

Chapter 6 – HUMAN EFFECTS ISSUES AFFECTING NLW DEVELOPMENT, TESTING AND ACCEPTANCE

6.1 INTRODUCTION

Armed Forces must have the doctrine, ethos, organisation, and weapons to defeat their opponents and achieve mission success. Throughout the Cold War, the armed forces of the West prepared for conventional, inter-state war. Within the past decade, the use of military force has not been principally state against state, but more typically exercised in regional engagements in peace keeping, peace enforcement, and humanitarian aid. Military sources refer to such scenarios as OOTW, Operations Other Than War.

Such scenarios are fraught with novel complications compared to conventional warfare. Troops deployed on peace keeping, policing, or humanitarian operations equipped with firearms are confronted and outnumbered by unarmed civilians including the elderly, infirm, women, and children. An excessive response can worsen the operational situation and can frequently include the “CNN factor”, i.e., selective news reports reaching the home audience in real time. A nil response or back-down by the troops undermines their peace keeping credibility with the consequence of no improvement in the overall situation. In the worse case, back-down may encourage the indigenous population to further action. In addition, a military commander may be faced with the moral dilemma of having to destroy a target with the risk of killing non-combatants or of trying to deter with a show of force, potentially placing his own troops in what some might consider to be unnecessary danger.

In these circumstances, commanders have found military worth in having both lethal and non-lethal options. Non-lethal capabilities expand the number of options available to commanders confronting situations in which the use of deadly force is not preferred. Additionally, non-lethal capabilities increase the engagement space and time, thus allowing a commander to reflect and act, as opposed to having to react.

Weapons useable in such scenarios are visualised as being non-lethal with a high effectiveness in role and employed as politically appropriate to the situation. The human effects of NLT development deployment, factors that can affect injury and death rates, as well as mission success, are examined in this section.

6.2 MILITARY NEEDS

The decision to use a lethal or non-lethal capability will depend on the effect to be achieved and the tactical or operational objective. Non-lethal capabilities include anti-personnel, anti-material, and anti-capability. Non-lethal capabilities may contribute to the following military need:

- Protection of military personnel, vehicles, depots, and installations to enhance force protection;
- Control of the movement or actions of people;
- Control or neutralisation of vehicles and weapon platforms;
- Protection of key assets, such as infrastructure (transport, power, water);
- Disarming people with low probability of fatal injury and minimal collateral damage;
- Neutralisation of Weapons of Mass Destruction and ballistic missiles without risk of payload release;

- Suppression of enemy weapon systems with minimum collateral damage; and
- Protection of friendly forces, including Non-Governmental Organisations (NGOs).

The military perceive non-lethal weapons as offering additional options in their response to OOTW compared to all out war. A survey undertaken by Deas et al [6.11.1] amongst serving officers of Captain to Colonel rank (75% response rate) with command or staff operational experience found that 92% of respondents advocated the use of NLT. NLT was envisaged as an intermediate stage in escalation, a means of delaying the use of lethal force; in other words NLT is seen as an addition to, not a replacement for conventional weapons. Eighteen scenarios were identified, for which the NLT solution was regarded as exclusively anti-personnel in 10 cases, anti-personnel and anti-equipment in a further 4 cases, and exclusively anti-equipment in the remaining 4. The identification of the intended purpose of the NLT has important implications on the characteristics of NLT, as intrinsic safety against personnel is obviously a very high priority.

The emphasis is very much on very low injury rates although the risk of injury may be allowed to increase as the situation nears use of lethal force, i.e. the least lethal or injurious alternative compatible with keeping order. Such intent is very difficult to weigh qualitatively and ultimately will rest with the commander in the field operating within guidelines and appropriate training.

Ideally, NLT allows the actions of peacekeepers to be graded to the scenario, avoiding excessive and escalating action, i.e. avoiding a disproportionate response. The numbers of casualties and the type of injuries, together with collateral damage, can be minimised to acceptable moral and political levels. Use may reduce the actions of a belligerent local population and consequently lower their morale, which along with prolonging the situation at low casualty levels would increase the opportunity of a political settlement being reached.

However, if belligerents perceive the NLT as an escalation or weakness, the situation will progress toward use of lethal force. The effectiveness and limitations of the particular NLT needs to be fully understood by the commander in the field to avoid indecision and inappropriate use. Appropriate deployment and training in tactics is as important as the actual NLT used.

