

[57] John B. Alexander, *Future War: Non-lethal Weapons in Twenty-first Century Warfare* (New York: St. Martin's Press, 1999), 205.

[58] Nick Lewer, *The Future of Non-lethal Weapons: Technologies, Operations, Ethics and Law* (Portland: Frank Cass, 2002), Chap 2.

[59] National Research Council, *An Assessment of Non-lethal Weapons Science and Technology* (Washington DC: National Academy Press, 2003), 32.

Concerns and challenges such as these threaten the credibility and legitimacy of many of the non-lethal weapon technologies. Adversaries can easily use these issues to manipulate the psychological responses to non-lethal weapons use. Accusations of chemical and biological attack could be devastating, particularly if they can link it to some form of illness or death, whether the link is real or not. The fact the alternative would have been the use of lethal force, resulting in certain deaths, may be easily overlooked. It is important that non-lethal weapons development programs consider and address these concerns in order to ensure their full psychological benefits can be realized. Military success could be nullified by political countermeasures if the development and employment of non-lethal weapons does not address the psychological, legal and political dimensions of such operations.[61]

Historical Non-lethal Weapon Use

The search of non-lethal weapon literature for this paper did not identify any references directly assessing their psychological effects in past military conflicts. It appears that little effort has been undertaken to support the psychological understanding of non-lethal weapons,[62] at the individual, group, or operational level. Although they

---

[60] Margaret-Anne Coppernoll, "The Nonlethal Weapon Debate," *Naval War College Review* 52, no. 2, (Spring 1999); http://search.epnet.com; Internet; accessed 22 September 2004.

[61] National Defence University, Strategic Assessment 1996: Elements of U.S. Power, National Defence University Press, 1996. www.ndu.edu/inss/Strategic%20Assessments/sa96/sa96ch12.html; Internet; accessed 6 November.

[62] National Research Council, *An Assessment of Non-lethal Weapons Science and Technology* (Washington DC: National Academy Press, 2003).

have been deployed in several conflicts, positive psychological effects are not readily apparent.

The U.S. deployed CS gas in Vietnam War for numerous uses, including flushing the enemy out of tunnels. [63] Nine million pounds of CS were used to achieve some tactical successes, however it was also discovered to cause deaths through asphyxiation in closed quarters,[64] and was blamed for the deaths of women and children in the tunnels. Although these deaths were unlikely to have significantly influenced the outcome of this war, given all the other factors surrounding this conflict, it could have contributed to the failure in the battle for public support and the hearts and minds of the people.

The British Army deployed water cannon, CS gas and rubber and plastic bullets in Northern Ireland, primarily for policing and riot control activities. The brutal show of force and use of water cannon by the Royal Ulster Constabulary (RUC) on 5 Oct 1968 in Derry, was sufficient to disrupt the existing riot, however, at that point in the struggle it also served to expand the movement for subsequent demonstrations in the weeks that followed. The frequent use of CS gas eventually became ineffective at controlling crowds and required backup with guns as the rioters took up arms. Its indiscriminant use was perceived to be a form of collective punishment that only contributed to the determination of the people and was blamed for several deaths and injuries. The introduction and use of tens of thousands of rubber bullets in 1970 did nothing to settle

---

[63] Department of National Defence, B-GL-300-001/FP-001, *Firepower* (Ottawa: DND Canada, 1999), Chapter 5.

[64]British Society for Social Responsibility in Science, "The New Technology of Repression: Lessons from Ireland,"(Nottingham: The Russell Press Ltd., 1974).

the situation in Northern Ireland.[65] The Irish hated these rounds and referred to them in contemporary folk songs with lines like "Take your rubber bullets and shove them up you're ass".[66] There was an escalation of rioting, with increased violence and bombings becoming an instrument of protest for the IRA. The underlying conflict remained and the cycle of violence escalated to the point that unacceptably high levels force would be required to smash the Catholic working-class movement. By 1996 seventeen people had been killed by rubber or plastic bullets, including seven children, and hundreds more suffered significant injuries including blindness and shattered bones.[67]

It is difficult to predict how the Northern Ireland conflict would have differed had there not been non-lethal weapons to achieve tactically successful crowd control. However, statistical analysis of several variables documented on the Northern Ireland conflict demonstrates a tendency for these counter-insurgency measures of the state security forces to ratchet up the conflict. It was suggested that although less-lethal weapons may initially appear to be an effective means of crowd control, in certain circumstances they may be considered an over corrective measure and lead to an increase in the conflict and further polarization of the parties. Despite the acknowledged tentative nature of the findings and recommendation for further conflict resolution research[68], it

---

[65]Ibid

[66] John B. Alexander, *Future War: Non-lethal Weapons in Twenty-first Century Warfare* (New York: St. Martin's Press, 1999), 89.

