Académie de droit international humanitaire
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Non-kinetic-energy weapons termed 'non-lethal'

A Preliminary Assessment under International Humanitarian Law and International Human Rights Law

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Contents

1. INTRODUCTION

1.1 Background

For a number of years a great deal of research and development has been taking place in developing new types of weapons, ostensibly in order to reduce mortality figures. These weapons have been marketed as 'non-lethal',[1] 'less lethal',[2] 'sub-lethal', or 'weapons not intended to be lethal', although the use of some of these devices has already resulted in significant numbers of deaths and serious injuries.[3] This paper addresses the use of certain such non-kinetic energy (NKE) weapons, by which is meant those weapons that seek to achieve their purpose *other than* through the threat or application of force to the human body.[4]

Certain of these weapons have been deployed and used in a variety of contexts: during armed conflict (both international and non-international), in peace operations, during policing operations, in prisons[5] and mental institutions, for riot control,[6] and for border control. Some of

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[1] The precise origin of the term 'non-lethal' weapons is somewhat obscure. According to Neil Davison, it was first used in the 1960s to describe a range of weapons systems, particularly riot control agents (RCAs) such as CS gas, although the term was used before for specific weapons, particularly chemical irritant weapons/RCAs. N. Davison, *'Non-Lethal' Weapons* (London: Palgrave Macmillan, 2009), p. 12; and email to the author, 24 August 2010.

[2] Dr Neil Davison cites the United States Department of Justice's claim that:

> Less-lethal weapons have been developed to provide law enforcement, corrections, and military personnel with an alternative to lethal force.

Presentation by Neil Davison to the May 2010 Meeting of Experts.

[3] See, generally, with respect to non-lethal weapons, D. A. Koplow, *Non-Lethal Weapons, The Law and Policy of Revolutionary Technologies for the Military and Law Enforcement* (Cambridge: Cambridge University Press, April 2006); N. Davison, *'Non-Lethal' Weapons* (London: Palgrave Macmillan, 2009); and J. Altmann, 'Non-lethal Weapons Technologies – the Case for Independent Scientific Analysis', *Medicine, Conflict and Survival* 17 (3) (2001), pp. 234–247; and D. P. Fidler, 'Non-lethal' weapons and international law: Three perspectives on the future', *Medicine, Conflict and Survival*, Vol. 17, No. 3 (2001), pp. 194–206.

[4] Such as through firing a bullet or other projectile. The meaning of 'force' is discussed *infra* at 1.2.

[5] For instance, it was reported in October 2010 that a man who was shocked by an electrical weapon (a Taser, see Section 5 below) 13 times by police at a police station in Western Australia in 2008, was shocked by a Taser another 11 times by prison officers a week later. The Western Australia Minister for Corrective Services, Christian Porter, announced that he had launched a review of the use of tasers by prison officers. According to the Minister:

> The rules for the deployment of tasers for corrective services are very different from those of the police and they do allow for compliance in very rare circumstances when a view is taken only as a last resort that only a taser can be used to effectively and safely remove someone from a cell.

'Man tasered 11 times in prison prompts review', *ABC News*, 14 October 2010, www.abc.net.au/news/stories/2010/10/14/3038022.htm?section=justin (visited 14 October 2010). In August 2010, a version of the millimetre wave Active Denial System weapon (see, *infra*, Section 6) was reportedly being installed in a Los Angeles prison to break up fights, as part of a trial by the National Institute of Justice. The weapon was deemed 'too controversial' for US military use in Iraq. See, e.g., 'Inmate-frying microwave pain blaster turret installed in US jail', *The Register*, 24 August 2010, www.theregister.co.uk/2010/08/24/pain_ray_la_county_jail/; and also 'Prison to use "excruciating" laser pain ray to control unruly inmates' *Daily Mail*, 24 August 2010, www.dailymail.co.uk/sciencetech/article-1305473/Prison-use-advanced-laser-pain-ray-control-unruly-inmates.html (both accessed 23 September 2010).

these weapons have been deployed to police or armed forces without adequate analysis of their likely effects; for instance, a 2003 review of studies of the human effects of seven types of weapons termed 'non-lethal' (acoustic weapons, entanglers, flash-bang non-lethal hand-grenades, laser 'dazzlers', malodorants, non-penetrating projectiles, and oleoresin capsicum[7]) concluded that:

> empirically speaking, most of the studies were of a particularly non-scientific nature, including those sources which portray themselves as being objective and controlled. It is often difficult to extrapolate exactly what tests were used to assess the technology, what was measured, and—quantitatively speaking—what effects found.[8]

Certain NKE weapons, notably electro-shock weapons, CS (chlorobenzylidene malononitrile) spray, and pepper spray, are even sold to ordinary citizens in some countries.

Too often assessments of the legality of NKE weapons under international law appear to have been inadequate (or even not conducted at all). This is particularly the case with respect to specific obligations to do so under international humanitarian law, but international human rights law and international criminal justice standards also have important ramifications for these weapons. This paper, which forms part of a broader research project by the Geneva Academy of International Humanitarian Law and Human Rights,[9] offers a preliminary assessment of the legality of their use. It covers the following categories of NKE weapons:

- Chemical and biological weapons,
- Electrical (electro-shock) weapons,
- Directed energy weapons, and
- Acoustic weapons.[10]

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[6] See, further, *infra*, Section 3.3.

[7] Also known as pepper spray. See, *infra*, Section 4.1.

[8] H. Griffioen-Young, 'Effects of Non-Lethal Weapons on Humans', in Proceedings of the 2nd European Symposium on Non-Lethal Weapons, 13–14 May 2003, European Working Group on Non-Lethal Weapons, Germany.

[9] The Geneva Academy of International Humanitarian Law and Human Rights (ADH), which was founded in 2007, replaced the University Centre for International Humanitarian Law created in 2002 by the University of Geneva and the Graduate Institute of International Studies (now the Graduate Institute of International and Development Studies). See www.adh-geneva.ch for further information on the ADH. The ADH would like to thank the Public International Law Section of the Federal Department of Foreign Affairs of Switzerland for its financial contribution to this project.

[10] The assessment does not, therefore, cover kinetic energy projectiles, such as rubber or plastic bullets; so-called 'cyber' attacks designed to target information systems; or barriers and entanglements, such as the Vehicle Lightweight Arresting Device said to have been used by the United States (US) Marines in Haiti, or nets used to capture individuals. See, e.g., N. Lewer and N. Davison, 'Non-lethal technologies—an overview', *Disarmament Forum*, Issue 1, 2005, p. 40. For information on cyber attacks, see, e.g., Computer Science and Telecommunications Board (CSTB), *Technology, Policy, Law, and Ethics Regarding U.S. Acquisition and Use of Cyberattack Capabilities* (US: National Academies Press, 2009). For discussion of the use of 'weaponised software', see M. Clayton, 'Stuxnet malware is "weapon" out to destroy ... Iran's Bushehr nuclear plant?', *Christian Science Monitor*; 21 September 2010, www.csmonitor.com/USA/2010/0921/Stuxnet-malware-is-weapon-out-to-destroy-Iran-s-Bushehr-nuclear-plant; and also R. Dreyfuss, 'Cyberwar Against Iran: Is Obama Already at War with Tehran?', The Nation, 27 September 2010, www.thenation.com/blog/155026/cyberwar-against-iran-obama-already-war-tehran (both visited 17 October 2010).

The paper has been drafted on the basis of discussions at a meeting of experts convened at the Geneva Academy on 17–19 May 2010 (hereinafter, the 'May 2010 Meeting of Experts') and supporting research.[11] It is divided into eight sections, including the present introduction (Section 1).

Section 2 provides an overview of NKE weapons, including an explanation of why the term 'non-kinetic energy' as an overall description of the category of weapon concerned is chosen in preference to others widely used, particularly 'non-lethal' or 'less-lethal'. It also looks at certain key scenarios in which these weapons are likely to be used.

Section 3 summarises relevant international humanitarian and human rights law and international criminal justice standards applicable to the use of NKE weapons.

Section 4 covers the legality of the use of chemical and biological weapons, particularly agents used for law enforcement or riot control, such as chemical 'incapacitants' or tear gas.

Section 5 covers the legality of the use of electrical weapons, particularly electro-shock weapons, such as the TASER Electronic Control Device (ECD).

Section 6 covers the legality of the use of 'directed energy' weapons, such as dazzling laser weapons, and microwave or millimetre wave weapons.

Section 7 covers the legality of the use of acoustic weapons (including whether they are weapons at all), such as the potential for harm from the Long Range Acoustic Device.

Section 8 summarises the conclusions and recommendations of this preliminary assessment.

A selected bibliography is followed by three annexes. Annex 1 lists the participants at the May 2010 meeting of experts. Annex 2 contains relevant text from the *1993 Chemical Weapons Convention*. Annex 3 contains the text of Protocol IV on blinding laser weapons annexed to the *Convention on Certain Conventional Weapons*.[12]

1.2 Definitions of key terms

This subsection seeks to provide definitions of the following key words and terms: 'weapon', 'kinetic energy' (weapon), 'non-kinetic-energy weapon', 'force', 'chemical' (weapon), 'incapacitant', 'biological' (weapon), 'electrical' (weapon), 'directed energy' (weapon), and 'acoustic weapon'. It is not claimed that any of these definitions is either authoritative or definitive, but it is hoped that they will stimulate further discussion of some important concepts.

[11] See Annex 1 for a list of participants, whose input into the project is gratefully acknowledged. Their participation in the meeting does not imply any endorsement of the content and the views expressed in this paper.

[12] The formal title of this treaty is the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects, as amended on 21 December 2001.

1.2.1 Weapon

Despite its frequent use in international treaties, there is no accepted definition of weapon under international law.[13] A weapon is ordinarily defined as 'a thing designed or used for inflicting bodily harm or physical damage' and 'a means of gaining an advantage or defending oneself'.[14] Another definition is 'a tool used to kill or incapacitate a person, or destroy a military target. It may be used to attack and defend, or in some instances just to threaten.'[15] For the purposes of this paper, the following working definition will be used:

> a device constructed to kill or physically harm, disorient, incapacitate, and/or affect the behaviour of a person against his/her will and/or destroy military, security force, or dual-use matériel, and which acts through the threat or application of force, or other means, such as the transmission of electricity, the diffusion of chemical substances or biological agents or sound, or the direction of electromagnetic energy.

1.2.2 Kinetic energy (weapon)

A kinetic-energy weapon is one that threatens or inflicts harm to a person through the application to the human body of the energy that a bullet, fragment, or other projectile possesses due to its mass and motion.[16] Such weapons can penetrate the body with injury to the inner organs, or impact bluntly on it. The term kinetic-energy weapon covers the majority of conventional weapons used today.[17] This category includes certain weapons termed 'non-lethal', the use of which dates back many decades,[18] such as plastic and rubber bullets/baton rounds, and shot-filled beanbags.

1.2.3 Non-kinetic-energy weapon

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[13] Within the context of international humanitarian law, a weapon is defined by one British military lawyer as connoting 'an offensive capability that can be applied to a military object or enemy combatant.' J. McClelland, 'The review of weapons in accordance with Article 36 of Additional Protocol I', *International Review of the Red Cross*, Vol. 85, No 850 (June 2003), p. 404. The US reportedly suggested a definition of 'all arms, munitions, materiel, instruments, mechanisms or devices that have an intended effect of injuring, damaging, destroying or disabling personnel or property.' Result of a US Department of Defense Working Group cited in ICRC, *A Guide to the Legal Review of New Weapons, Means and Methods of Warfare: Measures to Implement Article 36 of Additional Protocol I of 1977* (Geneva: ICRC, 2007), p. 8, fn. 17. The US Department of Defense Dictionary of Military Terms does not contain a definition of 'weapon'.

[14] *Compact Oxford English Dictionary*, www.askoxford.com/results/?view=dev_dict&field-12668446=weapon&branch=13842570&textsearchtype=exact&sortorder=score%2Cname (accessed 17 June 2010).

[15] *WordiQ.com* (online dictionary and thesaurus), www.wordiq.com/definition/Weapon (accessed 17 June 2010).

[16] $KE = mv^2/2$.

[17] Conventional weapons are not formally defined under international law but are generally understood to refer to all weapons other than biological, chemical, or nuclear weapons. See, e.g., *DOD Dictionary of Military and Associated Terms* (as amended through April 2010), p. 106, www.dtic.mil/doctrine/dod_dictionary/data/c/10851.html (accessed 17 June 2010).

[18] Neil Davison notes the origin of these weapons in Hong Kong where cylindrical inch-long bullets made of teak were used by the police in 1958. The bullets, which were 'skip-fired' off the ground into the victim's legs, were known as baton rounds as they were deemed a substitute for wooden batons at longer ranges. N. Davison, *'Non-Lethal' Weapons*, *op. cit.*, p. 20.

Accordingly, a non-kinetic-energy weapon is one that threatens or inflicts harm to a person other than through the application to the human body of the energy that a bullet, fragment, or other projectile possesses due to its mass and motion. This term encompasses devices or agents that act as a weapon the transmission of electricity, the diffusion of chemical substances or biological agents or sound, or the direction of electromagnetic energy.

1.2.4 Force

As discussed below, relevant international criminal justice standards include the 1990 Basic Principles on the Use of Force and Firearms by Law Enforcement Officials (hereinafter, the '1990 Basic Principles on the Use of Force').[19] But many weapons termed 'non-lethal' do not achieve their aims through the physical application of force but through means other than kinetic energy.[20]

1.2.5 Chemical (weapon)

A chemical is ordinarily defined as 'a distinct compound or substance, especially one which has been artificially prepared or purified'.[21] In turn, a chemical weapon is a weapon that uses the toxic properties of chemical substances to affect the brain or nervous system and/or to threaten or inflict bodily harm or physical damage. Chemical weapons are formally defined (and generally prohibited) under the *1993 Chemical Weapons Convention* as:

> (a) Toxic chemicals and their precursors, except where intended for purposes not prohibited under this Convention, as long as the types and quantities are consistent with such purposes;

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[19] 'Basic Principles on the Use of Force and Firearms by Law Enforcement Officials', Adopted by the Eighth United Nations Congress on the Prevention of Crime and the Treatment of Offenders, Havana, Cuba, 27 August to 7 September 1990, www2.ohchr.org/english/law/firearms.htm (accessed 17 June 2010). This reference to the use of force is to be distinguished from the use of force under international law (often referred to as *ius ad bellum*). For a description of *ius ad bellum*, see, e.g., Christine Gray, *International Law and the Use of Force*, Third Edition (Oxford: Oxford University Press, 2008).

[20] According to the Compact Oxford English Dictionary, the term 'force' has many ordinary meanings, specifically:

- physical strength or energy as an attribute of action or movement,
- (physics) an influence tending to change the motion of a body or produce motion or stress in a stationary body,
- coercion backed by the use or threat of violence,
- mental or moral strength or power,
- a person or thing regarded as exerting power or influence, and
- an organized body of military personnel, police, or workers.

www.askoxford.com/concise_oed/force?view=uk (accessed 17 June 2010).
Similarly, the term 'violence' is generally defined as:

> The exercise of physical force so as to inflict injury on, or cause damage to, persons or property; action or conduct characterized by this; treatment or usage tending to cause bodily injury or forcibly interfering with personal freedom.

Oxford English Dictionary, CD-ROM, Second Edition, 2004.

[21] *Compact Oxford English Dictionary*, www.askoxford.com/concise_oed/chemical?view=uk (accessed 17 June 2010).

[21] *WordiQ.com*, www.wordiq.com/definition/Weapon (accessed 17 June 2010).

(b) Munitions and devices, specifically designed to cause death or other harm through the toxic properties of those toxic chemicals specified in subparagraph (a), which would be released as a result of the employment of such munitions and devices;

(c) Any equipment specifically designed for use directly in connection with the employment of munitions and devices specified in subparagraph (b).[22]

In turn, 'toxic chemical' refers to:

> Any chemical which through its chemical action on life processes can cause death, temporary incapacitation or permanent harm to humans or animals. This includes all such chemicals, regardless of their origin or of their method of production, and regardless of whether they are produced in facilities, in munitions or elsewhere.[23]

See further below, Section 4, and also, for the relevant text of the Convention, Annex 2.[24]

1.2.6 Incapacitant

The term 'incapacitant' and the related terms '(to) incapacitate' and 'incapacitating' are widely used in international law, although they have not been formally defined. To incapacitate is ordinarily to 'prevent from functioning in a normal way'.[25] Incapacitants typically act on the central nervous system to sedate or render unconscious, but research has also focused on agents to affect blood pressure. Moreover, incapacitants may also kill. The term 'incapacitating agent' is defined by the US Department of Defense as:

> A chemical agent, which produces temporary disabling conditions which (unlike those caused by riot control agents) can be physical or mental and persist for hours or days after exposure to the agent has ceased.[26]

A suggested working definition is the following:

> A substance whose chemical action on specific biochemical processes and physiological systems, especially those affecting the higher regulatory activity of the central nervous system, produces a disabling condition (e.g. can cause incapacitation or disorientation, incoherence, hallucination,

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[22] Article II, paragraph 1, *1993 Chemical Weapons Convention*.
[23] Article II, paragraph 2, *1993 Chemical Weapons Convention*.
[24] The US Department of Defense defines 'chemical agent' as:

> a chemical substance which is intended for use in military operations to kill, seriously injure, or incapacitate mainly through its physiological effects. The term excludes riot control agents when used for law enforcement purposes, herbicides, smoke, and flames.

DOD Dictionary of Military and Associated Terms (as amended through April 2010), *op. cit.*, p. 70.
[25] *Compact Oxford English Dictionary*, www.askoxford.com/results/?view=dev_dict&field-12668446=incapacitate&branch=13842570&textsearchtype=exact&sortorder=score%2Cname (accessed 17 June 2010).
[26] DOD Dictionary of Military and Associated Terms (as amended through April 2010), op. cit., p. 224.

sedation, loss of consciousness). The effects of incapacitants are reportedly designed to be temporary, lasting from hours to days, but in higher concentrations they can result in death.[27]

1.2.7 Biological (weapon)

The term 'biological' is ordinarily defined, *inter alia*, as 'relating to biology or living organisms' and, in the military context, as referring to 'the use of micro-organisms or toxins of biological origin as weapons of war'.[28] Under the *1972 Biological Weapons Convention*,[29] each State Party:

> undertakes never in any circumstances to develop, produce, stockpile or otherwise acquire or retain:
>
> (1) Microbial or other biological agents, or toxins whatever their origin or method of production, of types and in quantities that have no justification for prophylactic, protective or other peaceful purposes.[30]

The terms (micro)biological agent, biological weapon, and toxin are not defined in the *1972 Biological Weapons Convention.*

1.2.8 Electrical (weapon)

Electricity is 'a form of energy resulting from the existence of charged particles (such as electrons or protons), either statically as an accumulation of charge or dynamically as a current.'[31] An electrical weapon (also called an electro-shock weapon) is described as a weapon that administers an electric shock aimed at disrupting superficial muscle functions and/or inflicting pain. One type is an electro-shock gun popularly known by the leading brand name TASER ECD [Electronic Control device], which fires projectiles that administer the shock through two thin, flexible wires. Electroshock weapons such as stun guns, stun batons, and electro-shock belts administer an electric shock by direct contact. An electric-shock round is a projectile which produces a current on impact.[32]

1.2.9 Directed energy (weapon)

Directed energy weapons are, as the name suggests, those which emit pure energy without a physical projectile, for instance in the form of radiation, in a specific direction to achieve their intended effects. They include laser weapons (which can affect the eyes and/or damage the skin and below through the emission of a beam of electromagnetic radiation)[33] and millimetre wave

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[27] Definition suggested by Michael Crowley, Project Coordinator, Bradford Non-lethal Weapons Research Project, Department of Peace Studies, Bradford University, UK, adapted from Pearson, A., Chevrier, M. and Wheelis, M. (eds.) *Incapacitating Biochemical Weapons*, Lanham: Lexington Books, 2007.