The intention of the deployment on an NLT should be to reach a political settlement with minimal long-term rancour, both internally and internationally. It is important that the new equilibrium is maintained thus allowing the affected state to function in a peaceful and civilised manner. The alternative is decay into civil strife that is expensive in human and financial terms to all parties. To achieve this outcome the military operations need to be proportionate with maintaining order; excessive and brutal force is hardly likely to be conducive to reach a satisfactory settlement.

6.3 RULES OF ENGAGEMENT

Rules of engagement (ROE) are addressed in Section 5.2 from the point of view of military employment of NLT. By their very nature ROE have the potential to affect casualty rates and severity of injury for both the deployed force and the population. They therefore have direct links to the human consequences of using NLT (see Reference 6.11.2).

An emphasis on minimising casualties is illustrated by UK ROE paraphrased below for operations other than war. For War fighting the Geneva Convention is followed.

For OOTW: – UK Armed Forces will only open fire if their life, those of their comrades or civilians is at imminent risk from death or serious injury from the actions of another person and

that there is no other way to prevent this danger. If opening fire, this must be at minimum force required to contain the situation and the number of rounds must be kept to a minimum to achieve the desired end state. Attacks on buildings or property does not constitute licence to open fire as this is against UK National Law unless the aggressor's attack is likely to cause imminent death or serious injury to those inside or adjacent to the building.

It is important to note that ROE are not intended to put the deployed soldier at a disadvantage in the face of threat of use of lethal force. All US ROE cards state “NOTHING IN THESE RULES LIMITS YOUR RIGHT TO EXERCISE YOUR INHERENT RIGHT OF SELF-DEFENCE.” The right of self-defence contains the caveats of necessity and proportionality. The US regards necessity when a hostile act has been committed or hostile intent is exhibited. UK ROE tend to be more proscriptive and generally allow action in response to the existing threat of force rather than immediately following a hostile act. Proportionality requires that any necessary use of force be reasonable in intensity, duration, and magnitude, based on all facts known to the commander at the time. As noted earlier, ROE also restricts the operational concepts of retaliation and pursuit. In other words, the use of force must be immediate, discriminatory, of short duration, and proportional to the threat.

The US Joint Chiefs of Staff Standing ROE (JCS SROE) directs U.S. forces to exercise force consistent with the U.N. Charter and customary international law. ROE are the means by which national authorities and operational commanders regulate the use of armed force in any given military operation. However, they also serve three more specific purposes.

Politically, ROE prevent military operations from expanding beyond political objectives.

Militarily, ROE represent limitations the on-scene commander may take in achieving mission accomplishment. The conduct of operations in OOTW always involves a balance of threat and counter threat by both sides. In this instance, ROE serve to ensure this balance is not upset, thus resulting in escalation of the crisis.

Legally, ROE represent operational guidance, including that required for self-defence, ensuring a commander's actions stay within the bounds of national and international law.

It should be noted that ROE are approved by legal representatives, e.g. UK Army Legal Department.

Utilising non-lethal capabilities requires a careful balance between using too much force – which may turn lethal – or too little, thus failing to induce the desired target response. The principal criterion for the employment of any non-lethal capability should be an assessment of its effectiveness against a target. Understanding such as a “risk” assessment, non-lethal capabilities clearly fill the gap between the negotiation and the bullet and provide options that allow commanders to choose from a broader range of options.

6.4 LEGAL ISSUES

The constraints of domestic and international law apply to the conduct of operations and to weapons and their use. These include treaty provisions containing prohibitions on specific weapons (such as the Ottawa Treaty and the Chemical Weapons Convention), restrictions on the use of weapons, prohibitions on causing superfluous injury or unnecessary suffering, protection for the environment, and requirements for discrimination (targeting). Additional constraints stem from the principles of proportionality and military necessity. All weapon systems and instructions for use (Guidance for Use & ROE) should undergo a legal

review prior to development and employment. Other elements to be considered include domestic law, national policy, diplomacy, and operational concerns. It is impossible to itemise domestic law for each individual NATO nation in this context in this chapter. In addition, the legal parameters are constantly evolving making it essential to obtain current legal opinion whenever NLT is considered for development or deployment.