[67]Human Rights Watch, "Plastic Bullets: Reviewing the Call For a Ban," www.hrw.org/campaigns/nireland98/bullet.htm; Internet; accessed 2 October 2004.

[68] Steve Wright and Dave Webb, "Multivariate Time Series Approaches to Analysing The Northern Irish Conflict: Lessons For Future Sub-State Conflict Control," The Praxis Center, Leeds Metropolitan University, Leeds UK. http://www.ima.org.uk/conflict/papers/Wright.pdf; Internet; accessed 6 November 2004.

does support a measured approach to the development and use of non-lethal weapons in order to clearly understand their impacts on conflict.

It was finally only through political change, the separation of the IRA from the community and concessions to the Catholics, that a move toward a reduction in the violence of this conflict was possible.[69] This suggests that addressing the root causes of the conflict were necessary to achieve success and warrants caution in drawing general conclusions regarding the psychological effects of non-lethal weapons based on this conflict.

Non-lethal weapons have been used extensively by the Israeli Forces in the conflict with the Palestinians. While achieving tactical effect, there is no readily apparent positive psychological benefit of using these weapons, as the conflict has continued to go unresolved. This finding is also not unexpected given the complex nature of the conflict and the requirement for more than military force to resolve it.

The UN initiated a humanitarian mission in 1992 to assist Somalia that was in the throws of a significant humanitarian crisis with drought, famine, clan warfare and extensive banditry. The mission quickly transitioned to a security operation to protect and support the humanitarian efforts. Youth in Mogadishu soon discovered that U.S. forces would not shoot children, so they were free to swarm convoys, stealing everything they could off the vehicles. With the introduction of pepper spray, word of its effects spread quickly and the mere sight of the aerosol can soon deterred any further approach to

---

[69] British Society for Social Responsibility in Science, "The New Technology of Repression: Lessons from Ireland,"(Nottingham: The Russell Press Ltd., 1974), 38.

convoys.[70] Unfortunately despite the humanitarian and security efforts, including the use non-lethal weapons, the mission continued to deteriorate and the events of 3 October 1993, 'Blackhawk Down', resulted in the US withdrawal from Somalia.

The UN remained in Somalia to continue the mission, however it was faltering and in February 1995 the US Marines were called in to provide cover for a UN withdrawal. A great deal of effort was put into supporting the withdrawal with non-lethal weapons systems. Forces deployed sticky foam and aqueous foam laced with tear gas, stinger grenades that disperse rubber pellets, rubber baton and pellet rounds, beanbag rounds, Mark 141 Flash-bang and caltrops. The systems were to be only used to control unarmed crowds and not as a substitute for deadly force when justified. The Somali clan leaders were made aware of their existence before deployment. In the end, the withdrawal operation went relatively peacefully with only limited use of sticky foam and caltrops. There are differing opinions as to the reason for the success; the deterrent effects of the non-lethal weapons,[71] or perhaps the advance diplomatic and public awareness efforts combined with the careful planning and execution.[72] Despite the limited use of the non-lethal weapons during this operation, Lt. Gen. Zinni came out strongly in favor of them, indicating they provided a significant capability to escalate short of deadly force.[73]

---

[70] James B. Linder, "A Case For Employing Nonlethal Weapons", *Military Review* 76, no. 5 (Sep/Oct 1996); http://search.epnet.com; Internet; accessed 22 September 2004.

[71]Colonel Timothy J. Lamb, "Emerging Nonlethal Weapons Technology and Strategic Policy Implications for 21st Century Warfare," *Military Police* (PB 19-03-1): 6-9.

[72]Col Frederick M. Lorenz, "Less-Lethal Force in Operation UNITED SHIELD," *Marine Corps Gazette* (September 1995): 69-76.

[73]Chris Lawson, *Army Times* 55 (April 25, 1995), Issue 39, 23.