[28] *Compact Oxford English Dictionary*, www.askoxford.com/concise_oed/biological?view=uk (accessed 17 June 2010).

[29] The formal title of this treaty is the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction.

[30] Article I(1), 1972 Biological Weapons Convention.

[31] *Compact Oxford English Dictionary*, www.askoxford.com/concise_oed/electricity?view=uk (accessed 17 June 2010).

[32] See, e.g., 'Electroshock weapon', en.wikipedia.org/wiki/Electroshock_weapon (accessed 17 June 2010).

[33] The word laser is an acronym for Light Amplification by Stimulated Emission of Radiation.

weapons (which can heat the skin through a high-powered beam of electromagnetic radiation in the form of high-frequency microwaves).

1.2.10 Acoustic (weapon)

"Acoustic" means to do with sound, that is small variations of air pressure travelling as waves. Thus, acoustic weapons are those weapons that seek to disturb or impair, temporarily or permanently, the hearing of a person or persons through the emission of high levels of sound.

1.2.11 Law enforcement

Law enforcement is not formally defined under international law although it is widely referred to in important international treaties and criminal justice standards. Under the 1979 Code of Conduct for Law Enforcement Officials:[34]

> a) The term 'law enforcement officials', includes all officers of the law, whether appointed or elected, who exercise police powers, especially the powers of arrest or detention.
>
> (b) In countries where police powers are exercised by military authorities, whether uniformed or not, or by State security forces, the definition of law enforcement officials shall be regarded as including officers of such services.

The term thus carries the notion of certain agents of the State that are authorised to apply force under certain conditions.'[35] In the US, for example, a law enforcement officer is 'a government employee who is responsible for the prevention, investigation, apprehension, or detention of individuals suspected or convicted of offenses against the criminal laws…'[36]

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[34] Adopted by UN General Assembly resolution 34/169 of 17 December 1979.

[35] US Legal Forms Inc., 'Definitions: Law enforcement', definitions.uslegal.com/l/law-enforcement/ (visited 1 July 2010).

[36] US Legal Forms Inc., 'Definitions: Law enforcement officer', definitions.uslegal.com/l/law-enforcement-officer/ (visited 1 July 2010). It was reported in February 2010 that efforts were continuing to standardise at federal level the US definition of law enforcement officer. Representative Bob Filner (D-California) has introduced the Law Enforcement Officers Equity Act in every session of Congress since 2001. That bill would standardise the definition of law enforcement officers as:

> employees who are authorized to carry firearms and whose main duties include the investigation or apprehension of people who are suspected of violating U.S. criminal law, and Internal Revenue Service employees who collect delinquent tax returns and payments.

Alyssa Rosenberg, 'Union calls for expanding definition of law enforcement officers', *Government Executive.com*, 24 February 2010, www.govexec.com/dailyfed/0210/022410ar1.htm (accessed 19 July 2010).

2. OVERVIEW OF NKE WEAPONS

2.1 What are non-kinetic-energy weapons?

The term 'non-kinetic-energy (NKE) weapons' is proposed as an overall category rather than 'non-lethal' or 'less-lethal' to describe the weapons that are the subject of this paper's concern. But just as there is no internationally agreed definition of what constitutes a 'non-lethal' weapon, so *a fortiori* there is no accepted definition of what constitutes an NKE weapon.

The North Atlantic Treaty Organization (NATO), based on a prior United States (US) Department of Defense Directive, defines 'non-lethal weapons' 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.[37]

The definition clearly acknowledges that fatalities or permanent injuries may occur from their use, although the probability sought is 'low'.[38]

Following discussions at the May 2010 Experts Meeting, this paper argues that the term 'non-lethal' is neither accurate nor helpful as an overarching category and should be avoided whenever possible. There are three main reasons for this stance.

First, as is widely acknowledged, all weapons can be used to kill. Thus, as a NATO report acknowledges, 'the term "non-lethal weapon" is an oxymoron'.[39] Similarly, the British military lawyer, William Boothby, describes the term as 'an inappropriate description' since 'with some NLW [non-lethal weapon] technologies, the danger of fatal injury remains.'[40] Furthermore, in a 1986 US Department of Justice conference it was observed that the 'excessive use' of non-lethal weapons:

> may result in no net improvement in rates of fatal injury when compared to lethal weapons practice. If, for example, a less than lethal weapon is one-tenth as lethal as a handgun but is used ten times more frequently, an identical number of subjects will be fatally injured.[41]

Second, certain doctrine underpinning the use of weapons commonly termed 'non-lethal' goes counter to a widely advanced argument for their use, namely to reduce the impact on people

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[37] See *NATO Policy on Non-Lethal Weapons* (Brussels: NATO, 1999), and US Department of Defense Directive 3000.3 of July 1996.
[38] See also, e.g., N. Davison, *'Non-Lethal' Weapons*, *op. cit.*, p. 1.
[39] NATO Research and Technology Organisation, 'The Human Effects of Non-Lethal Technologies', RTO-TR-HFM-073, August 2006, Section 6.4, available at: www.rta.nato.int/Pubs/RDP.asp?RDP=RTO-TR-HFM-073 (accessed 15 January 2010).
[40] W. H. Boothby, *Weapons and the Law of Armed Conflict* (Oxford: Oxford University Press, 2009), pp. 248–249.
[41] S. Sweetman, 'Report on the Attorney General's Conference on Less Than Lethal Weapons' (Washington, DC: National Institute of Justice, 1987), p. 26.

when compared with conventional lethal weapons.[42] Thus, Neil Davison observes that the policies of both the US Department of Defense and NATO note that 'non-lethal' weapons:

> may be used in conjunction with lethal weapon systems to enhance the latter's effectiveness and efficiency in military operations. This shall apply across the range of military operations to include those situations where overwhelming force is used.[43]

As examples, Davison points out that during the Vietnam War the irritant chemical agent CS (also known as 'tear gas') was used 'on a massive scale to enhance the killing power of lethal fire rather than to reduce casualties.'[44] A well-known, more recent case is the 2002 Moscow theatre siege in which Russian Special Forces deployed an unknown chemical, widely believed to be a derivative of fentanyl, a fast-acting opiate.[45] The chemical was used to render the Chechen hostage-takers unconscious prior to storming the theatre and then shooting and killing all of the hostage-takers.[46] At least 120 of the 800 hostages died as a result of exposure to the agent, whose major side effect is respiratory depression.[47]

Seen in this light, as Sjef Orbons has remarked:

> NLWs [non-lethal weapons] would appear to be nothing else than just another means to raise the effectiveness of one's own operations, irrespective of casualty reduction considerations. Hence this widened applicability of NLWs disregards the original benign motive to introduce NLWs, which precisely is to minimize fatalities, permanent injury and undesired damage. The explicitness in the NATO policy of a 'dual use' role of NLW potentially fuels political and public concern about the way NLWs will be used by the military.[48]

In 1998, the US Marine Corps' *Joint Concept for Non-Lethal Weapons* emphasised the need for a non-lethal to lethal 'rheostatic capability', which would give the user the ability to choose how powerful the emission from a weapon will be. The concept note asserted that:

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[42] A NATO report, for example, has stated that:

> Non-Lethal Weapons shall not be required to have zero probability of causing fatalities or permanent injuries. However, while complete avoidance of these effects is not guaranteed or expected, Non-Lethal Weapons should significantly reduce such effects when compared with the employment of conventional lethal weapons under the same circumstances.

'Chapter 1 – Background to NATO Activities on Non-Lethal Weapons (NLW)', in NATO Research and Technology Organisation, 'The Human Effects of Non-Lethal Technologies', *op. cit*, Section 1.1.

[43] NATO, *NATO Policy on Non-Lethal Weapons* (Brussels: NATO, 1999), and US Department of Defense Directive 3000.3 of July 1996.

[44] N. Davison, 'Non-Lethal' Weapons, *op. cit.*, p. 3.

[45] T. Stanley, 'Human Immobilization: Is the Experience in Moscow just the Beginning?', *European Journal of Anaesthesiology*, Vol. 20, No. 6 (2003), pp. 427–428.

[46] See, e.g., R. M. Coupland, 'Incapacitating chemical weapons: a year after the Moscow theatre siege', *The Lancet*, Vol. 362, Issue 9393, 25 October 2003, p. 1346; and D. P. Fidler, 'The meaning of Moscow: "Non-lethal" weapons and international law in the early 21st century,' *International Review of the Red Cross*, Vol. 87, No. 859 (September 2005), pp. 532–534.

[47] N. Lewer and N. Davison, 'Non-lethal technologies—an overview', *Disarmament Forum*, Issue 1, 2005, p. 45.

[48] S. Orbons, 'Do Non-Lethal Capabilities License to "Silence"?', *Journal of Military Ethics*, Vol. 9, No. 1 (2010), p. 81.

> the ideal NLW would be a system with continuously variable intensity and influence, ranging from a warning tap to a stunning blow to a lethal effect.[49]

The third major concern is that not only will weapons termed 'non-lethal' result in fatalities and serious injuries but that they may also, through the choice of the term, lead to a lowering of the threshold for their use on the basis that they are somehow safe. This concern has been seen in practice, particularly with respect to electro-shock weapons. Thus, Amnesty International asserted in 2004 that:

> There is … evidence to suggest that, far from being used to avoid lethal force, many US police agencies are deploying tasers as a routine force option to subdue non-compliant or disturbed individuals who do not pose a serious danger to themselves or others. In some departments, tasers have become the most prevalent force tool. They have been used against unruly schoolchildren; unarmed mentally disturbed or intoxicated individuals; suspects fleeing minor crime scenes and people who argue with police or fail to comply immediately with a command.[50]

This runs counter to international criminal justice standards, according to which the use of non-violent means is to be privileged over the use of force and firearms. For example, the *1979 Code of Conduct for Law Enforcement Officials* recommends that law enforcement officials 'may use force only when strictly necessary and to the extent required for the performance of their duty.'[51] Similarly, according to the *1990 Basic Principles on the Use of Force and Firearms by Law Enforcement Officials* (the '1990 Basic Principles on the Use of Force'):

> 4. Law enforcement officials, in carrying out their duty, shall, as far as possible, apply non-violent means before resorting to the use of force and firearms. They may use force and firearms only if other means remain ineffective or without any promise of achieving the intended result.
>
> 5. Whenever the lawful use of force and firearms is unavoidable, law enforcement officials shall:
>
> (a) Exercise restraint in such use and act in proportion to the seriousness of the offence and the legitimate objective to be achieved;
>
> (b) Minimize damage and injury, and respect and preserve human life;
>
> (c) Ensure that assistance and medical aid are rendered to any injured or affected persons at the earliest possible moment…

The relevant international criminal justice principles and standards are set out in greater detail in Section 3.4 below.

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[49] US Marine Corps, *Joint Concept for Non-Lethal Weapons*, 1998, www.mccdc.usmc.mil/futures/concepts/jnlw.pdf (accessed 20 January 2010).

[50] Amnesty International, United States of America, Excessive and lethal force? Amnesty International's concerns about deaths and ill-treatment involving police use of tasers (London: Amnesty International, November 2004), Report No. AMR 51/139/2004, p. 2.

[51] More generally Article 3, Code of Conduct for Law Enforcement Officials, adopted by UN General Assembly Resolution 34/169 of 17 December 1979.

According to one expert, the future of NKE weapons is likely to be weapons with longer range, a wider area of targeting, prolonged duration, and scaleable effects.[52] All of these issues have implications for the legality and legitimacy of such weapons.

2.2 Operational scenarios

This section addresses briefly four major operational scenarios in which NKE weapons are expected to be used.

2.2.1 Armed conflict

To date, the use of NKE weapons in armed conflict has been relatively limited. This situation may, though, change. In the USA, the Department of Defense's 2005 Strategy for Homeland Defense and Civil Support recommended greater investment in non-lethal weapons capabilities. The Pentagon's 2008 Guidance for the Development of the Force acknowledged their utility for irregular warfare, for combating weapons of mass destruction, and for homeland defense. The US 'acknowledges that non-lethal weapons "will often be the primary weapons" in future irregular warfare contingencies and notes that effective training includes "employing both lethal and non-lethal means."'[53]

US forces also provide training in the use of 'non-lethal' weapons to other armed forces.[54] For example, in February 2010 the Joint Non-Lethal Weapons Program trained Thai soldiers in the use of several 'non-lethal' weapons, including the Taser Electronic Control Device, the compressed air gun, a 12-gauge shot gun with point and area rubber ammunition, and a rubber grenade M-203 round. According to a press report on the training:

> Less than lethal force has become a vital part of combat operations. American Soldiers overseas and Thai soldiers battling insurgency in Southern Thailand are using these tactics to minimize collateral damage and to be able to apprehend suspects quickly.[55]

Finally, it is possible that the use of NKE weapons may significantly increase in the future, including through the use of 'drones' and robots.[56]

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[52] Presentation by Neil Davison to the May 2010 Meeting of Experts. The presentation was made in a personal capacity.

[53] D. J. Trachtenberg and W. E. Malone, 'Non-Lethal Weapons: The Right Tools for the Job', US Joint Non-Lethal Weapons Program, Media Release, Posted 19 February 2009 (Published with permission from Jane's Defence Weekly), www.jnlwp.com/PDF/RightTools.pdf (accessed 12 May 2010).

[54] See, generally, the US Department of Defense Joint Non Lethal Weapons Program website, at www.jnlwp.com/.

[55] Sgt. E. Knight (108th Public Affairs Detachment), 'South Carolina National Guard Teaches Non-Lethal Force Class in Thailand', 25 February 2010, www.dvidshub.net/?script=news/news_show.php&id=45856 (accessed 12 May 2010).

[56] See, e.g., D. Hambling, 'Future police: Meet the UK's armed robot drones' 10 February 2010, www.wired.co.uk/news/archive/2010-02/10/future-police-meet-the-uk's-armed-robot-drones (visited 17 October 2010); and see, generally, the International Committee for Robot Arms Control website (www.icrac.co.cc/index.html); and P. Singer, *Wired For War – The Robotics Revolution and Conflict in the 21st Century*, Penguin, New York, 2009.

2.2.2 Peace operations

Certain NKE weapons are likely to be increasingly used in peace operations in the future, including, for example, at checkpoints or to maintain public order in occupied countries.[57] In 2004, an Independent Task Force on Nonlethal Weapons and Capabilities sponsored by the US Council on Foreign Relations concluded that:

> Wider integration of nonlethal weapons (NLW) into the U.S. Army and Marine Corps could have reduced damage, saved lives, and helped to limit the widespread looting and sabotage that occurred after the cessation of major conflict in Iraq. Incorporating NLW capabilities into the equipment, training, and doctrine of the armed services could substantially improve U.S. effectiveness in conflict, post-conflict, and homeland defense.

The Task Force urged the US Department of Defense to increase spending on such weapons by seven times.[58] A year later, a US academic argued that:

> Peacekeeping requires other specialized equipment, such as nonlethal weapons that allow soldiers to protect themselves without killing anyone. The military has developed a variety of such weapons—ranging from guns that shoot beanbags and rubber bullets to immobilizing foam, megaphones that emit excruciating noise, and lasers that can heat up the body to produce an effect akin to touching a hot stove. But the fielding of such weapons has been slowed by the Pentagon's lack of interest and objections from humanitarian groups who worry that such weapons could cause permanent injuries and violate treaties such as the Chemical Weapons Convention. The perverse result of such criticism is that U.S. troops end up taking lives that might have been spared by such new technologies.[59]

Indeed, there is said to be a growing recognition that NKE weapons provide useful capabilities for dealing with unconventional contingencies.[60] Orbons, for example, notes their potential relevance in confronting the significant threat from suicide attacks in certain operational scenarios:

> In one case, international security forces in Afghanistan have been confronted with situations in which military convoys passing through villages or towns were attacked by vehicle borne suicide Improvised Explosive Device (IED) attacks. … In response to the threat, force protection procedures resulted in various civilian casualties when car drivers or motor bikers did not respond to warning signs and warning shots from the passing military vehicles to respect the minimal safe distance from the convoy. Non-lethality is being considered by operational commanders as a method to be able to stop or neutralize individuals indiscriminately. In an effort to accomplish

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[57] Remarks by a participant at the May 2010 Meeting of Experts.

[58] See, e.g. Council on Foreign Relations 'Lack of Nonlethal Weapons Capabilities Hindering U.S. Efforts in Postwar Iraq; Experts Urge Department of Defense to Increase Spending Seven-Fold', News release, 26 February 2004, www.cfr.org/publication/6794/lack_of_nonlethal_weapons_capabilities_hindering_us_efforts_in_postwar_iraq_experts_urge_department_of_defense_to_increase_spending_sevenfold.html?id=6794 (accessed 29 June 2010).

[59] M. Boot, 'The Struggle to Transform the Military', *Foreign Affairs*, March/April 2005, www.cfr.org/publication/8028/struggle_to_transform_the_military.html (accessed 28 June 2010).

[60] D. J. Trachtenberg and W. E. Malone, 'Non-Lethal Weapons: The Right Tools for the Job', *op. cit*.

> this, a stepwise approach is considered, with increasing levels of non-lethal physical effect when the target would continue to approach the convoy.[61]

2.2.3 Policing and riot control

NKE weapons have been widely used for policing and riot control. In those contexts, the argument often made in favour of the use of NKE weapons is that they serve as an alternative to the use of lethal force. It has been asserted, however, that in practice that their use often acts 'as a supplementary means of violence or an additional tier of force that can be more easily justified.'[62] For example, in the case of the use of CS gas in Northern Ireland in the 1970s, the UK Ministry of Defence has noted that:

> CS gas is rarely of use against gunmen; its application comes … at a lower level of violence, in circumstances in which the use of firearms by the troops would be inappropriate if not unlawful.[63]

In the case of *Stewart v. United Kingdom*, which concerned the death of a 13-year-old boy in 1976 as a result of a rubber bullet, the European Commission of Human Rights stated that because the baton gun is a potentially lethal weapon, its use must be judged against a high standard of care.[64] The Commission took into account the fact that the soldier who fired the shot was 'trained and experienced', that he had 'aimed at the leg of the rioter' near the victim, but that this aim had been 'disturbed at the moment of discharge.'[65]

Orbons has also noted the particular danger of 'non-lethal' weapons for children:

> What is easily overlooked or even ignored by security forces and police is the disproportional vulnerability of children to NLWs. The design parameters of most NLWs are based on what is required to temporarily incapacitate an adult of average size. Using the same weapon indiscriminately against children mixed in crowds has caused fatal injuries or lasting damage to their body. The ADS [Active Denial System, *see below*], as a next generation NLW, may be one of the very few nonlethal system concepts exempted from this concern, as the radiation only interacts with the upper skin, hence it is indifferent for the size of the target individual.[66]

2.2.4 Hostage-taking

A situation where hostages have been taken offers particularly difficult challenges to the authorities. For this reason, the use of certain weapons (e.g. expanding bullets) is not prohibited in a situation other than armed conflict, since it may be absolutely necessary to kill the hostage-taker(s) instantly in order to avoid the hostage(s) being killed and to minimise the risk of ricochet.