The legality of the weapons themselves will be the basis for the legal review. If there is a body of data showing that under specified conditions of use, the non-lethal criteria are met, one can justify that effort has been made to reduce casualties. A “zero probability of producing casualties” cannot be expected. NLT has certain conditions for use where it can be expected that lethality and injury can be confidently expected to be minimal. The military personnel need to be trained in the use of the NLT to achieve this objective. However, it is possible that the military operator could employ the NLT in a manner outside the non-lethal envelope, for example firing baton rounds directly at the head (instead of the body) at close range. The issue, depending on ones perspective, could be considered less an issue of legality than an issue of proper training and proper rules of engagement.

An important part of the legal consideration is that of intent. As such, the tactics, procedures, policy of deployment, and use are an integral part of any discussion of the weapon systems per se. An understanding of what the military commander or force is trying to achieve is linked to the intent and, when used, the proportionality of response becomes an important consideration.

Implicit in all applications of force is the potential for injury, and indeed lethality. The design of the equipment and the way in which it is used can substantially reduce this risk. The extent to which the risk becomes acceptable depends on the situation in which the weapon or system is used. For example, if NLT is being deployed as an alternative to a conventional firearm, de-escalation of force is achieved. Other issues relating to acceptability are discussed elsewhere in this section.

The semantics of terminology applied to non-lethal weapons can carry legal implications and much effort has been devoted by various organisations to define the terminology for a particular context of use. It is important to note that the potential exists for US domestic law being applied to US deployed forces operating in OOTW. At the time of writing, a similar situation exists in the UK where UK law may be used for an incident in Iraq. It is thus worth noting the various descriptors within civilian as well as military spheres. Terminology options have referred to “non-lethal”, “less than lethal”, or “less-lethal”. These first two terms imply that death will not result following the use of these weapons but plainly, this is not always the case in spite of the reassuring connotation. The term “non-lethal weapon” is an oxymoron and although the choice of words to describe alternatives to lethal force may initially appear trite, for law-enforcement officers called to describe their actions in court, a death attributed to a “non-lethal” system would invoke legal challenge and undermine a policy designed to reduce the recourse to lethal force. The issue of what to call these new types of military weapons is moot with respect to NATO, which has selected to call them “non-lethal weapons” (see Section 1.2), however it is still noteworthy that the choice of this terminology is not without implications.

For civilian law-enforcement, the term “less-lethal weapon” (LLW) is normally used to describe such equipment (and other capabilities). The United States National Institute of Justice (NIJ) uses the following definition for this type of equipment: “Devices or agents used to induce compliance with law-enforcement personnel without substantial risk of permanent injury or death to the subject.” This definition addresses weapon systems, but injury and death are human effects.

Using the NIJ definition as a basis, the Association of Chief Police Officers (ACPO) in the UK broadens the description to include tactics and describes less-lethal capabilities thus: “Weapons, devices or tactics designed

and intended to induce compliance without substantial risk of serious or permanent injury or death. The aim will be to control and neutralise a threat without recourse to lethal force. The outcome may occasionally be lethal but this is less likely than the result of the use of firearms.”

The military forces of the North Atlantic Treaty Organisation (NATO) use the descriptor “non-lethal”. This term in the military context does not imply nil casualties or damage, but is a statement of intent to achieve the lowest achievable probability of casualties and physical damage. The term has often been challenged as being inappropriate, but an alternative descriptor that can provide a better interpretation has yet to be widely adopted within international circles. “Non-lethal” merely emphasises one effect amongst a range of effects required for military operations. NATO defines non-lethal weapons (NLW) as: “... weapons which are explicitly designed and developed to incapacitate or repel personnel, with a low probability of fatality or permanent injury, or to disable equipment, with minimal undesired damage or impact on the environment.”

The US Department of Defence has issued a policy for NLW that includes an explicit contrast of NLW to conventional blast, penetration and fragmentation “lethal weapons”, and a recognition that their effects are can be “relatively reversible”: “Weapons that are explicitly designed and primarily employed so as to incapacitate personnel or materiel, whilst minimizing fatalities, permanent injury to personnel and undesired damage to property and the environment”.

In the UK, the development of less-lethal approaches and minimal force options should ensure compliance with European Human Rights Legislation (broadly equivalent to US Civil Rights legislation).

Discrimination of effects is important. Article 2 of the “UN Basic Principles on the use of Force and Firearms by Law-enforcement Officials” states that: “Governments and law-enforcement agencies should develop a range of means as broad as possible and equip law-enforcement officials with various types of weapons and ammunition that would allow for a differentiated use of force and firearms. These should include the development of non-lethal incapacitating weapons...”.