The US used carbon fibre munitions delivered by cruise missiles in the first gulf war to deactivate power plants and switching plants.[74] Although this limited the kinetic energy required to shut down the power, and perhaps reduce collateral damage and casualties, the prolonged shutdown had second and third order consequences from crippled hospitals, water and sewer treatment systems which were devastating.[75] The power stations were later destroyed by kinetic weapons because of difficulties with confirming the battle damage assessment.[76] This demonstrates the necessities for accurate damage assessment of non-lethal weapons and to ensure they are used in a manner that does not produce undesirable results.

U.S. forces came under attack from a hired mob during the Breko riots of August 1997 in Bosnia-Herzegovina. The only riot control agent authorized under the rules of engagement was tear gas grenades that the belligerents were able to throw right back at des thigigsint

In Kosovo, U.S. Task Force Falcon found themselves in a stand-off with acrowd trying to interfere with seizure of a weapons cache and the arrest of the alleged violator. The crowd was pelting them with rocks and sticks, while using women and children as human shields. Non-lethal weapons were successfully used to break the stand-off and were credited with saving hundreds of lives.[78]

These historical examples of non-lethal weapons demonstrate they provide a tactically effective means to apply military force while minimizing casualties and material damage; however, there is a lack of evidence of the desired psychological effects. These psychological effects require more than the availability of technology providing more flexible options of military force. In complex OOTW political leaders and commanders need to consider a balanced approach involving the judicious planning and integration of all sources of national power; diplomatic, development, economic, and military powers. Contemporary debates on conflict theory indicate that long-term resolution of violence, defeating the will of the enemy and winning hearts and minds, will require consideration of the roots causes for the conflict. This must be done along with protecting the integrity and unity of the peoples under threat, while avoiding legitimizing violence.[79] Non-lethal weapons technologies can provide the necessary flexibility in military force to fulfill this responsibility for protection, with a minimum of violence.

---

[78]National Research Council, *An Assessment of Non-lethal Weapons Science and Technology* (Washington DC: National Academy Press, 2003).

[79]Oliver P. Richmond, "Realizing Hegemony? Symbolic Terrorism and the Roots of Conflict," *Studies in Conflict & Terrorism* 26 (2003): 289-309.

Conclusion

Military forces are undertaking transformation in response to changing threats and the shift away from the Cold War framework of state versus state conflict, toward complex contingency OOTW involving failed or failing states. The nature of these operations, combined with intense political and media scrutiny, have brought militaries into much closer contact with the public both at home and abroad. This has increased the importance of conducting operations in a manner that minimizes casualties and collateral damage in order to achieve the psychological effects of defeating the will of the enemy, winning the hearts and minds of the local noncombatants, maintaining the commitment and confidence of friendly forces and building homeland and coalition/ international support for the mission. Non-lethal weapons technology provides an ever-increasing range of antipersonnel and antimateriel incapacitating capabilities that contribute to achieving these desired psychological effects.

There is a requirement to resolve several issues in order to optimize their psychological effects. The controversies regarding how the CWC, BWC, and IWC impact these weapons must be addressed, either by restricting development to uncontested technologies or modernizing the laws, in order to build the necessary International acceptance and legitimacy and remove the opportunity for opponents to conduct Information Operations against them. There is a need to tighten the specifications of each weapon system and thoroughly define their physical and psychological effects and limitations, to permit commanders to predict their risks and benefits using appropriately researched cross cultural data bases and models. It is very

important to resolve the question of whether the use of non-lethal weapons increases the risk of casualties for friendly forces and to develop weapon systems, concepts of operation, training, and TTPs that mitigate againssoperation, trainainainainpurisngasut3.75989 Tm(s)Tj11.92

We are not at the stage of setting our phasers on stun and having all the bad guys freeze in place, but we are certainly moving in that direction.

Bibliography

Alexander, John B., *Future War: Non-lethal Weapons in Twenty-First Century Warfare.* NewYork: St. Martins Press, 1999.

Alexander, Lexi R. and Julia L. Klare, "Nonlethal Weapons: New Tools for Peace," *Issues in Science and Technology* 69 (Winter 1995-96), 67-74.

British Society for Social Responsibility in Science, "The New Technology of Repression: Lessons from Ireland." Nottingham: The Russell Press Ltd., 1974.

Brown, Gary D., "Proportionality and Just War," *Journal of Military Ethics* 2, no. 3 (November 2003).