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[61] S. Orbons, 'Do Non-Lethal Capabilities License to "Silence"?', *op. cit.*, p. 91.
[62] N. Davison, 'Non-Lethal' Weapons, op. cit., p. 5.
[63] C. Ackroyd *et al.*, *The technology of Political Control*, Second Edition (London: Pluto Press, June 1980), p. 199.
[64] Stewart *v.* United Kingdom, App. No. 10044/82, Decision as to Admissibility, European Commission of Human Rights, 1984; see, e.g. Council of Europe, *Yearbook of the European Convention on Human Rights 1984*, Martinus Nijhoff, 1987.
[65] *ibid.*, §§20–29.
[66] S. Orbons, 'Do Non-Lethal Capabilities License to "Silence"?', *op. cit.*, pp. 94–95.

There may also be calls for the use of incapacitants in certain hostage situations.[67] For example, with specific respect to incapacitants, the Pentagon's Defense Science Board in their 2004 task force report on Future Strategic Strike Forces notes that:

> Calmatives might be considered to deal with otherwise difficult situations in which neutralizing individuals could enable ultimate mission success;
>
> > The principle [*sic*] technical issue is the balance between effectiveness (i.e., the targets are truly 'calmed') and margins of safety (i.e., avoiding overexposure and resulting fatalities of neutral bystanders);
> >
> > The treaty implications are significant.[68]

[67] See further, *supra*, Section 2.1 and *infra*, Section 4.2.3.

[68] US Department of Defense, *Future Strategic Strike Forces*, 2004, pp. 7–12, www.fas.org/irp/agency/dod/dsb/fssf.pdf (accessed 17 January 2010). The question of incapacitants is discussed further below, in particular with respect to the Moscow siege.

3. OVERVIEW OF APPLICABLE INTERNATIONAL LAW

The category of NKE weapons is a hybrid, as it potentially transcends the traditional boundary between so-called 'weapons of mass destruction'[69] (also referred to as non-conventional or ABC—atomic, biological, or chemical—weapons), and 'conventional' weapons (i.e. all other weapons).[70] This has resulted in a complex framework of applicable international law, as summarised in this section.

As a general principle, the development, deployment, and use of all NKE weapons (as with any weapons) should respect applicable international law as well as domestic laws and standards. It is, for example, express NATO policy that:

> The research and development, procurement and employment of Non-Lethal Weapons shall always remain consistent with applicable treaties, conventions and international law, particularly the Law of Armed conflict as well as national law and approved Rules of Engagement.[71]

This section reviews, in turn, the application of international humanitarian law and international human rights law (taking into account international criminal justice standards) to the use of weapons that would *a priori* fall within the NKE category.

3.2 International humanitarian law

International humanitarian law, also known as the international law of armed conflict, is the body of international law applicable to both international armed conflicts[72] and to armed conflicts of a non-international character.[73] Among other things, it regulates the use of weapons by States as

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[69] The US Department of Defense defines weapons of mass destruction as:

> Chemical, biological, radiological, or nuclear weapons capable of a high order of destruction or causing mass casualties and exclude the means of transporting or propelling the weapon where such means is a separable and divisible part from the weapon.

US Department of Defense, *Department of Defense Dictionary of Military and Associated Terms*, Joint Publication 1-02, 12 April 2001 (as amended through April 2010), *op. cit.*, p. 507.

[70] Thus, e.g., the US Department of Defense defines a conventional weapon as one 'which is neither nuclear, biological, nor chemical'. US Department of Defense, *Department of Defense Dictionary of Military and Associated Terms*, *op. cit.*, p. 106.

[71] 'Chapter 1 – Background to NATO Activities on Non-Lethal Weapons (NLW)', in *The Human Effects of Non-Lethal Technologies*, *op. cit.*, §1-2.

[72] An international armed conflict is an armed conflict between two or more States against each other or the military occupation of territory by a State of foreign territory, even if that occupation meets with no armed resistance. See, e.g. Article 2 common to the four *1949 Geneva Conventions*.

[73] Although not formally defined under international humanitarian law, based on jurisprudence within the International Criminal Tribunal for the former Yugoslavia, an armed conflict of a non-international character is a state of protracted armed violence involving one or more States fighting against one or more non-State armed groups. See, e.g., the judgment of the Tribunal in the Tadic case (Prosecutor v. Tadic, Case No. IT-94-1-T). The violence may occur on the territory of a single State or may spread across more than one State. An armed conflict is not a situation of internal disturbances and tensions, such as riots, isolated and sporadic acts of violence and other

well as by armed non-State actors that meet certain criteria (e.g. certain level of internal organisation).[74]

Both customary and treaty law apply to NKE weapons. The following general rules—all with the status of customary law—as well as a number of specific rules are applicable to the use of weapons in any armed conflict, unless otherwise stated.

3.2.1 General rules on the use of weapons in armed conflict

A. It is a general rule that the right of the parties to an armed conflict to choose methods or means of warfare[75] is not unlimited.[76] This is a general restatement of the international legal reality that certain weapons can never be lawfully used, while other weapons can be used subject to the restrictions imposed by applicable international law.

B. The second general rule is that the use of weapons which are by their nature indiscriminate is prohibited.[77] This rule flows from the prohibition on indiscriminate attacks[78]

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acts of a similar nature. See, e.g., Article 1, paragraph 2, *1977 Additional Protocol II* to the four 1949 Geneva Conventions.

[74] See, e.g., A. Clapham, *Human Rights Obligations of Non-State Actors* (Oxford: Oxford University Press, 2006), p. 271; and A. Cassese, *International Law*, Second Edition (Oxford: Oxford University Press, 2005), p. 125; and *cf.* also the judgment of the International Criminal Tribunal for the former Yugoslavia in the case of *Haradinaj et al.*:

> … an armed conflict can exist only between parties that are sufficiently organized to confront each other with military means. State governmental authorities have been presumed to dispose of armed forces that satisfy this criterion. As for armed groups, Trial Chambers have relied on several indicative factors, none of which are, in themselves, essential to establish whether the "organization" criterion is fulfilled. Such indicative factors include the existence of a command structure and disciplinary rules and mechanisms within the group; the existence of a headquarters; the fact that the group controls a certain territory; the ability of the group to gain access to weapons, other military equipment, recruits and military training; its ability to plan, coordinate and carry out military operations, including troop movements and logistics; its ability to define a unified military strategy and use military tactics; and its ability to speak with one voice and negotiate and conclude agreements such as cease-fire or peace accords.

Prosecutor v. Ramush Haradinaj, Idriz Balaj, and Lahi Brahimaj, Trial Judgement, International Tribunal for the Prosecution of Persons Responsible for Serious Violations of International Humanitarian Law Committed in the Territory of the Former Yugoslavia since 1991, Case No. IT-04-84-T, 3 April 2008, §60, available at: www.icty.org/x/cases/haradinaj/tjug/en/080403.pdf (accessed 14 April 2010).

[75] Means of warfare are the weapons and weapons systems themselves, whereas methods of warfare are the way in which the weapons are used (e.g. a bomb is a means of warfare, whereas aerial bombardment of a city is a method of warfare). See, e.g., W. H. Boothby, *Weapons and the Law of Armed Conflict*, *op. cit.*, p. 4.

[76] The rule is set out in Article 35, paragraph 1 of 1977 Additional Protocol I. It also appears in the third preambular paragraph of the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects, adopted in Geneva on 10 October 1980 (hereinafter, the *1980 Convention on Certain Conventional Weapons*); the eleventh preambular paragraph of the Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on their Destruction, adopted in Oslo on 18 September 1997 (hereinafter, the *1997 Anti-Personnel Mine Ban Convention*); and the twentieth preambular paragraph of the Convention on Cluster Munitions, adopted in Dublin on 30 May 2008.

[77] See, e.g., International Court of Justice, *Legality of The Threat or Use of Nuclear Weapons*, Advisory Opinion of 8 July 1996, §78, available at: www.icj-cij.org/docket/files/95/7495.pdf?PHPSESSID=ee0e588e0e6ec50a5097bd98d8d9747d (accessed 14 April 2010); *cf.* also, Article 8, paragraph 2(b)(xx) of the Rome Statute of the International Criminal Court, adopted in Rome on 17

which is underpinned by arguably the most fundamental rule of international humanitarian law, the principle of distinction, whereby military operations shall only be directed against military objectives, and never against civilians, the civilian population, or civilian objects.[79] Thus, for example, 'carpet bombing' or areas that are not exclusively military is prohibited. There is, though, no agreement on which weapons may be outlawed by this rule. One lawyer suggests that an example of such an inherently indiscriminate weapon would be 'a long-range missile with a guidance system so rudimentary or unreliable that its chances of striking a military objective are almost happenstance.'[80] Others have suggested that chemical and especially biological weapons fall within this category. But, as one participant at the May 2010 Meeting of Experts noted, unguided artillery is still regarded as legitimate means of warfare (although the gunner has to aim at a certain target, and include the effects of wind in his/her determination of where to fire).

Where a weapon is not deemed inherently indiscriminate—and therefore its use is not unlawful in all cases—it is still prohibited to use that weapon in an indiscriminate manner.[81] In

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July 1998. The International Committee of the Red Cross (ICRC) similarly considers this to be a rule of customary international law. See Rule 71, in J-M. Henckaerts and L. Doswald-Beck (eds.), *Customary International Humanitarian Law – Volume 1: Rules* (Cambridge: Cambridge University Press, 2005).

[78] Indiscriminate attacks are those:

> (a) which are not directed at a specific military objective;
> (b) which employ a method or means of combat which cannot be directed at a specific military objective; or
> (c) which employ a method or means of combat the effects of which cannot be limited as required by international humanitarian law;

and consequently, in each such case, are of a nature to strike military objectives and civilians or civilian objects without distinction.

[79] See, e.g., Rules 7, 9, 10, 11, and 12, in J-M. Henckaerts and L. Doswald-Beck (eds.), *Customary International Humanitarian Law - Volume 1: Rules*, *op. cit.* So-called 'collateral damage' (i.e. unintended or incidental death or injury to civilians) is not a violation as long as attacks respect the rule on proportionality.

[80] M. N. Schmitt, 'War, Technology, and International Humanitarian Law', Harvard Program on Humanitarian Policy and Conflict Research, Occasional Paper No. 4 (Summer 2005), p. 10. The Nuclear Weapons Advisory Opinion by the ICJ simply declares that 'States must never make civilians the object of attack and must consequently never use weapons that are incapable of distinguishing between civilian and military targets.' Nuclear Weapons Advisory Opinion, 8 July 1996, §78. In the case of nuclear weapons, the ICJ determined that:

> Nor can the Court make a determination on the validity of the view that the recourse to nuclear weapons would be illegal in any circumstance owing to their inherent and total incompatibility with the law applicable in armed conflict. Certainly, as the Court has already indicated, the principles and rules of law applicable in armed conflict – at the heart of which is the overriding consideration of humanity – make the conduct of armed hostilities subject to a number of strict requirements. Thus, methods and means of warfare, which would preclude any distinction between civilian and military targets, or which would result in unnecessary suffering to combatants, are prohibited. In view of the unique characteristics of nuclear weapons, to which the Court has referred above, the use of such weapons in fact seems scarcely reconcilable with respect for such requirements. Nevertheless, the Court considers that it does not have sufficient elements to enable it to conclude with certainty that the use of nuclear weapons would necessarily be at variance with the principles and rules of law applicable in armed conflict in any circumstance.

ibid., §95.

[81] See, e.g., the ICRC's listing of weapons that have been cited in practice as being indiscriminate in certain or all contexts: chemical, biological and nuclear weapons; anti-personnel landmines; mines; poison; explosives discharged from balloons; V-1 and V-2 rockets; cluster bombs; booby-traps; Scud missiles; Katyusha rockets; incendiary

determining whether a weapon is used indiscriminately, military commanders will have to make a judgment of the proportionality of an attack. This means assessing whether an attack 'may be expected to cause incidental loss of civilian life, injury to civilians, damage to civilian objects, or a combination thereof, which would be excessive in relation to the concrete and direct military advantage anticipated.'[82] Different States have understood and applied this principle in markedly different ways.[83]

Highly controversially, certain commentators have suggested that NKE weapons should not be subjected to the same rules of international humanitarian law as other weapons, specifically the rules flowing from the principle of distinction.[84] This position should be rejected. As a NATO paper on such weapons has noted,

> The obligation to discriminate between combatants and civilian persons and objects is a fundamental principle of the law of armed conflict. Weapons with indiscriminate effects are prohibited. Every weapon system must be able to be controlled in such a way as to be directed at a lawful military objective.'[85]

Others have noted that the use of 'non-lethal' weapons is a material factor in determining the proportionality of an attack.[86] In Orbons' view, for instance, the concept of non-lethality 'appears to be implicitly compliant with the imperative of proportionality.'[87]

C. The third general rule is that the use of means and methods of warfare which are of a nature to cause superfluous injury or unnecessary suffering is prohibited.[88] According to this rule, 'it is prohibited to cause unnecessary suffering to combatants: it is accordingly prohibited to use weapons causing them such harm or uselessly aggravating their suffering.'[89] Unnecessary suffering has in turn been defined as 'a harm greater than that unavoidable to achieve legitimate

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weapons; and environmental modification techniques. J.-M. Henckaerts and L. Doswald-Beck (eds.), *Customary International Humanitarian Law – Volume 1: Rules*, *op. cit*, pp. 249–250.

[82] See, e.g., Article 51(5)(b), *1977 Additional Protocol I*, and Rule 14, in J.-M. Henckaerts and L. Doswald-Beck (eds.), *Customary International Humanitarian Law – Volume 1: Rules*, *op. cit*, pp. 46 *et seq*.

[83] Also considered indiscriminate under *1977 Additional Protocol I* are attacks that employ a means or method of combat the effects of which cannot be limited as required by the Protocol (for example, as they are subject to the vagaries of the weather. See Article 51, paragraph 4(c), *1977 Additional Protocol I*.

[84] See, e.g., C. Mayer, 'Non-Lethal Weapons and Non-Combatant Immunity: Is it Permissible to target Noncombatants', *Journal of Military Ethics*, Vol. 6, No. 3 (2007); see also S. Orbons, 'Do Non-Lethal Capabilities License to "Silence"?', *Journal of Military Ethics*, Vol. 9, No. 1 (2010), p. 81.

[85] NATO Research and Technology Organisation, 'Non-Lethal Weapons and Future Peace Enforcement Operations', RTO-TR-SAS-040, December 2004, Annex C, www.rta.nato.int/Pubs/RDP.asp?RDP=RTO-TR-SAS-040 (accessed 11 May 2010).

[86] See, e.g., J. Alexander, 'When Precision is Not Enough', in Proceedings of the 4th European Symposium on Non-Lethal Weapons, 21–23 May 2007, European Working Group on Non-Lethal Weapons, Ettlingen, Germany, cited by S. Orbons, 'Do Non-Lethal Capabilities License to "Silence"?', *op. cit*. See also NATO Research and Technology Organisation, 'Non-Lethal Weapons and Future Peace Enforcement Operations', *op. cit.*, Annex C.

[87] S. Orbons, 'Do Non-Lethal Capabilities License to "Silence"?', *op. cit.*, p. 97.

[88] See, e.g. Rule 70, in *ibid*.; Article 8, paragraph 2(b)(xx) of the Rome Statute of the International Criminal Court; *cf.* also, the third preambular paragraph of the *1980 Convention on Certain Conventional Weapons*, and the eleventh preambular paragraph of the *1997 Anti-Personnel Mine Ban Convention.*

[89] International Court of Justice, *Legality of The Threat or Use of Nuclear Weapons*, Advisory Opinion of 8 July 1996, *op. cit*, §78.

military objectives.'[90] The practical criteria to judge the application of this principle, however, remain controversial.[91] NATO, for example, has observed that unnecessary suffering and superfluous injury 'are undefined in international law. International humanitarian law recognises that suffering will take place on the battlefield.' However, 'disproportionate suffering with regard to the achievement of the military objective is unlawful.' [92]

Examples of weapons whose use in armed conflict is widely believed to have been prohibited on the basis of this principle are: exploding bullets; expanding 'dum-dum' bullets; blinding laser weapons; and the use of poison.[93] NATO further affirms that:

> 'Generally, NLW by definition, should not violate this principle. However, new technologies such as directed energy weapons, laser technologies or electrical devices must be carefully reviewed for their human effects, both in the short term and in the long term. A multidisciplinary approach including legal, military, technical and medical expertise is recommended.'[94]

D. The fourth general rule is that each party to the conflict must take all feasible precautions in the choice of means and methods of warfare with a view to avoiding, and in any event to minimizing, incidental loss of civilian life, injury to civilians, and damage to civilian objects.[95] Proponents of 'non-lethal' weapons might argue that NKE weapons are well placed to respect this principle, which has obvious connection to the principle of proportionality.[96]

E. The fifth general principle is that the use of methods or means of warfare that are intended, or may be expected, to cause widespread, long-term and severe damage to the natural

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[90] *ibid.*, §238.

[91] The ICRC in its SIrUS Project proposed that what constitutes 'superfluous injury or unnecessary suffering' be determined by design dependent, foreseeable effects of weapons when they are used against human beings and cause:

> (1) Specific disease, specific abnormal physiological state, specific abnormal psychological state, specific and permanent disability or specific disfigurement, or
> (2) Field mortality of more than 25% or hospital mortality of more than 5%, or
> (3) Grade 3 wounds as measured by the Red Cross wound classification, or
> (4) Effects for which there is no well recognised and proved treatment.

Dr Robin Coupland of the ICRC pointed out that one or more of these criteria apply to all weapons which have already been prohibited. Blinding as a method of warfare, 'point detonating' antipersonnel mines, and the possible effects of new weapons are examined with these criteria in mind. See R. M Coupland, 'Abhorrent weapons and "superfluous injury or unnecessary suffering": from field surgery to law', British Medical Journal, No. 315 (29 November 1997), pp. 1450–1452, www.bmj.com/cgi/content/full/315/7120/1450 (accessed 12 May 2010). A number of States, however, particularly the USA, were highly critical of this approach. See, e.g., Maj. D. M. Verchio, 'Just Say No! The SIrUS Project: Well-Intentioned, But Unnecessary and Superfluous', *Air Force Law Review*, Vol. 51, No. 183 (2001), in which Verchio argued that the SIrUS Project's 'opposition' to laser weapons uses an 'impracticable, one-dimensional, health-effects-based criteria'.