6.5 DESIGN AND DEVELOPMENT OF NLT

Unlike conventional lethal weapons that destroy their targets principally through blast, penetration, and fragmentation, non-lethal weapons employ means other than gross physical destruction to prevent the target from functioning. Non-lethal weapons are intended to have one, or both, of the following characteristics:

- They have relatively reversible effects on personnel or materiel; and
- They affect objects differently within their area of influence.

It is within this context that benefit for the political and military leader is best realised. A combination of lethal and non-lethal capabilities provides the military commander with a broader range of means to accomplish a mission, particularly in the presence of civilian non-combatants and their property. It should be noted that the NATO and US DOD Directive definitions encompass the environmental impact of non-lethal weapons, and the capability to disable equipment. These additional roles reflect the broader requirements of the military use: countermeasures to sophisticated enemy technology or well-armed belligerents, and the ability to apply force over large geographical areas, frequently within other sovereign states. It must also be recognised that military forces may also be required to support or indeed replace law-enforcement officers and therefore require the equipment, tactics, and policy to tackle, for example, public-order disturbances.

In general, non-lethal/less-lethal capabilities must provide an adaptable and reliable means to influence the tactical, operational, and strategic situations and enhance the police or military commander’s ability to

accomplish assigned missions. The underpinning requirement is that commanders need a broad range of options, normally supported by lethal force, to reduce the frequency (compared to conventional weapons) of death and permanent injury to targeted personnel, without exposing their own personnel to unacceptable risks.

6.5.1 Hazard and Risk

Foremost of the general medical and biophysical principles that underlie the use of NLT against personnel, should be the recognition that any application of energy (whether kinetic, electrical, electromagnetic, or chemical) to the human body is potentially harmful. The acceptability of specific injuries may be defined both in terms of clinical criteria (threat to life; long-term complications; disability; poor clinical outcome), and political/operational criteria.

Hazard is the capability of a system to cause harm. Injury potential (“risk”) is related to the nature and severity of injury given an interaction, and the probability of an interaction occurring. The injuries, given an impact or other type of interaction (e.g. electric shock, chemical), depend on the vulnerability of the specific contact area to that form of energy; this vulnerability will be different for the various body regions. There will also be variations in response amongst individuals. For each type of energy application, the vulnerable areas should be identified. The probability of impact on the intended location is a function of accuracy of the technology, and therefore components such as internal (weapon), external (e.g. flight) ballistics and the skills and training of the user have important medical implications – accuracy and consistency are key medical issues.

The design of NLT that is effective whilst maintaining low lethality and minimal risk of medium and long-term injury, inevitably implies the use of medical researchers. This necessity evokes an ethical paradox to the researcher – the design of weaponry on one hand, set against the desire to minimise casualties caused by disorder in the longer term. The ethical conflict may be further exacerbated by the need to study effects in human volunteers: should the risk of NLT be understood through such research as opposed to no such research being undertaken.

6.6 NLT GENERAL CONCEPT

The key to the NLT concept is non-lethality, that is to say, the safety factor in that context of use. Any NLT or concept carries a certain degree of risk in its use, either in the perception by the hostile recipient or its intrinsic safety to humans. The former may be envisaged as escalation by the recipient and this is possibly but not necessarily linked to the intrinsic safety factor. The safety factor may be assessed in a number of ways, with a simple approach being the number of deaths or serious injuries per number of times used. However, this approach to risk depends exclusively on operational experiences with fielded NLWs and does nothing to help access the potential risks of new systems. New approaches for assessing risk using such information as (1) dose response injury data on a number of undesirable endpoints, (2) the probability of the nature of the location and coupling of the energy employed, and (3) recovery assessment of injuries of varying severity and being developed to create a science of non-lethal weapons risk assessment. Some day, non-weapons, used according to specified conditions or ROE, may be assigned a “non-lethal index” similar to the safety index used for therapeutic drugs.

Regardless of the terminology and means and metrics for estimating risk, it is still correct to assume any NLT used for a non-lethal weapon must have a very low risk of causing permanent injury or death.