Bunker, Robert J. and T. Lindsay Moore, "Nonlethal Technology and Forth Epoch War: A New Paradigm of Politico-Military Force," Land Warfare Paper No. 23, Institute of Land Warfare, Arlington, VA: Association of the United States Army February 1996.

Canada. Department of National Defence, B-GL-300-001/FP-001, *Firepower.* Ottawa: DND Canada, 1999.

Canada. Department of National Defence, B-GG-005-02

Human Rights Watch, "Plastic Bullets: Reviewing the Call For a Ban." www.hrw.org/campaigns/nireland98/bullet.htm; Internet; accessed 2 October 2004.

Lamb, Colonel Timothy J., "Emerging Nonlethal Weapons Technology and Strategic Policy Implications for 21st Century Warfare." *Military Police* (PB 19-03-1)6-9.

Lawson, Chris, *Army Times* 55 (April 25, 1995), no. 39, 23.

Levine, Susan D. and Maj. Noel Montgomery, "Non-lethal Weapon Human Effects – Establishing a Process for DoD Program Managers." *PM* (July-August 2002).

Lewer, Nick, "Non-lethal weapons: operational and policy developments", *THE LANCET Extreme Medicine*, 362 (December 2003): s20-21.

Lewer, Nick, *The Future of Non-lethal Weapons: Technologies, Operations, Ethics and Law*. Portland: Frank Cass, 2002.

Linder, James B. "A Case For Employing Nonlethal Weapons," Military Review 76, no. 5 (Sep/Oct 1996); http://search.epnet.com; Internet; accessed 22 September 2004.

Lorenz, Col Frederick M., "Less-Lethal Force in Operation UNITED SHIELD", *Marine Corps Gazette*, September 1995.

Lovelace, Douglas C. Jr. and Steven Metz, *Nonlethality and American Land Power: Strategic Context and Operational Concepts, Final Report*, Strategic Studies Institute, U.S. Army War College, Carlisle Barracks, PA, 1998. Repok, Carlisle.02 151.63229 434.81992 Tmh7n

Omega Foundation, "Crowd Control Technologies (An appraisal of technologies for political control)." European Parliament, Director General for Research, June 2000.

Pasco, LtCol Jonathan T., "Operational Planning Considerations For The Deployment of Nonlethal Weapons: A Commanders Guide." Newport: Navy War College Joint Military Operations, May 1999.

Pratto, Felicia et al, "Who's life is it anyway? How group interests and group values shape what violence is considered moral." Paper prepared for the conference on War and Peace: Social Psychological Approaches to Armed Conflicts and Humanitarian Issues, Geneva, Switzerland, 9-11 September, 2004.

Rappert, Brian and Steve Wright, "A Flexible Response? Assessing Non-lethal Weapons", *Technology Analysis & Strategic Management* 12, no. 4 (December 2000). http://search.epnet.com; Internet; accessed 22 September 2004.

Richmond, Oliver P., "Realizing Hegemony? Symbolic Terrorism and the Roots of Conflict." *Studies in Conflict & Terrorism* 26 (2003): 289-309.

Sheldon, Rex D., "Nonlethal Policy, Nonlethal Weapons, and Complex Contingencies." Newport: Navy War College Joint Military Operations, February 1999.

Stockwell, Colonel Harmon A., "Beyond Sticky Foam: The Operational Employment of Non-lethal Technologies." Newport: Navy War College Joint Military Operations, May 2001.

Tzu, Sun, *The Art of War*, trans. Thomas Cleary, Shambhala Publications, 1988.

U.S. National Institute of Justice, Research for Practice Report, *Impact Munitions Use: Types, Targets, Effects*. Washington, D.C.: Office of Justice Programs, National Institute of Justice, October 2004. http://www.ojp.usdoj.gov/nij; Internet accessed; 6 November 2004.

U.S. National Institute of Justice, Research for Practice Report, *The Effectiveness and Safety of Pepper Spray*. Washington, D.C.: Office of Justice Programs, National Institute of Justice, April 2003. http://www.ojp.usdoj.gov/nij; Internet accessed; 6 November 2004.

Wright, Steve and Dave Webb, "Multivariate Time Series Approaches to Analysing The Northern Irish Conflict: Lessons For Future Sub-State Conflict Control." The Praxis Center, Leeds Metropolitan University, Leeds UK. http://www.ima.org.uk/conflict/papers/Wright.pdf; Internet; accessed 6 November 2004.