[92] NATO Research and Technology Organisation, 'Non-Lethal Weapons and Future Peace Enforcement Operations', *op. cit.*, Annex C.

[93] See, e.g., Rule 17, in J.-M. Henckaerts and L. Doswald-Beck (eds.), *Customary International Humanitarian Law - Volume 1: Rules*, *op. cit*., p. 241.

[94] NATO Research and Technology Organisation, 'Non-Lethal Weapons and Future Peace Enforcement Operations', *op. cit.*, Annex C.

[95] See, e.g., Rule 17, in *ibid*.

[96] See, e.g., Dr. F. Krüger-Sprengel, 'Non Lethal Weapons and Disarmament', February 2009, Paper presented at the 5th European Symposium on Non-Lethal Weapons', Ettlingen, 11–13 May 2009.

environment is prohibited. Destruction of the natural environment may not be used as a weapon.[97] NATO has observed that certain 'non-lethal' weapons, 'as well as conventional weapons, may have an impact on environment [*sic*] and will have to be reviewed with reference to the appropriate conventions.'[98]

F. Another important customary rule of international humanitarian law applicable to NKE weapons is the prohibition on attacking persons who are *hors de combat*. A person *hors de combat* includes any fighter who is defenceless because of unconsciousness or wounds (provided he or she abstains from any hostile act and does not attempt to escape).[99] This could apply to persons rendered defenceless and unable to surrender by NKE weapons, a number of which can effectively blind or incapacitate.

Finally, it should be noted that States that are party to *1977 Additional Protocol I* are thereby obliged by a provision entitled 'New weapons' to determine, in the 'study, development, acquisition or adoption of a new weapon, means or method of warfare', whether its use would, 'in some or all circumstances, be prohibited' by the Protocol or by 'any other rule of international law applicable' to that State.[100]

In its guidelines for legal review of non-lethal weapons, NATO has noted that such a review should 'at least' include the following elements for analysis:

- Can the new weapon cause 'unnecessary suffering and superfluous injury'?
- Is the new weapon indiscriminate in its effect?[101]

Boothby suggests the need also to consider the following:

- Whether the weapon in question is intended, or may be expected, to cause widespread, long-term, and severe damage to the environment;
- Whether there are any specific rules of treaty or customary law that prohibit or restrict the use of the weapon; and
- Whether there are any likely future developments in the law of armed conflict that may be expected to affect the weapon that is subject to review.[102]

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[97] See, e.g., Rule 45, in *ibid*. According to the ICRC, the rule is applicable in international armed conflicts and arguably also in armed conflicts of a non-international character. *Cf.* also Rule 44, according to which:

> Methods and means of warfare must be employed with due regard to the protection and preservation of the natural environment. In the conduct of military operations, all feasible precautions must be taken to avoid, and in any event to minimize, incidental damage to the environment. Lack of scientific certainty as to the effects on the environment of certain military operations does not absolve a party to the conflict from taking such precautions.'

[98] NATO Research and Technology Organisation, 'Non-Lethal Weapons and Future Peace Enforcement Operations', *op. cit.*, Annex C.

[99] See, e.g., Rule 47, in J.-M. Henckaerts and L. Doswald-Beck (eds.), *Customary International Humanitarian Law - Volume 1: Rules*, *op. cit*., p. 164.

[100] Article 36, *1977 Additional Protocol I.*

[101] NATO Research and Technology Organisation, 'Non-Lethal Weapons and Future Peace Enforcement Operations', RTO-TR-SAS-040, December 2004, Annex C, www.rta.nato.int/Pubs/RDP.asp?RDP=RTO-TR-SAS-040 (accessed 11 May 2010).

[102] W. Boothby, *Weapons and the Law of Armed Conflict*, *op. cit.*, p. 346.

Based on the language used in the provision in Article 36 of *1977 Additional Protocol I*, there is also an argument that the reference to 'any other rule of international law applicable' to a State Party to the Protocol would also encompass international human rights law. Indeed, if there were not a difference of meaning between 'weapon' and 'means of warfare' the reference to both terms in the provision might be redundant.[103] The commentary published by the ICRC on Article 36 does not refer specifically to human rights law, which is also generally applicable in situations of armed conflict, but nor does it exclude it:

> Regarding the clause on 'any other rule of international law applicable to the High Contracting Party', this refers to any agreement on disarmament concluded by the Party concerned, or any other agreement related to the prohibition, limitation or restriction on the use of a weapon or a particular type of weapon,[104] concluded by this Party, which would relate, for example to a new generation of small calibre weapons or any other type of weapons.[105] Naturally, it also includes the rules which form part of international customary law.[106]

3.2.2 Rules applicable to the use of specific weapons in armed conflict

The use in armed conflict of certain weapons is specifically prohibited or restricted under international treaty and customary law.[107] It has not necessarily been articulated by States whether the prohibition is the result of the application of one or more of the general rules of international law referred to above.

Poison
The use of poison or poisoned weapons is prohibited.[108]

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[103] *Cp.*, e.g., I. Daoust, R. Coupland, and R. Ishoey, 'New wars, new weapons? The obligation of States to assess the legality of means and methods of warfare', *International Review of the Red Cross*, No. 846 (2002), p. 352, fn. 19.
[104] For example, the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons which may be deemed to be Excessively Injurious or to have Indiscriminate Effects, of 10 October 1980. Article 8 of this Convention provides for a review mechanism with the purpose of examining new categories of conventional weapons which do not yet fall under the Protocols annexed to the Convention. A Conference will be held when this is requested by a Contracting Party to the Convention with the agreement of a majority of at least eighteen of them. All States, including all Parties to the Protocol, will be invited to this Conference. Thus this provision complements the implementation of the present Article 36 in a valuable way.
[105] Some further examples can be given of auxiliary means of interpretation, such as the Report of the Secretary General of the United Nations ('Rules of international law in force relating to the prohibition or the restriction on the use of certain weapons' (A/9215, 1973)), the 'Comparative table of proposals' drawn up by the Ad Hoc Committee on conventional weapons (O.R. XVI, pp. 551-627, CDDH/IV/226) and the 'possible elements of a prohibition of the use of weapons' drawn up by this same Committee (*ibid.*, pp. 539–549, CDDH/408/Rev.1, Appendices I and II). This concerns future law to be created by the States themselves, individually or not, on the basis of the principles which they have established, at least up to a point, during laborious discussions.
[106] B. Zimmermann *et al.*, *Commentary on the Additional Protocols of 8 June 1977 to the Geneva Conventions of 12 August 1949* (Netherlands: Martinus Nijhoff, 1987), p. 425 (original footnotes), www.icrc.org/ihl.nsf/COM/470-750045?OpenDocument (accessed 28 June 2010).
[107] Particular reference is made in this section to the conclusions of the ICRC's study of customary international humanitarian law, published in 2005.
[108] Rule 72, in J.-M. Henckaerts and L. Doswald-Beck (eds.), Customary International Humanitarian Law – Volume 1: Rules, *op. cit*. The prohibition on poison is a longstanding one, being already included in the Regulations annexed to the *1907 Hague Convention on the Laws and Customs of War on Land* (Article 23(a)).

Biological weapons
The use of biological weapons is prohibited.[109]

Chemical weapons
The use of chemical weapons is prohibited.[110] The use of riot-control agents as a method of warfare—in an non-international as well as an international armed conflict—is prohibited.[111] The use of herbicides as a method of warfare is prohibited if they:

(a) are of a nature to be prohibited chemical weapons;
(b) are of a nature to be prohibited biological weapons;
(c) are aimed at vegetation that is not a military objective;
(d) would cause incidental loss of civilian life, injury to civilians, damage to civilian objects, or a combination thereof, which may be expected to be excessive in relation to the concrete and direct military advantage anticipated; or
(e) would cause widespread, long-term and severe damage to the natural environment.[112]

Expanding bullets
The use of bullets which expand or flatten easily in the human body is prohibited.[113]

Exploding bullets
The anti-personnel use of bullets which explode within the human body is prohibited.[114]

Weapons primarily injuring by non-detectable fragments
The use of weapons the primary effect of which is to injure by fragments which are not detectable by X-rays of the human body is prohibited.[115] The prohibition of such weapons (which are not generally believed to exist) is contained in Protocol I of the *Convention on Certain Conventional Weapons*.

Blinding laser weapons
The use of laser weapons that are specifically designed, as their sole combat function or as one of their combat functions, to cause permanent blindness to unenhanced vision is prohibited.[116] The prohibition of blinding laser weapons is contained in Protocol IV of the *Convention on Certain Conventional Weapons*.

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[109] Rule 73, in *ibid*. The prohibition first appeared in the *1925 Geneva Gas Protocol*.
[110] Rule 74, in *ibid*. A prohibition on certain chemical weapons was first included in the *1899 Hague Declaration (IV,2) on Asphyxiating Gases*, and then the *1925 Geneva Gas Protocol*.
[111] Rule 75, in *ibid*. See Article I(5), *1993 Chemical Weapons Convention*. The term 'method of warfare' is not formally defined but can be understood to be narrower than simply any use of a weapon within a country that is in a situation of armed conflict. Thus, a State may use riot control agents against individuals on its own territory during an armed conflict in limited circumstances (i.e. within the confines of international human rights law) without necessarily infringing the prohibition on their use as a method of warfare.
[112] Rule 76, in *ibid*.
[113] Rule 77, in *ibid*. This prohibition was first introduced in the *1899 Hague Declaration (IV,3) on Expanding Bullets*.
[114] Rule 78, in *ibid*. This prohibition was first introduced in the *1868 St. Petersburg Declaration Renouncing the Use, in Time of War, of Explosive Projectiles Under 400 Grammes Weight*.
[115] Rule 79, in *ibid*.
[116] Rule 86, in *ibid*.

Anti-personnel mines

The development, production, stockpiling, transfer, and use of anti-personnel mines are prohibited by the *1997 Anti-Personnel Mine Ban Convention*.[117] Anti-personnel mines are defined under the Convention as:

> a mine designed to be exploded by the presence, proximity or contact of a person and that will incapacitate, injure or kill one or more persons. Mines designed to be detonated by the presence, proximity or contact of a vehicle as opposed to a person, that are equipped with anti-handling devices, are not considered anti-personnel mines as a result of being so equipped.[118]

In turn, a mine is defined as: 'a munition designed to be placed under, on or near the ground or other surface area and to be exploded by the presence, proximity or contact of a person or a vehicle.'[119]

It is widely agreed that the prohibition on the use of anti-personnel mines has not yet attained the status of customary law,[120] although as of October 2010 a total of 156 States were party to the Convention and therefore any use of the weapons by any State Party would be unlawful. Furthermore, the ICRC's study of customary international humanitarian law, published in 2005, concluded that State practice 'appears to indicate that an obligation to eliminate anti-personnel mines is emerging.'[121]

Cluster munitions

Cluster munitions are prohibited under the Convention on Cluster Munitions, whose entry into force for the first 30 States that ratified the instrument was on 1 August 2010.[122] The Convention is not considered declaratory of customary law. The definition of a cluster munition does not encompass weapons with non-conventional submunitions, nor does it cover a munition or submunition designed to dispense flares, smoke, pyrotechnics, or chaff; a munition or

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[117] The formal title of this treaty is the Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on their Destruction.

[118] Article 2, paragraph 1, 1997 Anti-Personnel Mine Ban Convention.

[119] Article 2, paragraph 2, 1997 Anti-Personnel Mine Ban Convention.

[120] Professor Yoram Dinstein, for example, observes that:

> With a view to elaborating clear norms of conduct in hostilities, a plethora of treaty provisions—each dealing with a chosen weapons—have been negotiated, signed, and ratified. Some of these treaty clauses (by no means all) have generated customary international law applicable to all states. Others (pre-eminently the repudiation of anti-personnel mines) remain binding only among Contracting Parties.

Y. Dinstein, 'Foreword' in Boothby, W. H., *Weapons and the Law of Armed Conflict*, *op. cit.*, p. viii. *Cf.* also the Eritrea-Ethiopia Claims Commission, Partial Award, Central Front, Eritrea's Claims 2, 4, 6, 7, 8, and 22 (2004), 43 *ILM* (2006), pp. 1249, 1255, cited by Y. Dinstein, *The Conduct of Hostilities under the Law of International Armed Conflict*, Second Edition (Cambridge: Cambridge University Press, 2010), pp. 74–75.

[121] J.-M. Henckaerts and L. Doswald-Beck, Customary International Humanitarian Law – Volume 1: Rules, op. cit., p. 283.

[122] See, e.g., The United Nations Office in Geneva, 'Convention on Cluster Munitions: Signatories and Ratifying States', www.unog.ch/80256EE600585943/(httpPages)/67DC5063EB530E02C12574F8002E9E49?OpenDocument (accessed 15 October 2010). As of mid-October 2010, 42 States had ratified the Convention.

submunition designed to produce electrical or electronic effects; or a munition designed exclusively for an air defence role.[123]

Incendiary weapons

According to the ICRC study of customary law, the anti-personnel use of incendiary weapons in an international armed conflict is prohibited, 'unless it is not feasible to use a less harmful weapon to render a person *hors de combat*.'[124] The ICRC believes that 'it is reasonable to conclude' that the rule is also applicable in an armed conflict of a non-international character. Given the prohibition on the use of means or methods of warfare that are of a nature to cause unnecessary suffering, 'the anti-personnel use of incendiary weapons in situations where such use is not required by military necessity would constitute a violation of that rule.'[125]

3.3 International human rights law

International human rights law applies in all situations. Thus, it continues to apply in armed conflicts, subject to the possibility for a State of derogating from full observance of certain rights in limited circumstances.[126] It has particular relevance for the use of weapons, including NKE weapons, in domestic law enforcement, in prisons and health institutions, and in the context of certain peace operations, especially by State actors.[127]

International human rights law does not specifically prohibit the use *per se* of any weapon, whatever its categorisation.[128] But the way a weapon is used may violate human rights and

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[123] Article 2, paragraph 2(a) and (b), Convention on Cluster Munitions.

[124] Rule 85, in J.-M. Henckaerts and L. Doswald-Beck (eds.), Customary International Humanitarian Law - Volume 1: Rules, op. cit.

[125] *ibid.*, p. 291. According to one participant at the May 2010 Meeting of Experts, a number of military personnel have argued that there are certain situations where only flamethrowers are effective in meeting the military's need to neutralise specific military objectives. Protocol III to the CCW prohibits the use of incendiary weapons in populated areas but does not outlaw all use of such weapons during armed conflict.

[126] The interrelationship between international humanitarian law and international human rights law is complex. It is common to talk of 'complementarity' between the two branches of international law, with some commentators approving the approach taken by the International Court of Justice whereby international humanitarian law is the *lex specialis* that determines the content of human rights law applicable to the conduct of hostilities. Others see human rights law as having much greater legal impact than this. For a discussion of some of the key issues see, e.g., Y. Dinstein, *The Conduct of Hostilities under the Law of International Armed Conflict*, Second Edition (Cambridge: Cambridge University Press, 2010), pp. 23–26; and *cf.* also Human Rights Council Resolution 9/9: Protection of the human rights of civilians in armed conflict, 24 September 2008, adopted without a vote, contained in Human Rights Council, 'Report of the Human Rights Council on its Ninth Session', UN doc. A/HRC/9/28, 2 December 2008.

[127] Though the traditional view that only States can violate human rights law (as opposed to human rights norms) is increasingly being challenged. See generally, A. Clapham, *Human Rights Obligations of Non-State Actors*, *op. cit.*; and A. Clapham, 'The Rights and Responsibilities of Armed Non-State Actors: The Legal Landscape & Issues Surrounding Engagement', 1 February 2010, available at: papers.ssrn.com/sol3/papers.cfm?abstract_id=1569636 (accessed 16 April 2010).

[128] Indeed, certain weapons whose use is prohibited in armed conflict, such as riot control agents or expanding 'dum-dum' bullets, are not outlawed by human rights law in other situations. In the context of the *1966 International Covenant on Civil and Political Rights*, however, the Human Rights Committee has, though, made specific reference to the threat to the right to life from nuclear weapons:

> While remaining deeply concerned by the toll of human life taken by conventional weapons in armed conflicts, the Committee has noted that, during successive sessions of the General Assembly,

therefore be illegal under international (and potentially also national) law. In determining this legality, reference can usefully be made to international criminal justice standards, which are summarised below.

The issue of NKE weapons is not currently on the agenda of the Human Rights Council, although certain human rights treaty bodies have addressed specific NKE weapons, particularly electro-shock weapons.[129]

3.3.1 The right to life

The most fundamental human right can be considered the right of each person to life.[130] The right to life prohibits the arbitrary deprivation of life by the State or its agents. Thus, for example, with respect to the *1966 International Covenant on Civil and Political Rights*,[131] the Human Rights Committee has stated its view that:

> States parties should take measures not only to prevent and punish deprivation of life by criminal acts, but also to prevent arbitrary killing by their own security forces. The deprivation of life by the authorities of the State is a matter of the utmost gravity. Therefore, the law must strictly control and limit the circumstances in which a person may be deprived of his life by such authorities.[132]

The right to life applies at all times and it is never lawful for a State to 'derogate' from its observance.[133] Furthermore, the Human Rights Committee has argued that, in the case of the

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> representatives from all geographical regions have expressed their growing concern at the development and proliferation of increasingly awesome weapons of mass destruction…
>
> … The Committee associates itself with this concern. It is evident that the designing, testing, manufacture, possession and deployment of nuclear weapons are among the greatest threats to the right to life which confront mankind today. This threat is compounded by the danger that the actual use of such weapons may be brought about, not only in the event of war, but even through human or mechanical error or failure.

Human Rights Committee, General Comment No. 14: Nuclear weapons and the right to life, Twenty-third session, 1984.

[129] See, *infra*, Section 3.3.2 on torture and other forms of cruel, inhuman, or degrading treatment or punishment.

[130] According to the Human Rights Committee, for instance, which monitors the implementation of the *1966 International Covenant on Civil and Political Rights*, it is 'the supreme right from which no derogation is permitted even in time of public emergency which threatens the life of the nation…' Human Rights Committee, General Comment No. 6: The right to life, Sixteenth Session, 1982. Though, *cf.* also, Paul Sieghart's comment that the right to life 'stands in marked contrast' to certain other rights, such the right to freedom from torture and other ill-treatment, as qualifications to the right render it 'less than absolute', 'allowing human life to be deliberately terminated in certain specified cases'. P. Sieghart, *The International Law of Human Rights* (Oxford: Clarendon Press, 1983), p. 130. He further notes that:

> [f]rom the point of view of the person concerned, the law tends to regard acute or prolonged suffering (at all events in cases where it is inflicted by others, and so is potentially avoidable) as a greater evil than death, which is ultimately unavoidable for everyone.

ibid.

[131] As of mid-October 2010, 166 States were party to the Covenant.