Factors to consider during the development phase should include:

- **Training.** The overall accuracy of the system is in the hands of an individual; effective training not only to ensure discriminatory and appropriate response but also to reduce the incidence of inadvertent and inappropriate use (see Chapter 5).
- **Quality control of weapons and ammunition.** This factor will affect accuracy, dispersion, and weapon output such as minimum and maximum velocity, contaminants in irritants etc. The fact that defective weapons can cause serious and unplanned injury will be no less true for non-lethal weapons than for traditional weapons.
- **Reports on use (After-Action Reports).** Users must be responsive to medical issues that may arise in operational use. It is essential that those responsible for policy and audit of use, receive feedback – this may enable changes in procedure that minimise unexpected injuries (type and severity) whilst maintaining operational effectiveness (see Chapter 4 and Annex N).
- **Equipment/user support.** Small changes in the design of an existing weapon system or in the guidance for its use may have profound medical consequences. For example, a change in the source of propellant for the cartridge of a kinetic energy system could reduce the consistency of the burn process, and consequently the velocity, accuracy, and consistency of the system. Quality control ensures that systems are safe (to the user) and are suitable for effective deployment also have direct impact on their human effects.

For some forms of energy transfer such as kinetic energy (impact), the biophysical interactions and pathophysiological consequences are relatively well understood and can be predicted with models. For others (such as electrical incapacitation devices), the mechanisms are not well understood and predictive models are currently unavailable.

Absolute prediction of injury is difficult, even when the biophysical principles are understood. Inherent human variability and limitations in the predictive models (which may be based on animal experimentation¹, work on human cadavers², or fundamental studies on the material properties of the body) necessitate caution in extrapolation to absolute injury in living humans. Confidence may be acquired in the veracity of opinion by comparing with similar systems where there is information from operational use, and where the existing system may be used as a benchmark. However, there always remains an element of subjectivity in interpretation.

Experimental or modelling data may allow a comparison of the injury potential of a new NLT system with that on one deployed historically, but laboratory studies cannot model true operational use; it is desirable that retrospective and prospective casualty data be acquired and reviewed to gain further confidence in the laboratory work (see Annex N).

It is also desirable to engage a broader focus beyond biophysical interactions and the direct consequences of energy transfer operationally:

- The outcome of unintended serious injury is also dependent on the timeliness and quality of available medical care; in an operational setting these may not be optimal (see Chapter 4).
- Although it is natural to focus an assessment of the NLT on physical injury – both acute and long-term – the psychological impact of injury or even non-injurious exposure is also important to consider.

¹ Subject to national policy on such research.

² Subject to national policy on such research.

A model is a representation of the necessary (in the opinion of the modeller) characteristics of an object or event in the real world. A model in the context of injury prediction is a tool that describes a biophysical process. The tool can be used to predict how changes in the input to the body or body part (e.g. energy, contact area, etc.) would affect the potentially injurious output (e.g. pressure in the body, damage to a material). A model may be physical or mathematical, or a combination of the two. Any model is only as good as the data and presumed relationships used to develop it. A common error with the use of models is use outside the boundaries of the assumptions and data that supports them (e.g. using a model developed using low-speed impact data to predict effects from high-speed impacts). Treated with skepticism, models are useful for “what-if” studies to determine the consequences of changing input parameters, e.g. contact diameter, or the stiffness of projectiles. However, all models are necessarily incomplete and have limitations; their use to predict specific injuries to personnel requires informed judgement (preferably reinforced by validation from human exposure), not blind faith. Models are not literal mimics of human response.

6.7 CONVENTIONS

Chemicals have a strong historical background as riot control agents (RCA). The change to NLT from RCA is an alteration in scenario and it is essential that guidance be obtained in view of the high profile legal, ethical, and political issues involved.

Most if not all NATO member countries are a State Party to the Chemical Weapons Convention (CWC), the Convention on the Prohibition of the Development Production, Stockpiling and Use of Chemical Weapons and on their Destruction [6.11.3], and also to the Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare (Geneva 1925) [6.11.4], as well as the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction, referred to as the BWC [6.11.5].

What is a Chemical Weapon? The CWC defines chemical weapons (CW) as toxic chemicals and their precursors, except where intended for purposes not prohibited under the convention, as long as the types and quantities of the chemicals are consistent with such purposes.

What is a Toxic Chemical? The CWC defines a toxic chemical as any chemical that through its chemical action on life processes can cause death, temporary incapacitation, or permanent harm to humans or animals. To help implement the convention, chemicals identified for the application of verification procedures are listed in schedules. It is important to note the wording “any chemical which through its chemical action can cause.... temporary incapacitation”. This definition certainly overlaps with any envisaged role of a chemical NLT; indeed, the CWC defines a riot control agent as any chemical not listed in a schedule that can produce sensory irritation rapidly in humans or disabling physical effects that disappear within a short time following termination of exposure.