[132] Human Rights Committee, General Comment No. 6: The right to life, *op. cit.*

[133] Some treaties, including four of the major international human rights treaties, allow a State Party under certain circumstances to unilaterally declare it is not in a position to fully observe all of the treaty provisions. Certain rights,

1966 International Covenant on Civil and Political Rights at least, it is a right 'which should not be interpreted narrowly.'[134]

Regional instruments also address the content of the right to life as a prohibition on arbitrary deprivation. For instance, the *1950 European Convention on Human Rights* provides that:

> Everyone's right to life shall be protected by law. … Deprivation of life shall not be regarded as inflicted in contravention of this article when it results from the use of force which is no more than absolutely necessary:
> (a) in defence of any person from unlawful violence;
> (b) in order to effect a lawful arrest or to prevent escape of a person lawfully detained;
> (c) in action lawfully taken for the purpose of quelling a riot or insurrection.[135]

The European Court of Human Rights has specifically regretted the lack of availability of an alternative to lethal force to a State Party to the *1950 European Convention on Human Rights*. In Gülec *v.* Turkey, the Court stated that:

> it goes without saying that a balance must be struck between the aim pursued and the means employed to achieve it. The gendarmes used a very powerful weapon because they apparently did not have truncheons, riot shields, water cannon, rubber bullets or tear gas. The lack of such equipment is all the more incomprehensible and unacceptable because the province of Sirnak, as the Government pointed out, is in a region in which a state of emergency has been declared, where at the materiel time disorder could have been expected.[136]

In the case of *McCann* et al. *v. UK*, which concerned the killing by British soldiers of three Irish Republican Army members intending to place a bomb in Gibraltar, in determining whether the force used was compatible with Article 2 of the *1950 European Convention on Human Rights* (the right to life), the Court observed that it must

> carefully scrutinise … not only whether the force used by the soldiers was strictly proportionate to the aim of protecting persons against unlawful violence but also whether the anti-terrorist operation was planned and controlled by the authorities so as to minimise, to the greatest extent possible, recourse to lethal force.[137]

It further noted that it is:

> not clear whether … [the soldiers] had been trained or instructed to assess whether the use of firearms to wound their targets may have been warranted by the specific circumstances that confronted them at the moment of arrest.

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including the right to life are, though, non-derogable; accordingly they apply in all circumstances. See, e.g., P. Sieghart, *The International Law of Human Rights*, *op. cit.*, p. 38. *Cf.* also International Court of Justice, *Legality of The Threat or Use of Nuclear Weapons*, Advisory Opinion of 8 July 1996, *op. cit*, §§24 and 25.

[134] Human Rights Committee, General Comment No. 6: The right to life, *op. cit.*

[135] Article 2, paragraphs 1 and 2, 1950 European Convention on Human Rights.

[136] Gülec *v.* Turkey, Judgment, 27 July 1998 (App. No. 54/1997/838/1044), §71.

[137] McCann *et al. v.* UK, European Court of Human Rights, Series A, No. 324, App. No 18984/91 (1995), §194, cmiskp.echr.coe.int/tkp197/view.asp?item=1&portal=hbkm&action=html&highlight=mccann&sessionid=56190310&skin=hudoc-en (accessed 25 June 2010).

> Their reflex action in this vital respect lacks the degree of caution in the use of firearms to be expected from law enforcement personnel in a democratic society, even when dealing with dangerous terrorist suspects, and stands in marked contrast to the standard of care reflected in the instructions in the use of firearms by the police which had been drawn to their attention and which emphasised the legal responsibilities of the individual officer in the light of conditions prevailing at the moment of engagement …[138]

According to the *1990 Basic Principles on the Use of Force and Firearms*, intentional lethal use of firearms should only be made 'when strictly unavoidable in order to protect life'.[139] The official commentary on this provision states as follows:

> '(a) … the use of force by law enforcement officials should be exceptional; while it implies that law enforcement officials may be authorized to use force as is reasonably necessary under the circumstances for the prevention of crime or in effecting or assisting in the lawful arrest of offenders or suspected offenders, no force going beyond that may be used.
>
> (b) National law ordinarily restricts the use of force by law enforcement officials in accordance with a principle of proportionality. It is to be understood that such national principles of proportionality are to be respected in the interpretation of this provision. In no case should this provision be interpreted to authorize the use of force which is disproportionate to the legitimate objective to be achieved.
>
> (c) The use of firearms is considered an extreme measure. Every effort should be made to exclude the use of firearms, especially against children. In general, firearms should not be used except when a suspected offender offers armed resistance or otherwise jeopardizes the lives of others and less extreme measures are not sufficient to restrain or apprehend the suspected offender. In every instance in which a firearm is discharged, a report should be made promptly to the competent authorities.'[140]

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[138] *ibid.*, §212.

[139] Provision 9 of the 1990 Basic Principles on the Use of Force and Firearms by Law Enforcement Officials states in full as follows:

> Law enforcement officials shall not use firearms against persons except in self-defence or defence of others against the imminent threat of death or serious injury, to prevent the perpetration of a particularly serious crime involving grave threat to life, to arrest a person presenting such a danger and resisting their authority, or to prevent his or her escape, and only when less extreme means are insufficient to achieve these objectives. In any event, intentional lethal use of firearms may only be made when strictly unavoidable in order to protect life.'

The 1990 Basic Principles also provide that:

> Exceptional circumstances such as internal political instability or any other public emergency may not be invoked to justify any departure from these basic principles.

ibid., Provision 8.

[140] See, e.g. 'The Eighth United Nations Congress on the Prevention of Crime and the Treatment of Offenders Havana, Cuba August 27–September 7, 1990', *Criminal Law Forum* (The Netherlands: Springer, March 1990), Vol. 1, No. 3, pp. 513 *et seq*.

In sum, the *1990 Basic Principles* emphasise the use of force by law enforcement officials as an exceptional act and that in such cases the use of force shall be proportionate to the legitimate objective to be achieved. In other respects, the *1990 Basic Principles* appear explicitly to endorse the use of NKE weapons. Thus, the Principles provide as follows:

> 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 for use in appropriate situations, with a view to increasingly restraining the application of means capable of causing death or injury to persons.
>
> The development and deployment of non-lethal incapacitating weapons should be carefully evaluated in order to minimize the risk of endangering uninvolved persons, and the use of such weapons should be carefully controlled.[141]

International criminal law is also of potential relevance to NKE weapons termed non-lethal if they were used to commit war crimes or crimes against humanity.[142] There could also be relevance for complicity in war crimes, crimes against humanity, and genocide. Thus, for example:

> on 23 December 2005, the District Court of The Hague found Dutch businessman, Frans van Anraat, guilty of complicity to war crimes, but acquitted him of complicity to genocide itself. He was sentenced to 15 years' imprisonment. During the 1980s, Van Anraat was Saddam Hussein's most important supplier of chemicals used for the production of mustard gas. According to the Court, van Anraat's involvement in supplying chemicals to Iraq was an essential contribution to the chemical weapons programme of Saddam Hussein's regime. The Court also found that the chemical attacks during the 1980s were committed with the intent of the destruction of the Kurdish peoples in Iraq. There was insufficient evidence that Van Anraat knew about the genocidal intent of Saddam's regime – a necessary element for a 'complicity to genocide' conviction.
>
> Frans van Anraat was convicted of complicity to war crimes since his deliveries facilitated the attacks on the Kurdish peoples and made the carrying out of the regime's ambitions considerably easier. Both the Prosecution and Van Anraat appealed the decision. On 9 May 2007, the Appeal Chamber confirmed the decision of the district court and condemned Frans van Anraat to 17 years of imprisonment.[143]

Van Anraat's sentence was reduced by six months on further appeal to the Supreme Court in June 2009.[144]

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[141] Principles 2 and 3 of the 1990 Basic Principles on the Use of Force and Firearms by Law Enforcement Officials.
[142] See, e.g., *infra*, Section 4.2.
[143] The Hague Justice Portal, "Frans van Anraat", www.haguejusticeportal.net/eCache/DEF/6/411.html (accessed 7 July 2010).
[144] Trial Watch, "Frans van Anraat", www.trial-ch.org/index.php?id=801&L=0&tx_jbtrial_pi2[tab]=facts&tx_jbtrial_pi2[profile]=frans_van-anraat_286&cHash=7ddfa77ea0 (accessed 7 July 2010).

3.3.1 The right to freedom from torture

A second non-derogable right with particular relevance to NKE weapons[145] is the right to freedom from torture or cruel, inhuman, or degrading treatment or punishment.[146] The definition of torture differs somewhat from treaty to treaty, and has also been the subject of extensive jurisprudence, especially in regional human rights courts and other fora.[147] Article 1, paragraph 1 of the *1984 UN Convention Against Torture* states that for the purposes of the Convention:

> the term 'torture' means any act by which severe pain or suffering, whether physical or mental, is intentionally inflicted on a person for such purposes as obtaining from him or a third person information or a confession, punishing him for an act he or a third person has committed or is suspected of having committed, or intimidating or coercing him or a third person, or for any reason based on discrimination of any kind, when such pain or suffering is inflicted by or at the instigation of or with the consent or acquiescence of a public official or other person acting in an official capacity. It does not include pain or suffering arising only from, inherent in or incidental to lawful sanctions.[148]

The Special Rapporteur on Torture has noted that at least four essential elements are reflected in this definition. First, an act inflicting severe pain or suffering, whether physical or mental; second, the element of intent; third, the specific purpose; and fourth, the involvement of a State official, at least by acquiescence. 'Taken together, these elements contribute to a comprehensive concept of torture, as distinguished from other forms of cruel, inhuman or degrading treatment.'[149]

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[145] See, e.g., Article 7 and Article 4, paragraph 2, of the *1966 International Covenant on Civil and Political Rights*. *Cf.* also, Human Rights Committee, General Comment No. 29: States of Emergency (Article 4), UN doc. CCPR/C/21/Rev.1/Add.11, 21 August 2001, para. 7.

[146] Based on an analysis of US and UN standards, Nowak and McArthur conclude that 'the severity of pain or suffering, although constituting an essential element of the definition of torture, is not a criterion distinguishing torture from cruel or inhuman treatment', that '[i]n principle, every form of cruel or inhuman treatment (including torture) requires the infliction of severe pain or suffering', and that 'only in the case of particularly humiliating treatment might the infliction of non-severe pain or suffering reach the level of degrading treatment or punishment.' Cited in N. S. Rodley with M. Pollard, *The Treatment of Prisoners Under International Law*, Third Edition, *op. cit.*, p. 115.

[147] See, e.g., Chapter 3: What Constitutes Torture and Other Ill-treatment, in N. S. Rodley with M. Pollard, *The Treatment of Prisoners Under International Law*, Third Edition (Oxford: Oxford University Press, 2009), pp. 82–144.

[148] Article 1, Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment, adopted by UN General Assembly Resolution 39/46 of 10 December 1984. A broader definition of torture is contained in the 1998 Rome Statute of the International Criminal Court, which provides, in the case of a crime against humanity, that:

> "Torture" means the intentional infliction of severe pain or suffering, whether physical or mental, upon a person in the custody or under the control of the accused; except that torture shall not include pain or suffering arising only from, inherent in or incidental to, lawful sanctions.

Article 7, paragraph 2(e), Rome Statute of the International Criminal Court.

[149] Manfred Nowak, 'Report of the Special Rapporteur on torture and other cruel, inhuman or degrading treatment or punishment, Study on the phenomena of torture, cruel, inhuman or degrading treatment or punishment in the world, including an assessment of conditions of detention', Addendum, UN doc. A/HRC/13/39/Add.5, 5 February 2010, §13.

Torture constitutes a particularly aggravated form of ill-treatment.[150] According to Manfred Nowak, it differs from cruel, inhuman or degrading treatment, 'not necessarily by the intensity of the pain or suffering inflicted, but by the specific purpose of the act.'[151] Thus:

> The element of intent contained in the definition of torture in the Convention requires that severe pain or suffering be intentionally inflicted on the victim in order to achieve a certain purpose. From this follows that torture can never be inflicted by negligence. A detainee who is forgotten by the prison officials and suffers from severe pain due to the lack of food is without doubt the victim of a severe human rights violation. However, this treatment does not amount to torture given the lack of intent by the authorities.

Whether the use of certain NKE weapons may violate the prohibitions on torture and of other cruel or inhuman or degrading treatment or punishment was earlier considered within the United Nations. A 2003 report by the UN Special Rapporteur on Torture[152] was produced pursuant to Resolution 2002/38 of the UN Commission on Human Rights.[153] The Special Rapporteur noted in his report that:

> Over the years, information alleging torture and other forms of ill-treatment involving the use of security and other equipment and instruments deemed to be specifically designed for that purpose has been brought to the attention of Governments. In particular, reference was made to … electro-shock weapons, such as electro-shock batons, stun guns, stun shields and tasers, electro-shock stun belts and kinetic impact devices; and chemical control substances, such as tear gas and pepper sprays…

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[150] Cf., e.g. 'Torture', in S. Marks and A. Clapham, *International Human Rights Lexicon* (Oxford: Oxford University Press, 2005), pp. 366 *et seq*. It is noted therein that the boundary between the different concepts is not fixed, citing a 1999 decision by the European Court on Human Rights (Selmouni *v.* France) whereby the Court considered that:

> certain acts which were classified in the past as 'inhuman and degrading treatment' as opposed to 'torture' could be classified differently in future. It takes the view that the increasingly high standard being required in the area of the protection of human rights and fundamental liberties correspondingly and inevitably requires greater firmness in assessing breaches of the fundamental values of democratic societies.

Selmouni *v.* France, Judgment, European Court of Human Rights, 28 July 1999, §101.

[151] *ibid.*, §35.

[152] 'Study on the situation of trade in and production of equipment which is specifically designed to inflict torture or other cruel, inhuman or degrading treatment, its origin, destination and forms, submitted by Theo van Boven, Special Rapporteur on torture, pursuant to resolution 2002/38 of the Commission on Human Rights', UN doc. E/CN.4/2003/69, 13 January 2003.

[153] In the resolution, among other things, the Commission:

> 12. Calls upon all Governments to take appropriate effective legislative, administrative, judicial or other measures to prevent and prohibit the production, trade, export and use of equipment which is specifically designed to inflict torture or other cruel, inhuman or degrading treatment;
>
> 13. Requests the Special Rapporteur to continue the study, with a view to its prompt completion, of the situation of trade and production in such equipment, its origin, destination and forms, with a view to finding the best ways to prohibit such trade and production and to combat its proliferation and to report thereon to the Commission at its fifty-ninth session, and calls upon States and non-governmental organizations to provide the information requested by the Special Rapporteur.

> The legitimate use of certain kinds of such equipment, in particular some restraints (such as handcuffs) and kinetic and chemical devices, is recognized in a number of appropriate circumstances. The Special Rapporteur notes that they may often constitute non-lethal alternatives to other security devices. It is nevertheless alleged that they have also been misused – sometimes due to a lack of proper training – or intentionally used to inflict torture and other forms of ill-treatment. On the other hand, it is believed that other types of equipment are inherently cruel, inhuman or degrading and that their use would necessarily breach the prohibition of torture and other forms of ill-treatment.[154]

In addition, the European Union has played an important role in seeking to limit the export of certain 'tools of torture'. As Amnesty International stated in a March 2010 report with the Omega Research Foundation:

> In 2006[,] the European Union (EU) introduced the world's first multilateral trade controls to prohibit the international trade in equipment that has no other practical purpose than for capital punishment, torture and other ill-treatment; and to control the trade in a range of policing and security equipment frequently misused for such ill-treatment. Council Regulation 1236/2005 … fills a major gap in human-rights-based export controls. It introduced unprecedented, binding trade controls on a range of equipment which is often used in serious human rights violations, but which has not usually been included on Member States' military, dual-use or strategic export control lists.[155]

Items normally requiring specific authorisation for export or import being deemed 'goods that could be used for the purpose of torture or other cruel, inhuman or degrading treatment or punishment' include:

- 'Portable electric shock devices, including but not limited to, electric shock batons, electric shock shields, stun guns and electric shock dart guns having a no-load voltage exceeding 10 000 V'; and
- Oleoresin capsicum (OC).[156]

Nonetheless, the report concludes that EC Regulation 1236/2005 remains unimplemented or only partly implemented in several Member States; that traders in some Member States have continued to offer for sale equipment which is explicitly prohibited for import and export to and from the EU on the grounds that it has no other practical purpose than for torture or other ill-treatment; and that other Member States 'have explicitly authorised the export of security equipment controlled under the Regulation to destinations where such equipment is widely used

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[154] 'Study on the situation of trade in and production of equipment which is specifically designed to inflict torture or other cruel, inhuman or degrading treatment', *op. cit.*, §§ 6 and 7.

[155] Amnesty International and the Omega Research Foundation, *From Words to Deeds: Making the EU Ban on the Trade in 'Tools Of Torture' a Reality*, AI Report Index EUR 01/004/2010, March 2010, p. 5, www.amnesty.org/en/library/asset/EUR01/004/2010/en/fb4ff4cc-9a20-44dc-8212-ebd9f4727f7b/eur010042010en.pdf (accessed 7 July 2010).

[156] See Annex III, Council Regulation (EC) No 1236/2005 of 27 June 2005 concerning trade in certain goods which could be used for capital punishment, torture or other cruel, inhuman or degrading treatment or punishment, eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2005:200:0001:0019:EN:PDF (accessed 7 July 2010).

in torture and other ill-treatment, raising serious concerns about the adequate assessment of human rights standards in Member States' export licensing decisions.'[157]

In June 2010, the European Parliament adopted a resolution calling for any trade in equipment such as spiked batons, thumb-cuffs, and any body-worn electric-shock weapon to be banned in Europe. The resolution also called on Member States to report regularly on their export licences issued for instruments that could be used for torture or other ill-treatment.[158]

In December 1997, S&J Products, a US company supplying electro-shock stun guns and other security products, was prosecuted for 'knowingly and wilfully' exporting stun guns and pepper sprays without the required export licences to Guatemala, Indonesia, Mexico, Papua New Guinea and the Philippines. S&J Products had earlier attempted to export stun guns to Russia. Court documents described how S&J Products would provide pro-forma invoices to the foreign companies supplying the electro-shock weapons and properly describe their products in terms like '300,000 volt Curved stun gun', but that when the weapons were exported the documentation would include descriptions such as 'Fountain pens, Keychains, Child Sound device, Electrical voltage units'.[159]

One participant at the May 2010 Meeting of Experts suggested that the focus of efforts to regulate NKE weapons should be on the grounds that they constituted inhuman or degrading treatment, as the ambit of the legal protection was broader than for torture. Degrading treatment may include handcuffing or blindfolding of a suspect when this is not reasonably necessary, for example to prevent escape or injury or damage.[160] In the case of *Antipenkov v. Russia*, decided by the European Court of Human Rights in 2009, the Court noted that recourse to physical force which is not made strictly necessary by the detainee's own conduct 'diminishes human dignity' and is in principle an infringement of the right set forth in Article 3 of the *1950 European Convention on Human Rights*.