How Incapacitating and how Temporary the Effect? Although a chemical may have a very low likelihood of loss of life or serious injury, this does not mean it is exempt from the CWC. Chemicals cannot be used as a method of warfare. The CWC does not define warfare but strictly defines legitimate chemical use, including, “Military purposes not connected with the use of chemical weapons and not dependent on the use of the toxic properties of chemicals as a method of warfare, e.g., screening smokes and chemicals used for explosive properties” and “Law enforcement including domestic riot control purposes”.

What is Law Enforcement? Chemicals can be used in law enforcement but not in warfare, but what is the definition of a law enforcement operation; is it one conducted specifically within a nation undertaken by that

nation's police and military forces, e.g., the conflicts in Northern Ireland. Should riot control operations undertaken by an invited foreign power be viewed as law enforcement? Are international peacekeeping operations a law enforcement operation? It is possible that what starts out as a policing action with limited terms of engagement may change into similar to limited warfare, with terms of engagement to match. It is conceivable that riot control agents may be justified as non-lethal weapons in low-key law enforcement operations, but violate the CWC if the operations become more aggressive. The definition of whether law enforcement equates to peacekeeping is a crucial grey area requiring international clarification if chemicals are to be considered as NLT.

Chemical Weapon Convention Limitations: Article X of the convention “Assistance and protection against chemical weapons”, states that each State Party has the right to request and receive assistance and protection against the use or threat of use of chemical weapons”, conditional on:

- Chemical weapons have been used against it;
- Riot control agents have been used against it as a method of warfare; or
- It is threatened by actions or activities of any state that are prohibited by Article 1.

Article 1 “General Obligations” states that each State Party undertakes never under any circumstances to:

- Develop, produce, otherwise acquire or retain chemical weapons, or to transfer, directly or indirectly, chemical weapons to anyone;
- Use chemical weapons;
- Engage in any military preparations to use chemical weapons;
- Assist, encourage or induce in any way, anyone to engage in any activity to a State Party under this convention; and
- Each State Party undertakes not to use riot control agents as a method of warfare.

This set of prohibitions places a number of potential limitations upon chemical NLT. Any use, or threat to use chemical NLT as an antiriot agent, could be challenged as use as a method of warfare. Any NLT chemical, not regarded as an antiriot agent could be viewed as a chemical weapon and therefore a contravention of the Convention. Any chemical NLT programme would require a development programme, which would need to be distinguishable in character from that required for a chemical weapons programme, which is forbidden by the CWC. Attempts to justify chemical NLT development could create opportunities for CW proliferators to justify their actions and make the task of implementing the CWC virtually impossible.

Finally, the employment of chemicals as NLT has to be compatible with use, thus demonstrating intent. For example, whereas CS in hand or baton round sized canisters would be considered legitimate law enforcement equipment, 155mm shells filled with CS would clearly be considered as preparation to use riot control agent in waging war, prohibited under the CWC.

Research & development of novel incapacitants could be open to misinterpretation under the CWC. Non-lethal incapacitating chemicals for riot control are legitimate whereas those for military purposes are not. It is significant that use of chemical incapacitants in hostage rescue situations appears to be acceptable, but only when there is a potential lethal threat to the hostages and the situation is very limited in time, location, and number of people involved.

Super caustics, corrosives, depolymerisers, and embrittlement agents are not prohibited by the CWC; any toxic effect would be a by-product of their intended primary purpose. Any use of these substances directly

against humans or animals is prohibited under the convention. Use of this class of chemicals should be considered within the context of the environment. Broadly speaking persistent widely dispersed, and economically damaging chemicals would fail to comply with various international conventions.

All biological materials are prohibited unless they are for permitted purposes under the BWC. Biodeterioration chemicals would be permissible for break down of hydrocarbons as part of pollution control but would not be permissible as a means of economic warfare.

The human effects issues raised by the use of anaesthetic drugs are considered in Annex M. However, in our opinion, the potential use of chemicals as non-lethal warfare weapons is fraught with legal and political difficulties. The receipt of an accusation of contravention of the Convention would be embarrassing for any Government or organisation: consequently, deployment of such NLT would need to be extremely carefully considered.

6.8 INHUMANE WEAPONS

In 1995, a United Nations review conference was held in Vienna to examine the provisions of the 1980 Weapons Convention. In essence this comprised a review of “inhuman” weapons”. In some respects, all weapons can be regarded as inhuman, hence it is necessary to examine the background to the original request for a review to understand the context and thinking behind the conference and the Weapons Convention.

The 1980 Convention was adopted by the United Nations conference by consensus, with three protocols, Protocol 1, non-detectable fragments, Protocol II mines & booby traps, and Protocol III incendiary weapons. A committee was set up to deal with restrictions on conventional weapons (i.e. not nuclear, chemical, or biological) by the 1974 – 1977 Diplomatic Conference. There is thus a considerable drive toward humanising weaponry [6.11.6].

The International Committee of the Red Cross (ICRC) has held a number of meetings to consider the subject of laser weapons. This culminated in the Vienna session of the Review Conference of the 1980 United Nations Convention on Certain Conventional Weapons in 1995 [6.11.7] Blinding is considered to be a superfluous injury and to cause unnecessary suffering. The IV Protocol was adopted in Vienna and applies to international conflicts, although the intention of future provisions is to extend the Protocol IV to internal conflicts. The Fourth Protocol prohibits the use and transfer of laser weapons specifically designed to cause permanent blindness as one of their functions. Additionally the state must take all feasible precautions to avoid permanent blinding through the legitimate use of lasers for other purposes, including training. ICRC points out that this is the first time that use and transfer of a weapon has been entirely prohibited under international humanitarian law [6.11.8].

An extrapolation that can be made from the prohibitions of the IV Protocol is that reversibility of a serious effect is an essential criterion for any NLT and that accidental serious injury needs to be very unlikely. In the opinion of many workers in the NLT field, even small numbers of injuries or fatalities would be difficult to defend. Dazzle does not appear to fall within the IV Protocol and at the opposite end of the effect spectrum, it should be noted that blinding by lasers used for anti-equipment purposes (e.g. against optical sights) has been stated by some parties as being not applicable.

An important question to answer is – can reasonable estimations of future bans be made in relation to non-lethal weapons? NLTs have already been discussed in ICRC documents as possibly inhumane weapons.

6.9 PUBLIC AND POLITICAL ATTITUDES AND EXPECTATIONS

Current military operations are increasingly complex, characterised by a high degree of unpredictability, and this trend is likely to continue. Military operations other than war (OOTW) will almost certainly continue to be the most frequent. Adversaries will focus on vulnerabilities, such as sensitivity to casualties, legitimacy, reliance on technology, Rules of Engagement, and media impact. Minimising the consequences of such interventions is an important factor in any rapid return to normality, including the maintenance of public support. There is also a growing public expectation, fuelled by the promise of technology, that somehow conflicts involving the West can be resolved successfully and swiftly with few or no casualties and minimal collateral damage. Military operations are under the scrutiny of the world media and mistakes or successes attract immediate attention. As such, today's forces may not yet be fully equipped to meet the demands imposed by peacekeeping, peace enforcement, and humanitarian operations. Non-lethal capabilities – fielded and under development – will help alleviate such operational deficiencies. It should be noted that the NL concept envisages that NLT will always be underpinned by lethal force and should provide the commander in the field with a greater range of options. A scale of lethality is envisaged in which NLT forms the lower part of the scale with lethal force at the top end of the scale.

Acceptability: After ensuring the legality of a weapon's development and use, it is important to address other elements of public awareness and acceptability. Belligerents may exploit perceived inadequacies, whether these are true or not, in the safety of the NLT system. Unacceptable facts or publicity can affect the public, politicians and the military user and quite possibly can affect the success of the mission. It is thus important to have effective testing of the system prior to deployment coupled with appropriate ROE and training. Security considerations may affect the types of information that can be made available for the sake of public information prior to a weapon's deployment. Policies will ultimately have to account for all elements of public awareness and acceptability.

Public Perceptions: Public expectation of the country supplying the military force will differ from that of the public of the country receiving the aid. Recent such deployments, e.g. Kosovo, Somalia, have involved elements of peace keeping, policing, and humanitarian operations. The political decision taken by the country supplying the military force is in response to a desire for an improvement in reduction in violence, implementation of order, and/or implementation of food and medical aid.