The Court found that the use of rubber truncheons—a kinetic energy weapon of course—on the detainee was, at least partly, retaliatory in nature and that the actions by the police officers concerned were disproportionate to his alleged misconduct and inconsistent with the goals they sought to achieve. The purpose of that treatment was to punish and drive him into submission. In addition, the Court found that the use of rubber truncheons, to which the applicant was subjected, must have caused him mental and physical suffering, even though it did not apparently result in any long-term damage to his health.[161] *A fortiori*, therefore, the application of an NKE weapon to

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[157] Amnesty International and the Omega Research Foundation, From Words to Deeds: Making the EU Ban on the Trade in 'Tools Of Torture' a Reality, op. cit., p. 5.

[158] European Parliament, 'Updating EU trade ban on torture implements', Press release, 17 June 2010, www.europarl.europa.eu/news/expert/infopress_page/026-76232-165-06-25-903-20100616IPR76231-14-06-2010-2010-false/default_en.htm (accessed 9 July 2010).

[159] Amnesty International with the Omega Research Foundation, *Stopping the Torture Trade*, www.amnesty.org/en/library/asset/ACT40/002/2001/en/96267802-dc5f-11dd-bce7-11be3666d687/act400022001en.html (accessed 9 July 2010), citing Air Waybill documents for an export to Indonesia in 1996, cited in US District Court documents, 30 December 1997: USA *v.* Jack Allen Baugher.

[160] See, e.g., the European Court of Human Rights judgment in *Ocalan v. Turkey* (App. no. 46221/99), Judgment, 12 May 2005, §§181–184; African Commission on Human Rights, International PEN *et al. v.* Nigeria, 1998, §§79–81.

[161] ECHR, Antipenkov *v.* Russia, Judgment, 15 October 2009, *esp.* §§54 and 60.

a suspect who is already handcuffed or blindfolded—or otherwise incapacitated—is likely to be subject to particularly stringent review by a human rights body.

3.3.3 Right to liberty and security

Every person has the right to liberty and security. No one shall be subjected to arbitrary arrest or detention. The detention of any person must therefore be in accordance with applicable national and international law. The concepts are typically considered broadly, and could potentially cover the use of NKE weapons that prevent a person from moving.[162] For example, in the case of Gillan and Quinton *v*. the UK, decided by the European Court on Human Rights in January 2010, the Court determined that the police's stopping and searching of two individuals was a violation of their human rights:

> The Court observes that although the length of time during which each applicant was stopped and searched did not in either case exceed 30 minutes, during this period the applicants were entirely deprived of any freedom of movement. They were obliged to remain where they were and submit to the search and if they had refused they would have been liable to arrest, detention at a police station and criminal charges. This element of coercion is indicative of a deprivation of liberty within the meaning of [Article 5, paragraph 1 of the 1950 European Convention on Human Rights].[163]

It is possible for a State to derogate from the right to liberty under certain treaties and in specified circumstances, but this possibility of derogation is strictly limited.

3.3.4 Right to protest

There is increasing discussion of a 'right to protest', which encompasses rights to freedom of opinion and expression, of association, and of assembly, as well as of non-violent protest,[164] although the right to protest as such is not affirmed in any human rights treaty.[165] This right 'is qualified by the various qualifications that apply to the rights to freedom of expression, assembly and association themselves.'[166] Thus, for example, under the *1966 International Covenant on Civil and Political Rights*, the right to freedom of expression

> carries with it special duties and responsibilities. It may therefore be subject to certain restrictions, but these shall only be such as are provided by law and are necessary:
>
> (a) For respect of the rights or reputations of others;

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[162] Certain NKE weapons may cause paralysis in human beings. This paralysis may last only a few seconds or it may be more prolonged. Thus, the use of such weapons by security officials might, in certain circumstances, be deemed to violate a person's right to liberty and security of person in addition to other human rights they may infringe.

[163] *Gillan and Quinton v. UK* (App. No. 4158/05), Judgment, 12 January 2010, §57: cmiskp.echr.coe.int/tkp197/view.asp?action=html&documentId=860909&portal=hbkm&source=externalbydocnumber (accessed 30 June 2010).

[164] E.g., one of the specific undertakings with respect to civil liberties included in the UK's coalition government programme is 'to restore rights to non-violent protest'. Government of the UK, *The Coalition: our programme for government* (London: UK, 2010), p. 11, www.cabinetoffice.gov.uk/media/409088/pfg_coalition.pdf (accessed 25 June 2010). The use of weapons or other forms of violence by protesters clearly changes the legality of the response by the security forces/authorities.

[165] See, e.g., 'Protest', in S. Marks and A. Clapham, *International Human Rights Lexicon* (Oxford: Oxford University Press, 2005), pp. 273 *et seq.*

[166] *ibid.*, p. 274.

> (b) For the protection of national security or of public order (ordre public), or of public health or morals.[167]

Nonetheless, this does not give the security forces the licence to use NKE weapons unnecessarily or disproportionately, even if a protest is banned by the authorities. According to the *1990 Basic Principles on the Use of Force*:

> 13. In the dispersal of assemblies that are unlawful but non-violent, law enforcement officials shall avoid the use of force or, where that is not practicable, shall restrict such force to the minimum extent necessary.[168]

In the 2007 case of Balçik *et al. v.* Turkey, before the European Court of Human Rights, a group of demonstrators gathered in a street in Istanbul to read a press declaration and block the tram line to protest against high-security prisons. The police asked the group to disperse and informed them that the demonstration was unlawful since no advance notice had been submitted to the authorities. The demonstrators refused to obey and attempted to march along Istiklal Street, chanting slogans and reading out a press declaration. The police dispersed the group, allegedly by using truncheons and tear gas. The applicants were arrested along with 39 other persons. Two of the applicants, Sema Gül and Semiha Kirkoç, were subsequently taken to Taksim hospital where they were treated for injuries.[169] The Court found that the Government had failed to furnish 'convincing or credible arguments which would provide a basis to explain or to justify the degree of force used against the applicants, whose injuries are corroborated by medical reports.' As a result, it concluded 'that the injuries of Ms Semiha Kirkoç and Ms Sema Gül were the result of treatment for which the State bore responsibility.'[170]

3.3.5 Right to health

It is generally agreed today that civil and political rights and economic, social, and cultural rights are indivisible and interdependent,[171] although the question of the justiciability of the latter remains contentious, despite important advances in this regard.[172] The right to health is typically articulated as the right to the enjoyment of the highest attainable standard of physical and mental health. Its application to the use of weapons does not appear to have been tested. In the General Comment of the Committee on Economic, Social and Cultural Rights on this right it is stated that:

> Violations of the obligation to respect are State actions, policies or laws that contravene standards set out in article 12 of the Covenant and are likely to result in bodily harm, unnecessary morbidity and preventable mortality.

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[167] Article 19, paragraph 3, 1966 International Covenant on Civil and Political Rights.
[168] Principle 13 of the 1990 Basic Principles on the Use of Force.
[169] Balçik *et al. v.* Turkey, (Application no. 25/02), Judgment, 29 November 2007, §§5–6.
[170] *ibid.*, §33.
[171] The rights were dealt with in two separate agreements in 1996: the International Covenant on Civil and Political Rights, and the International Covenant on Economic, Social and Cultural Rights.
[172] See, e.g. UN, 'High Commissioner backs work on mechanism to consider complaints of breaches of economic, social and cultural rights', Press release, Geneva, 16 July 2007, www.ohchr.org/EN/NewsEvents/Pages/DisplayNews.aspx?NewsID=6155&LangID=E (accessed 12 May 2010).

The standards referred to by the Committee govern infant mortality, environmental and industrial hygiene, the prevention and control of disease, and medical treatment. However, a challenge to certain NKE weapons on the basis of their health effects, including by prisoners or patients at a mental health institution, merits consideration.

3.3.6 The importance of training for law enforcement officials

Training is an obvious element in any effort to instil good practice in the use of NKE weapons, and as seen below, inadequate training helps to explain some of the unnecessary injuries that have been occasioned by certain of these weapons. Thus, the *1990 Basic Principles on the Use of Force* also refer to the content of such training of law enforcement officials:

> In the training of law enforcement officials, Governments and law enforcement agencies shall give special attention to issues of police ethics and human rights, especially in the investigative process, to alternatives to the use of force and firearms, including the peaceful settlement of conflicts, the understanding of crowd behaviour, and the methods of persuasion, negotiation and mediation, as well as to technical means, with a view to limiting the use of force and firearms. Law enforcement agencies should review their training programmes and operational procedures in the light of particular incidents.[173]

3.4 International criminal justice standards

The following criminal justice standards were adopted under the auspices of the United Nations:

- *1955 Standard Minimum Rules for the Treatment of Prisoners* (the '1955 Standard Minimum Rules'),
- *1984 Procedures for the effective implementation of the Standard Minimum Rules for the Treatment of Prisoners* (the '1984 Procedures'),
- *1990 Basic Principles for the Treatment of Prisoners*,
- *1979 Code of Conduct for Law Enforcement Officials*, and the
- *1990 Basic Principles on the Use of Force*.

Although formally at least these standards are not legally binding they are widely approved as illustrative of good practice as well as reflective of existing national norms.

In 2009, the United Nations published a revised and updated version of its Criminal Justice Standards for United Nations Police.[174] An extract from the section on the use of force and firearms is reproduced here, which succinctly summarises internationally established good practice:

> 14. Police and other law enforcement officials may use force only when strictly necessary and to the extent required for the performance of their duty. Any force used should be proportionate and no more force than is necessary should be used.

[173] Principle 20 of the 1990 Basic Principles on the Use of Force.
[174] UN Office on Drugs and Crime and the UN Department of Peacekeeping Operations, *United Nations Criminal Justice Standards for United Nations Police* (New York: UN, 2009), available at: www.unodc.org/documents/justice-and-prison-reform/08-58900_Ebook.pdf (accessed 13 May 2010).

15. Police and other law enforcement officials, in carrying out their duties, must as far as possible apply non-violent means before resorting to the use of force and firearms. They may use force and firearms only if other means remain ineffective or without any promise of achieving the intended result.

16. Whenever the lawful use of force and firearms is unavoidable, police or other law enforcement officials must:
(a) Exercise restraint in such use and act in proportion to the seriousness of the offence and the legitimate objective to be achieved;
(b) Minimize damage and injury, and respect and preserve human life;
(c) Ensure that assistance and medical aid are rendered to any injured or affected persons at the earliest possible moment;
(d) Ensure that relatives or close friends of the injured or affected person are notified at the earliest possible moment.

17. Police and other law enforcement officials must not use firearms against persons except:
(a) In self-defence or defence of others against the imminent threat of death or serious injury;
(b) To prevent the perpetration of a particularly serious crime involving grave threat to life;
(c) To arrest a person presenting such a danger and resisting their authority, or to prevent his or her escape.

18. Police and other law enforcement officials must only use firearms when less extreme means are insufficient to achieve the objectives contained in paragraph 17 (a)–(c) above.

19. Intentional lethal use of firearms may only be made when strictly unavoidable in order to protect life.

20. When police or other law enforcement officials are dispersing assemblies that are unlawful but non-violent, they must avoid the use of force or, where that is not practicable, they must restrict such force to the minimum extent necessary.

21. When police or other law enforcement officials are dispersing assemblies that are violent, they may use firearms only when less dangerous means are not practicable and only to the minimum extent necessary.

22. Before discharging a firearm, a police or other law enforcement official must:
(a) Identify himself or herself as a police or other law enforcement official;
(b) Give a clear warning of his or her intent to use firearms, with sufficient time for the warning to be observed unless to do so would unduly place the police or other law enforcement official at risk or would create a risk of death or serious harm to other persons, or would be clearly inappropriate or pointless in the circumstances of the incident.

23. When injury or death is caused by the use of force and firearms by a police or other law enforcement official, the officer or official must report the incident promptly to his or her superiors. Governments and law enforcement agencies must establish effective reporting and review procedures for these incidents.

4. CHEMICAL AND BIOLOGICAL WEAPONS

> *'Using existing drugs as weapons means knowingly moving towards the top of a 'slippery slope' at the bottom of which is the spectre of 'militarization' of biology, this could include intentional manipulation of peoples' emotions, memories, immune responses or even fertility.'*[175]

4.1 Overview of the weapons and their impact

This category covers an extremely wide range of substances, from biochemical incapacitants to riot control agents and malodorants. The effects of these different substances vary significantly.[176]

Biological/chemical incapacitants (also called 'calmatives', 'knock-out gas', or 'immobilizing agents') act on cell receptors in the central nervous system to produce various effects including sedation, disorientation, unconsciousness, and death.[177] As noted above,[178] there is no internationally agreed definition of an incapacitant. A medical professional has noted that incapacitants are centrally active on the brain, and are therefore distinguished from irritants, such as those used in riot control, which affect the body peripherally, such as the nose or throat.[179]

There are a wide variety of chemicals that could potentially be used as incapacitants and recent research has concentrated upon the following varieties of candidate agents: anaesthetic agents, skeletal muscle relaxants, opioid analgesics, anxiolytics, antipsychotics, antidepressants, and sedative-hypnotic agents. A number of these agents are currently legitimately used by the medical or veterinary professions as tranquilising or anesthetising agents.[180]

According to Lewer and Davison:

> 'The boundaries of chemistry and biology become blurred in this area since substances that can exert influence by action on specific cell receptor sites can have either a synthetic chemical origin (i.e. toxic chemicals/drugs) or a natural biological origin (i.e. bioregulators). ... These weapons

[175] British Medical Association, 2007, cited by Michael Crowley in his presentation to the May 2010 Meeting of Experts.
[176] For a useful overview of chemical and biochemical weapons see, e.g., the study by the British Medical Association, 'The use of drugs as weapons: the concerns and responsibilities of healthcare professionals', May 2007.
[177] They are therefore distinct from RCAs due to their 'central effects', whereas RCAs cause 'local irritation to the eyes and other mucous membranes'. N. Lewer and N. Davison, 'Non-lethal technologies—an overview', *Disarmament Forum*, Issue 1, 2005, p. 44.
[178] See, *supra*, Section 1.2.6.
[179] Statement by a participant at the May 2010 Meeting of Experts.
[180] See for example: Lakoski J., Bosseau Murray W. & Kenny J. (2000) The advantages and limitations of calmatives for use as a non-lethal technique, College of Medicine Applied Research Laboratory, Pennsylvania State University, October 2000, nldt2.arl.psu.edu/documents/calamative_ report.pdf, as cited in M. Crowley, 'Dangerous Ambiguities: Regulation of Riot Control Agents and Incapacitants under the Chemical Weapons Convention', Bradford Non-Lethal Weapons Research Project, University of Bradford, October 2009, p. 58, www.brad.ac.uk/acad/nlw/publications/BNLWRPDangerous1.pdf (accessed 10 April 2010).

> agents fall somewhere in between "traditional" chemical agents (nerve, blood and blister agents) and "traditional" biological agents (bacteria, viruses and rickettsia).'[181]

A broad range of observers, including scientific and medical professionals, arms control organisations, international legal experts, human rights monitors, and humanitarian organisations, as well as a number of States, are highly sceptical about the development and utility of incapacitants, highlighting the fact that such weapons are not inherently 'non-lethal', even if they were to be used with a 'non-lethal' intent. [182]

There are said to have been long-term health effects among the survivors of the 2002 Moscow theatre siege as a result of the use of what is believed to have been a derivative of the chemical, fentanyl.[183] As a participant at the May 2010 Meeting of Experts noted, fentanyl is used as an anaesthetic, and is therefore supposed to be used in circumstances that are carefully controlled by experienced professionals. Patients are checked before, during, and after an operation. Its use 'en masse' is therefore entirely inappropriate. According to a 2007 report by the British Medical Association:

> The agent whereby people could be incapacitated without risk of death in a tactical situation does not exist and is unlikely to in the foreseeable future. In such a situation, it is and will continue to be almost impossible to deliver the right agent to the right people in the right dose without exposing the wrong people, or delivering the wrong dose.[184]

As well as such technical barriers, there are a number of serious risks and damaging consequences that could follow from the development of such weapons including creeping legitimisation and the erosion of the norm against weaponisation of toxicity, proliferation to States and non-State actors, use of such weapons as lethal force multipliers and use in the facilitation of torture and other human rights violations; research in this area could also pave the way for the further malign application of advances in the life sciences.[185]

Riot control agents (RCAs) are defined under the *1993 Chemical Weapons Convention* as:

> Any chemical not listed in a Schedule,[186] which can produce rapidly in humans sensory irritation or disabling physical effects which disappear within a short time following termination of exposure.[187]

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[181] N. Lewer and N. Davison, 'Non-lethal technologies—an overview', *op. cit.*, p. 44.
[182] M. Crowley, 'Dangerous Ambiguities: Regulation of Riot Control Agents and Incapacitants under the Chemical Weapons Convention', *op. cit*, p. 59.
[183] Statement by a participant at the May 2010 Meeting of Experts.
[184] British Medical Association (BMA), The use of drugs as weapons: The concerns and responsibilities of healthcare professionals (London: BMA, May 2007). See, also, L. Klotz, M. Furmanski, and M. Wheelis, 'Beware the Siren's Song: Why "Non-Lethal" Incapacitating Chemical Agents are Lethal', 2003; and V. L. Klochikhin *et al.*, 'Principles of Modeling of the Scenario of Calmative Application in a Building with Deterred Hostages', 3rd European Symposium on Non-Lethal Weapons, Ettlingen, 10–12 May 2005.
[185] For further discussion see M. Crowley, 'Dangerous Ambiguities: Regulation of Riot Control Agents and Incapacitants under the Chemical Weapons Convention', *op.cit* pp. 60-63 and 84-86
[186] The *1993 Chemical Weapons Convention* distinguishes three classes of controlled substance in three Schedules: 1, 2, and 3.
[187] Article II(7), *1993 Chemical Weapons Convention*. According to the US Army's textbook of Military Medicine:

RCAs include synthetic chemicals CN, CS, and CR[188] as well as Oleoresin Capsicum (OC) or 'pepper spray', which is biological in origin.[189] CN was first used by police in the 1920s in the US. CS gas was developed by the UK's Porton Down research laboratory[190] and was used first in Cyprus in 1958–1959 by the British. CR was first synthesised in 1962. It attacks the mucous membranes, ears, nose and lungs.[191] On 16 October 1974, British forces allegedly used CR gas on Irish Republican and Loyalist prisoners in Long Kesh prison. The British government denied use of CR. This event remains controversial, and it is reported that some later developed cancer as a result of this. In the late 1980s, CR was reportedly used in the townships in South Africa. It caused some fatalities, particularly among children. Because of its alleged carcinogenic properties, the United States is said not to use CR for riot control. CR is also said to have been used in a prison in New Zealand in 1974.[192]

The primary role of RCAs is said to be to cause people who are potentially exposed to them to move away.[193] Indeed, according to one participant at the May 2010 Meeting of Experts, their effects typically disappear quickly if a person leaves the affected area. In some instances, however, misuse of RCAs, particularly in enclosed spaces, has resulted in serious injury or death:

> On 2 September 2004, riot police fired tear gas directly into the homes of Porta Farm residents in attempt to forcibly evict them. Eleven people subsequently died following exposure to tear gas.

> Riot control agents are compounds that cause temporary incapacitation by irritation of the eyes (tearing and blepharospasm), causing them to close, and irritation of the upper respiratory tract. They are often called irritants, irritating agents, and harassing agents; the general public usually calls them tear gas.