The domestic population supplying the troops is not directly affected and has a stand off perspective; the majority of that population is almost certainly prepared to accept a higher number of consequential casualties compared to the population of the affected country. However, if the number of overall casualties increases, the majority of the domestic population supporting the deployment will start to decrease and will eventually reach a point where the domestic population will cease to support the deployment. It should be emphasised that the demographics of this response have not been modelled as far as the author is aware and almost certainly varies with the nationality and the particular scenario. Long-term deployments are common, e.g. Kosovo, and are linked with a perception that the deployed forces are "doing a good job", with low casualties and a noticeable improvement in the situation.

The affected country however may not be so tolerant of any casualties and may regard the helping military force as an additional burden to their plight. It is important that the deployed forces are seen to be improving the situation and the converse does not occur. The deployed forces must not be seen or perceived to change from a neutral stance to one of supporting one faction. Casualties and attitude changes can be manipulated by internal factions to their own ends, which can lead to escalation.

Misuse of NLT could result in bullying or torture, or at least the appearance or claim thereof. NLT, by definition of its reversibility, leaves little or no evidence of use on the victim. It is therefore extremely difficult to refute use of NLT for torture of captives unless sound procedures are in place.

Public and or press may perceive that a particular NLT was inhumane. The only counter to such accusation is to demonstrate the very low likelihood of injury, especially in comparison with alternative courses of action.

Military: It is important to note that the military require public and political support, and that the military expect, eventually, to leave the affected country, preferably in a better state than when they arrived. Lack of any of these expectations can affect morale, not only of the deployed force, but that of the force as a whole, and eventually affect recruitment and retention. A reduction of morale carries the risk of discipline impairment and weapon misuse.

Political: The politician has three pressures, from the domestic population (the points outlined above), the military, and other countries. From the principles above and legal judgements, the UK has developed an auditing framework for evaluating potential less-lethal options. This “acceptability matrix” for the technology has four headings; examples of the issues addressed are given:

- **Strategic** – Does it meet legal requirements? Is deployment nationally being considered? Does it meet the stated Operational Requirements?
- **Ethical** – Has a medical assessment been undertaken? Does it meet health and safety requirements? Are there ethical/cultural issues?
- **Operational** – What are the training requirements? Is a community impact assessment required? What monitoring of the technology will take place?
- **Societal** – What public consultation is appropriate? What is the public liability? What is the justification for adopting the technology?

The use of NLT as an alternative to lethal force does not absolve the authorities from demonstrating accountability, and engendering public and political support for their policies, tactics and technology.

6.10 SUMMARY

There is general acceptance by both military and civilian individuals and bodies that deployment and use of NLT is a positive move to reduce both casualty numbers and severity of injury whilst still maintaining order.

Many factors interlink to provide casualty reduction whilst maintaining or improving NLT effectiveness. These factors are weapon design, manufacturing to quality standard, training and use, and ROE. Any defect in any one of these factors can increase casualty numbers and severity.

Beside NLT effectiveness in role, the ethics, legality and perception of NLT can potentially affect deployment and use. Such issues can rapidly become political, potentially constraining use of an otherwise effective NLT, with an adverse outcome on the particular scenario, in terms of objective and casualties.

6.11 REFERENCES

6.11.1 Deas, A.J., Choo, P.N., Grundy, F.J. and Millen, D.A.J. Non-Lethal technologies. Student Project 1995 RMCS Shrivenham UK.

- 6.11.2 Hall, D.B. Maj. Rules of Engagement and Non Lethal Weapons: A deadly Combination? 1997. <http://www.globalsecurity.org/military/library/report/1997/Hall.htm>
- 6.11.3 Chemical Weapons Convention, Convention on the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction. <http://www.opcw.org/index.html>
- 6.11.4 Protocol for the Convention on the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare (Geneva 1925) <http://www.fas.harvard.edu/~hsp/1925.html>
- 6.11.5 Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction, (London, Moscow & Washington 1972). <http://www.opcw.org/html/db/cwc/more/biotox.html>
- 6.11.6 Review Conference of the 1980 Weapons Convention. N. Khlestov, International Review of the Red Cross. 307: pp. 368-374, 1995.
- 6.11.7 Vienna session of the Review Conference of the 1980 United Nations Convention on Certain Conventional Weapons in 1995 (International Review of the Red Cross no 309, pp. 672-677, 1995). <http://www.icrc.org/Web/eng/siteeng0.nsf/iwpList336/A827D71D8EB6CEEAC1256B6600598FA2>
- 6.11.8 New Protocol on Blinding Laser Weapons, Doswald Beck L. Int Rev Red Cross 312, pp. 272-299. <http://www.icrc.ch/iccrenews/2976.html>