F. Sidell, 'Riot Control Agents', in Office of the Surgeon General, Department of the Army, *Textbook of Military Medicine: Medical Aspects of Chemical and Biological Warfare*, www.vnh.org/MedAspChemBioWar/chapters/chapter_12.htm (accessed 20 January 2010).

[188] According to one online report, CN gas:

> causes very intense irritation and skin pain, namely around moist areas, blepharospasm causing temporary blindness, coughing and gasping for breath, and panic. It is capable of causing immediate incapacitation.
>
> It is a suspected carcinogen, although evidence is questionable. It is toxic, but less so than its counterpart, CS gas, by ingestion and exposure. However, it can be lethal in large quantities. In a poorly ventilated space, an individual may inhale a lethal dose within minutes. Death is caused by asphyxiation and pulmonary edema.
>
> The effect of CR is long-term and persistent. CR can persist on surfaces, especially porous ones, for up to 60 days.

'CR gas', tripatlas.com/CR_gas (accessed 18 July 2010).

[189] N. Lewer and N. Davison, 'Non-lethal technologies—an overview', *Disarmament Forum*, Issue 1, 2005, p. 43.

[190] For a UK Ministry of Defence summary of the official history of Porton Down, see www.mod.uk/DefenceInternet/AboutDefence/WhatWeDo/HealthandSafety/PortonDownVolunteers/ (accessed 18 July 2010).

[191] See N. Davison, *'Non-Lethal' Weapons* (London: Palgrave Macmillan, 2009), pp. 16–19.

[192] Statement by a participant at the May 2010 Meeting of Experts.

[193] M. Crowley, 'Dangerous Ambiguities: Regulation of Riot Control Agents and Incapacitants under the Chemical Weapons Convention', *op. cit.*, p. 5.

> Among the dead were five babies – the youngest just one day old.[194]

Under the exception for these agents in the *1993 Chemical Weapons Convention*, a State Party is required only to make an initial declaration of which chemicals it holds for riot control,[195] it is not required to report the quantities it holds of RCAs, where they are held, and the means of delivery.[196] It is therefore not possible to determine whether a State Party's possession of RCAs is consistent with the permitted purposes under the treaty. There are also severe limitations on the level of public transparency in this area. Although the Organisation for the Prohibition of Chemical Weapons' Annual Report contains a summary of RCA declarations—for example, recording that as of 31 December 2008, 105 States Parties had declared retaining CS gas for permitted purposes, 64 held CN gas, and 10 were stockpiling CR gas[197]—it is impossible to identify which country holds which chemical agent.[198]

Malodorants are foul-smelling chemical compounds that are seen as having potential use for controlling crowds, clearing facilities, and area denial.[199]

It is clear that chemical and biological weapons can be lethal, even if they are labelled as 'non-lethal'. Lewer and Davison note that:

> The reversibility of effects, with no permanent deleterious change to the victim may be seen as a key aspect of any non-lethal weapon targeted at humans. However, a model developed by Klotz et alia suggests that no existing agents would be able to perform this role.[200] New compounds are likely to present similar problems. If a compound is extremely potent it will tend to have a poor safety ratio. If a compound has a good safety ratio it will tend to have a long onset time or not be sufficiently potent. ... Even with an 'ideal' compound (high safety ratio and high potency), there would be significant obstacles to 'non-lethality', that is the delivery of an effective but safe dose to all individuals in a given area, notwithstanding the differences in age, size and health and the problems of uneven concentrations and cumulative intake of agent.[201]

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[194] See Amnesty International, *Another Death at Porta Farm – 11 People Dead Following Police Misuse of Tear Gas*, October 2004; UN Commission on Human Rights, Extrajudicial, summary or arbitrary executions, Report of the Special Rapporteur, March 2006.

[195] Under Article III(1)(e), *1993 Chemical Weapons Convention*, States are required to submit to the OPCW, not later than 30 days after becoming a party to the treaty:

> (e) With respect to riot control agents: Specify the chemical name, structural formula and Chemical Abstracts Service (CAS) registry number, if assigned, of each chemical it holds for riot control purposes. This declaration shall be updated not later than 30 days after any change becomes effective.

[196] Important questions to ask would be: are they in hand-thrown canisters or sprays suitable for law enforcement or are they in mortar shells, artillery projectiles, or cluster bombs intended for armed conflict? Presentation by Michael Crowley to the May 2010 Meeting of Experts. Another participant noted during the meeting that the means of delivery was a key issue, as the difference between a drug and poison was largely a matter of dose.

[197] Presentation by Michael Crowley to the May 2010 Meeting of Experts.

[198] M.Crowley, 'Dangerous Ambiguities: Regulation of Riot Control Agents and Incapacitants under the Chemical Weapons Convention', *op. cit.*, pp. 52–54.

[199] N. Lewer and N. Davison, 'Non-lethal technologies—an overview', *op. cit.*, p. 43.

[200] L. Klotz, M. Furmanski, and M. Wheelis, 'Beware the Siren's Song: Why "Non-Lethal" Incapacitating Chemical Agents are Lethal', 2003, www.armscontrolcenter.org/cbw/old/papers/sirens_song.pdf (accessed 15 January 2010).

[201] N. Lewer and N. Davison, 'Non-lethal technologies—an overview', *Disarmament Forum*, Issue 1, 2005, p. 45, citing Federation of American Scientists Working Group on Biological Weapons, 'Position Paper: Chemical

Furthermore, the decision to use any drug 'whether intended to induce a state of calm or complete unconsciousness requires knowledge of a subject's medical history, particularly the use of any prescribed or non-prescribed medication and any relevant medical conditions. There would also be considerable responsibility in terms of immediate and post-incident aftercare.'[202]

Wheelis and Dando have also warned of the dangers of new drugs being developed in the future:

> In addition to drugs causing calming or unconsciousness, compounds on the horizon with potential as military agents include noradrenaline antagonists such as propranolol to cause selective memory loss, cholecystokinin B agonists to cause panic attacks, and substance P agonists to induce depression. The question thus is not so much when these capabilities will arise—because arise they certainly will—but what purposes will those with such capabilities pursue.[203]

4.2 International humanitarian law

The *1925 Geneva Gas Protocol*[204] prohibits the 'use in war' of 'asphyxiating, poisonous or other gases, and of all analogous liquids materials or devices' and 'agree to extend this prohibition to the use of bacteriological methods of warfare.' However, the extent to which this prohibition covers tear gas and other similar gases, or herbicides and similar agents is controversial.[205] Under the *1972 Biological Weapons Convention*:[206] each State Party:

> undertakes never in any circumstances to develop, produce, stockpile or otherwise acquire or retain:
>
> (1) Microbial or other biological agents, or toxins whatever their origin or method of production, of types and in quantities that have no justification for prophylactic, protective or other peaceful purposes;
>
> (2) Weapons, equipment or means of delivery designed to use such agents or toxins for hostile purposes or in armed conflict.[207]

Incapacitating Weapons Are Not Non-Lethal' (Washington, DC: Federation of American Scientists, 2003), www.armscontrolcenter.org/cbw/papers/pp/pp_chemical_incapacitants.pdf (accessed 14 January 2010).

[202] *ibid.*, p. 47. See, also, V. L. Klochikhin *et al.*, 'Principles of Modeling of the Scenario of Calmative Application in a Building with Deterred Hostages', 3rd European Symposium on Non-Lethal Weapons, *op. cit.*

[203] Wheelis, M. and Dando, M., 'Neurobiology: A case study of the imminent militarization of biology', *International Review of the Red Cross*, No. 859, 30 September 2005, pp. 553–572, available at: www.icrc.org/web/eng/siteeng0.nsf/html/review-859-p553 (accessed 18 July 2010).

[204] Protocol for the Prohibition of the Use of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare, adopted in Geneva on 17 June 1925.

[205] See, e.g., A. Roberts and R. Guelff, *Documents on the Laws of War*, Third Edition (Oxford: Oxford University Press, 2004), pp. 156–157.

[206] The formal title of this treaty is the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction.

[207] Article I, *1972 Biological Weapons Convention*. Under Article VIII,

> 'Nothing in this Convention shall be interpreted as in any way limiting or detracting from the obligations assumed by any State under the Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare, signed at Geneva on June 17, 1925.'

According to the *1993 Chemical Weapons Convention*,[208] each State Party:

> 'undertakes never under any circumstances:
>
> (a) To develop, produce, otherwise acquire, stockpile or retain chemical weapons, or transfer, directly or indirectly, chemical weapons to anyone;
>
> (b) To use chemical weapons.'[209]

A specific exception to the general prohibition is included for:

> (a) Industrial, agricultural, research, medical, pharmaceutical or other peaceful purposes;
>
> (b) Protective purposes, namely those purposes directly related to protection against toxic chemicals and to protection against chemical weapons;
>
> (c) 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;
>
> (d) Law enforcement including domestic riot control purposes.[210]

As noted above, riot control agents are defined as: 'Any chemical not listed in a Schedule, which can produce rapidly in humans sensory irritation or disabling physical effects which disappear within a short time following termination of exposure.'[211] Law enforcement is not defined, but according to one expert, the exception was included to enable the US to continue to use chemicals in its execution of the death penalty.[212]

International criminal law is also potentially applicable to the use of certain chemical agents. Under the *1998 Statute of the International Criminal Court*,[213] the International Criminal Court has jurisdiction over use in an international armed conflict of asphyxiating, poisonous or other gases, and all analogous liquids, materials or devices.[214] The first Review Conference of the Rome Statute in June 2010 extended jurisdiction for such use to an armed conflict of a non-international character, subject to the requisite ratification of the amendment by the States Parties.[215]

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[208] The formal title of this treaty is the Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction.
[209] Article I, paragraph 1, *1993 Chemical Weapons Convention*.
[210] Article II, paragraph 9, *1993 Chemical Weapons Convention*. *Cf.* also §1.2.5 *supra*.
[211] Article II, paragraph 7, *1993 Chemical Weapons Convention*.
[212] Statement by a participant at the May 2010 Meeting of Experts.
[213] Rome Statute of the International Criminal Court, adopted in Rome on 17 July 1998, UN doc. A/CONF.183/9, untreaty.un.org/cod/icc/statute/romefra.htm (accessed 19 April 2010).
[214] Article 8, paragraph 2 (b) (xviii), *1998 Statute of the International Criminal Court*.
[215] See 'Draft resolution amending article 8 of the Rome Statute', Review Conference of the Rome Statute, doc. RC/WGOA/1/Rev.2, www.icc-cpi.int/NR/rdonlyres/234A4C10-5526-4F4E-8C36-A37A7D91D963/0/RCWGOA1Rev2ENG.pdf (accessed 18 July 2010).

4.2.1 Riot Control Agents

The use of RCAs in armed conflict 'as a method of warfare' is explicitly prohibited by the *1993 Chemical Weapons Convention*.[216] Thus, the reported use of an RCA by Turkish armed forces against armed Kurdish fighters in 1999 may have breached the *1993 Chemical Weapons Convention*.[217] On 27 October 1999, German TV broadcast allegations of the reported use of CS gas by Turkish armed forces against Kurdish armed fighters hiding in a cave near Balikaya, south-east of Sirnak, on 11 May 1999. The military engagement resulted in the deaths of 20 Kurdish fighters. It is unclear whether they died from high concentrations of tear gas or whether they were shot when leaving the cave. A Turkish Foreign Ministry spokesperson, Sermet Atacanli, subsequently countered the allegations made by German TV, stating that Turkey had assumed the obligation not to develop, produce, store or use chemical weapons, which it meticulously observed. He declared that: 'It is logical to infer that Turkey cannot use such weapons if they do not exist in Turkey.'[218]

Lewer and Davison note that:

> In the run up to the war in Iraq, Secretary of Defense Donald Rumsfeld testified to the US Congress House Armed Services Committee, admitting that the US was attempting to 'fashion rules of engagement' to enable their use.[219] Subsequently President Bush authorized their use in Iraq in certain circumstances, and CS and pepper spray were shipped to the Gulf. This is legal in US law under Executive Order 11850, which was signed by President Ford in 1975 and permits the use of RCAs under specific conditions such as in 'riot control situations in areas under direct and distinct US military control, to include controlling rioting prisoners of war' and in 'situations in which civilians are used to mask or screen attacks and civilian casualties can be reduced or avoided'.[220] However, it is illegal under international law. Article I of the 1993 Chemical Weapons Convention (CWC) clearly states 'Each State Party undertakes not to use riot control agents as a method of warfare'.[221]

In 2004, the Independent Task Force sponsored by the US Council on Foreign Relations, which looked at the possible use of riot control agents stated its belief that:

> to press for an amendment to the CWC or even to assert a right to use RCAs as a method of warfare risks impairing the legitimacy of all NLW [non-lethal weapons]. This would also free others to openly and legitimately conduct focused governmental R&D that could more readily yield advanced lethal agents than improved nonlethal capabilities. … Accordingly the Task Force

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[216] Article I, paragraph 5, 1993 Chemical Weapons Convention.
[217] M. Crowley, 'Dangerous Ambiguities: Regulation of Riot Control Agents and Incapacitants under the Chemical Weapons Convention', *op. cit.*, pp. 4 and 35.
[218] *ibid.*, p. 35, citing, *inter alia*, Anatolia news agency (Ankara) 28 October 1999, as translated in BBC-SWB, 30 October 1999, EE/D3679/B; 'Spokesperson denies manufacture, use of chemical weapons', 991028, Harvard Sussex Program Events Database, retrieved 7 July 2009;
[219] D. McGlinchey, 'United States: Rumsfeld Says Pentagon Wants Use of Nonlethal Gas', *Global Security Newswire*, 6 February 2003, www.nti.org/d_newswire/issues/thisweek/2003_2_6_chmw.html#2 (visited 20 January 2010).
[220] US, Executive Order 11850, 8 April 1975, www.archives.gov/federal_register/codification/executive_order/11850.html (visited 20 January 2010).
[221] N. Lewer and N. Davison, 'Non-lethal technologies—an overview', *Disarmament Forum*, Issue 1, 2005, p. 43.

> judges that on balance the best course for the United States is to reaffirm its commitment to the CWC and the BWC and to be a leader in ensuring that other nations comply with the treaties.[222]

4.2.2 Malodorants

The US military do not consider the development of malodorants to be restricted by the *1993 Chemical Weapons Convention*:

> Malodorants are not considered toxic chemicals, since they do not cause—or are not specifically designed to cause—death, temporary incapacitation, or permanent harm to humans or animals.[223]

However, a US Council on Foreign Relations report on non-lethal weapons stated that malodorants are 'probably also classed as riot control agents' and could not therefore be used in warfare.[224]

4.2.3 Biological and chemical incapacitants

Certain biological/chemical incapacitants are covered only by the *1993 Chemical Weapons Convention*, while others also fall under the *1972 Biological Weapons Convention*.[225] According to Lewer and Davison:

> Synthetic chemicals such as the fentanyl derivative used by authorities during the 2002 Moscow theatre siege would fall into the theoretical "Industrial Pharmaceutical Chemicals" category and, as toxic chemicals, are covered by the CWC [*1993 Chemical Weapons Convention*] alone. However the superficial boundaries between this category and that of "Bioregulators" and "Toxins" are blurred. As Wheelis points out, the analogues of bioregulators and toxins are covered by the BTWC [*1972 Biological Weapons Convention*]. He argues, therefore, that synthetic chemical analogues (i.e. drugs) that bind to the same specific cell receptor sites in the body as the corresponding natural ligands (i.e. bioregulators) are also covered. The significance of this "double coverage" is that would-be developers of such agents should not be able to exploit the loophole in the CWC that permits the use of certain chemicals for "law enforcement including domestic riot control purposes". This is particularly important given conflicting interpretations of both the CWC's definition of RCAs and its provisions on the acceptable situations for use of such agents.[226]

Lewer and Davison assert that 'currently available incapacitating agents and associated delivery systems cannot be termed RCAs'.[227] Indeed, the UK stated in 2003 that no type of agent (RCA

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[222] G. Allison, P. Kelley, and R. Garwin, 'Nonlethal Weapons and Capabilities, Report of an Independent Task Force Sponsored by the Council on Foreign Relations' (New York: 2004), p. 32.
[223] National Research Council, *An Assessment of Non-lethal Weapons Science and Technology*, (Washington, DC: National Academies Press, 2003), books.nap.edu/openbook/0309082889/html/index.html (accessed 20 January 2010), cited by N. Lewer and N. Davison, 'Non-lethal technologies—an overview', *op. cit.*, p. 44.
[224] G. Allison, P. Kelley, and R. Garwin, 'Nonlethal Weapons and Capabilities, Report of an Independent Task Force', *op. cit.*, p. 56; see also N. Davison, '*Non-Lethal' Weapons*, *op. cit.*, 2009, p. 102.
[225] See M. Crowley, 'Dangerous Ambiguities: Regulation of Riot Control Agents and Incapacitants under the Chemical Weapons Convention', *op. cit.*, pp. 62–67 and 93–95.
[226] N. Lewer and N. Davison, 'Non-lethal technologies—an overview', *op. cit.*, pp. 44–45, citing M. Wheelis, 'Biotechnology and Biochemical Weapons', *Nonproliferation Review*, Vol. 9, No. 1 (2002).
[227] N. Lewer and N. Davison, 'Non-lethal technologies—an overview', *op. cit.*, p. 45.

or incapacitants) would be used in military operations because of its obligations under the *1993 Chemical Weapons Convention*.[228] The use of an incapacitant in the 2002 Moscow siege was not addressed collectively by States Parties to the *1993 Chemical Weapons Convention*, even though a Review Conference of the Convention occurred six months after the siege.[229]

4.3 International human rights law

As noted above, the use of most chemical agents is prohibited by the *1993 Chemical Weapons Convention* in all circumstances. The *1972 Biological Weapons Convention*, which also applies in all circumstances, does not explicitly prohibit the use of such weapons, although since possession is prohibited in all circumstances a prohibition also on use should be understood. Furthermore, two preambular paragraphs of the *1972 Biological Weapons Convention* declare the view of the States Parties that:

> 'Determined for the sake of all mankind, to exclude completely the possibility of bacteriological (biological) agents and toxins being used as weapons,
>
> Convinced that such use would be repugnant to the conscience of mankind and that no effort should be spared to minimize this risk.'[230]

Human rights law would clearly reflect the prohibitions on the use of weapons contained in these treaties. The situation with respect to biological and chemical incapacitants and riot control agents under human rights law when explicitly excluded from the treaty prohibitions is, however, more complex.

4.3.1 Biological/chemical incapacitants[231]

It has been argued by certain legal experts, such as Fidler, that the use of incapacitants may not violate the right to life 'in extreme law enforcement situations where authorities need to resort to potentially lethal force to resolve urgent, life threatening situations because less violent and dangerous methods have failed.'[232] However, even in such extreme situations the obligation to

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[228] Defence Secretary and the Chief of the Defence Staff: Press Conference at the Ministry of Defence, London, 27 March 2003, cited by N. Lewer and N. Davison, 'Non-lethal technologies—an overview', *op. cit.*, p. 47.

[229] For further discussion see M. Crowley, 'Dangerous Ambiguities: Regulation of Riot Control Agents and Incapacitants under the Chemical Weapons Convention', *op. cit.*, pp. 67–74; and D. P. Fidler, 'The meaning of Moscow: "Non-lethal" weapons and international law in the early 21st century,' *International Review of the Red Cross*, Vol. 87, No. 859 (September 2005).

[230] Ninth and tenth preambular paragraphs of the *1972 Biological Weapons Convention*. The second preambular paragraph stipulates that:

> Recognizing the important significance of the Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare, signed at Geneva on June 17, 1925, and conscious also of the contribution which the said Protocol has already made, and continues to make, to mitigating the horrors of war.

[231] This section is based on M. Crowley, 'Dangerous Ambiguities: Regulation of Riot Control Agents and Incapacitants under the Chemical Weapons Convention', *op. cit.*, pp. 96–99.

[232] This section is based on M. Crowley, 'Dangerous Ambiguities: Regulation of Riot Control Agents and Incapacitants under the Chemical Weapons Convention', *op. cit.*, pp. 96–99.

protect the right to life is maintained.[233] According to Aceves, 'the right to life norm places strict limits on the use of force, which includes the use of incapacitating biochemical weapons… States must, therefore, act with due diligence in all cases involving these weapons. The use of these weapons must be carefully regulated and cannot cause indiscriminate harm. Their use must be proportionate to the perceived threat and must be justified under the circumstances.'[234]

Furthermore, Fidler believes that: 'The inability to control dosage or exposure environment in extreme law enforcement emergencies heightens government responsibility to ensure all precautions are taken to minimize harm to innocent people and to provide immediate and adequate medical attention to those exposed and perhaps adversely affected.'[235]

Following an analysis of relevant law, Aceves concludes that:

> the prohibition against cruel, inhuman or degrading treatment places significant restrictions on the use of incapacitating biochemical weapons. These weapons are designed to impair the physical and mental integrity of the individual. Depending on the nature, duration and long-term effects of this impairment, the use of incapacitating biochemical weapons can give rise to a claim of cruel, inhuman, or degrading treatment.[236]

In Fidler's view:

> Non-consensual, non-therapeutic use of any chemical or biochemical against detained individuals would constitute degrading treatment and could constitute cruel or inhuman treatment and perhaps even torture.[237]

Fidler does, however, believe that there may be situations where use of incapacitants might be compatible with international human rights law, such as where the detained person poses an immediate, violent threat to himself or to safety and order in the detention facility.[238]

4.3.2 Riot Control Agents

Michael Crowley has noted that riot control agents, 'when used in accordance with manufacturers' instructions and in line with international human rights standards, can provide an important alternative to other applications of force more likely to result in injury or death e.g.

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[233] D. Fidler, 'Incapacitating Chemical and Biochemical Weapons and Law Enforcement Under the Chemical Weapons Convention', A. Pearson, M., Chevrier, and M. Wheelis (eds.), *Incapacitating Biochemical Weapons* (Lanham: Lexington Books, 2007), pp. 174–176.

[234] J. Aceves, 'Human Rights Law and the Use of Incapacitating Biochemical Weapons', in A. Pearson, M., Chevrier, and M. Wheelis (eds.), *Incapacitating Biochemical Weapons*, *op. cit.*, p. 268.

[235] D. Fidler, 'Incapacitating Chemical and Biochemical Weapons and Law Enforcement Under the Chemical Weapons Convention', A. Pearson, M., Chevrier, and M. Wheelis (eds.), *Incapacitating Biochemical Weapons*, *op. cit.*, p. 175.

[236] J. Aceves, 'Human Rights Law and the Use of Incapacitating Biochemical Weapons', in A. Pearson, M., Chevrier, and M. Wheelis (eds.), *Incapacitating Biochemical Weapons*, *op. cit.*, p. 271.

[237] D. Fidler, 'Incapacitating Chemical and Biochemical Weapons and Law Enforcement Under the Chemical Weapons Convention', A. Pearson, M., Chevrier, and M. Wheelis (eds.), *Incapacitating Biochemical Weapons*, *op. cit.*, p. 176.

[238] *ibid.*

firearms. They are legitimately employed by law enforcement officials for activities such as the dispersal of assemblies posing an imminent threat of serious injury, or the incapacitation of violent individuals. However they are also open to misuse.'[239]

In 2003, the Special Rapporteur on Torture noted that:

> chemical agents, such as tear gas/irritant ammunition and pepper spray weapons, are said to be promoted as providing effective control without the risk to life, i.e. as 'humane alternatives' to lethal force. However, according to information received, insufficient research has been undertaken into their potential effects on targeted persons. The Special Rapporteur notes in particular that chemical agents provided for 'crowd-control' purposes are prone to abuse if used against demonstrators in an indiscriminate manner. Precise practical guidelines regarding the circumstances in which such chemical agents may be used, as well as information regarding their effects on specific categories of persons such as children, pregnant women and persons with respiratory problems, are said often to be lacking.[240]

Michael Crowley's survey of the use of RCAs by law enforcement officials has found allegations of human rights abuses involving the use of RCAs in at least 35 countries and territories from 2004 to 2008.[241] The survey revealed that the use of RCAs has been reported to have been used to suppress the right to assembly and freedom of expression[242] as well as in acts of torture or cruel, inhuman, or degrading treatment or punishment.[243] In some instances, misuse of RCAs, particularly in enclosed spaces, has reportedly resulted in serious injury or death. Crowley has also noted the misuse of tear gas by a private military company. He notes that Blackwater deployed tear gas from a helicopter in Baghdad in 2005, ostensibly to clear a traffic jam, but due

[239] M. Crowley, 'Dangerous Ambiguities: Regulation of Riot Control Agents and Incapacitants under the Chemical Weapons Convention', *op. cit.*, p. 41.

[240] 'Civil and Political Rights, including the question of torture and detention: Study on the situation of trade in and production of equipment which is specifically designed to inflict torture or other cruel, inhuman or degrading treatment, its origin, destination and forms, submitted by Theo van Boven, Special Rapporteur on torture, pursuant to resolution 2002/38 of the Commission on Human Rights', UN doc. E/CN.4/2003/69, 13 January 2003, §12.

[241] Countries and territories cited are: Bahrain, Brazil, Cambodia, China, Côte d'Ivoire, the Democratic Republic of Congo, the Dominican Republic, East Timor, Egypt, Georgia, India, Indonesia, Iran, Israel, Kenya, Kosovo (Serbia), Malaysia, Maldives, Mauritania, Myanmar, Nepal, Nigeria, Pakistan, Russian Federation, South Africa, Sudan, Thailand, Togo, Turkey, Uganda, Ukraine, USA, Venezuela, Vietnam, and Zimbabwe. *Cf.* M. Crowley, 'Dangerous Ambiguities: Regulation of Riot Control Agents and Incapacitants under the Chemical Weapons Convention', *op. cit.*, p. 47.

[242] Georgia, Iran, Israel, USA, and Vietnam.

[243] Michael Crowley cites an April 2006 Human Rights Watch report on East Timor (*Tortured Beginnings: Police Violence and the Beginnings of Impunity in East Timor*), which documents use of excessive force during arrests, torture and ill-treatment of detainees by the National Police of East Timor (PNTL). In several cases, pepper spray was reportedly used. In the case of Venezuela, Human Rights Watch has reported that in early February and late March 2004, National Guard and police officers beat and tortured people detained during and after protests in Caracas and other Venezuelan cities. Some reported that their captors hurled tear gas bombs into the closed vehicles in which they were seated, causing extreme distress, near suffocation, and panic, while others described how the powder from tear gas canisters was sprinkled on their faces and eyes, causing burns and skin irritation. ('Events of 2004, Venezuela', *Human Rights Watch World Report 2005*, 12 January 2005), cited by M. Crowley, 'Dangerous Ambiguities: Regulation of Riot Control Agents and Incapacitants under the Chemical Weapons Convention', *op. cit.*, pp. 42–44.

to an error the gas was actually dropped on a US army checkpoint.[244]

As part of a seemingly pre-planned massacre at a stadium in Conakry, Guinea, on 28 September 2009, it has been reported that tear gas was first fired into the political gathering from outside.[245] This created a stampede, following which the security forces fired into the crowd. One opposition supporter, a 32-year-old man, described to Human Rights Watch how the 'red berets' (the Presidential Guard) entered the stadium and began firing directly at the protesters, and how the killings continued as he tried to escape:

> They first began to fire tear gas from outside the stadium – many canisters of tear gas were fired into the stadium. Just then, the red berets entered from the big gate to the stadium. As soon as they entered, they began to fire directly at the crowd. I heard a soldier yell, 'We've come to clean!' I decided to run to the gate at the far end. As I looked back, I could see many bodies on the grass. I decided to try and run out of the stadium.[246]

According to a UN report on the massacre, dozens of people attempting to escape through the stadium gates 'either suffocated or were trampled to death in stampedes, which were compounded by the use of tear gas.'[247]

[244] Presentation by Michael Crowley to a meeting of the Geneva Forum on 'Non-lethal' Weapons in Policy, Practice and Law, Geneva, 26 November 2009 (author's notes).
[245] This incident was raised in the presentations of Michael Crowley and Brian Rappert to the May 2010 Meeting of Experts. Both cited: Amnesty International, Guinea: 'You did not want the military, so now we are going to teach you a lesson', February 2010 AI Index: AFR 29/001/2010.
[246] Human Rights Watch, 'Guinea: September 28 Massacre Was Premeditated, In-Depth Investigation Also Documents Widespread Rape', 27 October 2009, www.hrw.org/en/node/86269 (accessed 25 June 2010).
[247] Report of the International Commission of Inquiry mandated to establish the facts and circumstances of the events of 28 September 2009 in Guinea, §62, annexed to Letter dated 18 December 2009 addressed to the President of the Security Council by the UN Secretary-General, UN doc. S/2009/693, www.un.org/ga/search/view_doc.asp?symbol=S/2009/693&Submit=Search&Lang=E (accessed 1 July 2010).

5. ELECTRICAL (ELECTRO-SHOCK) WEAPONS

> *'We, along with our sister circuits, have held that tasers and stun guns fall into the category of non-lethal force… Non-lethal, however, is not synonymous with non-excessive; all force—lethal and non-lethal—must be justified by the need for the specific level of force employed… Nor is "non-lethal" a monolithic category of force. A blast of pepper spray and blows from a baton are not necessarily constitutionally equivalent levels of force simply because both are classified as non-lethal. Rather than relying on broad characterizations, we must evaluate the nature of the specific force employed in a specific factual situation.'*
>
> US Court of Appeals for the Ninth Circuit in the case of Bryan v. McPherson, 2010

5.1 Overview of the weapons and their impact

As their name suggests, electrical weapons use the application of electricity to cause pain and in the case of Electronic Control Devices (ECDs) incapacitate their targets.[248] These weapons include stun guns, stun belts, and certain types of electrified 'landmine'.[249] ECDs are designed to use wired projectiles or direct contact to deliver electrical energy to affect the sensory and motor functions of the skeleton nervous system.[250]

5.1.1 Tasers

The best known electrical weapon is probably the TASER ECD,[251] a product of TASER International, Inc. headquartered in the USA. As of end June 2010, TASER International had sold approximately 499,000 TASER® brand ECDs (Tasers) to more than 15,500 law enforcement and military agencies in more than 45 countries worldwide. More than 6,400 agencies were deploying the weapons to all patrol officers. In addition, more than 221,000 of the weapons have been sold to the general public for personal protection.[252] They are currently

[248] Taser International notes that it is a myth that high voltage is dangerous; it is sustained amperage that is hazardous. Presentation by Peter Holran, Vice President, Government and Public Affairs, TASER International, to the May 2010 Meeting of Experts.

[249] The TASER Shockwave is used like a Claymore directional fragmentation device and could be used by the military at checkpoints and for area control by law enforcement personnel. It has a 100 yard loop and will be video controlled with 'target recognition'. Remarks by Peter Holran, TASER International, to the May 2010 Meeting of Experts.

[250] *ibid.*

[251] TASER is an acronym for Thomas A. Swift's Electrical Rifle, based on the child's novel *Tom Swift and his Electric Rifle* by Victor Appleton, published in 1911. See further, *infra*, for details of the TASER ECD.

[252] Updated numbers as of 30 June 2010, after presentation by Peter Holran to the May 2010 Meeting of Experts. The company's website claims that the TASER C2, the model marketed for sale to the general public is:

> far more powerful than a traditional stun gun. First, it can incapacitate an attacker from up to 15 feet away while a stun gun requires direct contact with the threat. This gives you a zone of protection other self-defense options cannot offer. Second, unlike stun guns, TASER technology does not rely on pain compliance localized to the point of contact; rather it affects the sensory and motor functions of the nervous system and inhibits muscular control. This keeps an attacker down and immobilized for 30 seconds not just 'stunned' for as long as you maintain contact. However, TASER C2 can also be used as a stun device if necessary.

available in most states of the United States and 22 other countries.[253] According to the TASER International website, Tasers are not considered firearms by the U.S. Bureau of Alcohol, Tobacco, Firearms, and Explosives (BATF) because the TASER cartridge uses compressed, inert nitrogen gas to launch the probes instead of gunpowder.[254] This situation is not the same in all other countries.

According to the company:

> TASER technology protects life, and the use of TASER devices dramatically reduces injury rates for law enforcement officers and suspects.[255]

TASER International notes that Tasers have been used more than two million times: an estimated 1,070,785 (±2%) times for field use and an estimated 1,107,033 (±7%) times in training or against volunteers. It believes that were there significant health implications from Taser use, they would have become evident by now.[256] It cites an interim report of a study released in June 2008 by the National Institute of Justice: Study of Deaths Following Electro Muscular Disruption. According to the company, an expert panel of physicians, medical examiners, and other relevant specialists in cardiology, emergency medicine, epidemiology, pathology and toxicology concluded that:

> [a]lthough exposure to CED [Taser] is not risk free, there is no conclusive medical evidence within the state of current medical research that indicates a high risk of serious injury or death from the direct effects of CED exposure.
>
> ... the risk of a death or serious injury is low when police use TASERs against healthy adults.[257]

Amnesty International has, though, noted the dangers of use in repeated and prolonged fashion. It believes that the weapons are inherently open to abuse as they are portable devices for causing pain without leaving marks. The organisation has concluded that since 2001 more than 400 deaths have followed Taser use, including 50 in which the use of a Taser was reported to be a cause or contributory factor.[258] Concerns have thus been raised about Tasers, including that some people are more vulnerable to serious injury or death from its effects; that adequate medical

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TASER International, 'Common Myths', www.itaser.com/common_myths.html (accessed 22 April 2010).

[253] Presentation by Peter Holran, Vice President, Government and Public Affairs, TASER International, to the May 2010 Meeting of Experts. It is legal to own a TASER C2 ECD in the US except in the following states: Hawaii, Massachusetts, Michigan, New Jersey, New York, Rhode Island, Wisconsin, and the District of Columbia. Other states might have limited restrictions on the use or possession of ECDs. TASER International, 'Common Myths', www.itaser.com/common_myths.html (accessed 22 April 2010).

[254] Since the first generation TASER device used gunpowder, the BATF in the USA declared the TASER a Title II firearm and it remained mainly unavailable to consumers in 1976 even as a Title I firearm. TASER International, 'Company trivia', www.taser.com/company/Pages/trivia.aspx (accessed 22 April 2010).

[255] Taser, 'About TASER', www.taser.com/company/pages/aboutTASER.aspx (accessed 22 April 2010).

[256] Updated numbers as of June 30, 2010, after presentation by Peter Holran, Vice President, Government and Public Affairs, TASER International, to the May 2010 Meeting of Experts.

[257] *ibid.*

[258] Presentation by Angela Wright, Researcher, Amnesty International, to the May 2010 Meeting of Experts.

research into the safety of more powerful such weaponss has not been carried out;[259] and that it may be used for torture.[260] One participant at the May 2010 Meeting of Experts questioned whether depression of the immune system could be a long-term effect of the use of weapon.

A review of reports of Taser use in 2002–2006, published in 2010,[261] found that:

> Several suspect factors were significantly associated with the reporting of a fatal TASER incident, including drug use (but not alcohol), mental illness, and continued resistance. Multiple deployments of the TASER against a suspect was also associated with the likelihood of the article describing a fatality—especially if the suspect was emotionally disturbed—which raises the possibility that the risk of multiple shocks might not be uniform for all suspects.[262]

The article concluded that more research is needed 'to explore the relationship between mental illness, drug use (illicit or therapeutic), continued resistance, and increased risk of death. In the meantime, police departments should develop specific policies and training governing the use of multiple Taser shocks against individuals who could be in these vulnerable physiological and psychological states.'[263]

A medical study published in 2010,[264] which involved the user of TASER ECDs[265] and pepper spray[266] against volunteers,[267] simulated encounters between law enforcement authorities and

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[259] With respect to this point, TASER International Inc. points out that 'there are more than 290 major medical and scientific studies, abstracts and reports on the TASER technology. No other force option has more than 1/10 this number of peer-reviewed published studies.' Email from Peter Holran, Vice President Government and Public Affairs, TASER International Inc., 23 August 2010.

[260] N. Lewer and N. Davison, 'Non-lethal technologies—an overview', *Disarmament Forum*, Issue 1, 2005, p. 41; see also Amnesty International, *United States of America, Excessive and lethal force? Amnesty International's concerns about deaths and ill-treatment involving police use of tasers* (London: Amnesty International, November 2004), Report No. AMR 51/139/2004.

[261] M. D. White and J. Ready, Arizona State University, 'Examining fatal and nonfatal incidents involving the TASER, Identifying predictors of suspect death reported in the media', *Criminology & Public Policy*, Vol. 8, Issue 4 (2010), pp. 865–891.

[262] *ibid.*, pp. 865–866.

[263] *ibid.*, p. 866.

[264] Dr Jeffrey D. Ho *et al.*, 'Basic Investigation, Acidosis and Catecholamine Evaluation Following Simulated Law Enforcement "Use of Force" Encounters', *Academic Emergency Medicine*, 2010, No. 17, pp. E60–E68. TASER International, Inc., provided partial funding for the study. It was disclosed in the article that one of the authors serves as the contractual medical director and a medical consultant to TASER International, Inc. and other serves as a medical consultant to TASER International, Inc. Both personally own shares of stock in the company.

[265] According to the study report:

> The subject was exposed to a 10-second continuous TASER X26 electronic control device discharge to the back with deployed probes. The probes were deployed with the subject in the prone position on a protective mat from a distance of approximately 7 feet; the operator fired from an elevated position on a stepladder. The probes and the TASER device were standard products from the manufacturer. The spread between the probes was measured to indicate the area of the subject exposed to the current.

ibid., p. E61.

[266] According to the study report:

> The subject was sprayed with 10% OC foam (Sabre Red, Security Equipment Corp, Fenton, MO) for a period long enough in duration to cover the face and the anterior portion of the neck (approximately 2–3

resisting suspects. The report noted that these encounters 'sometimes result in the sudden and unexpected death of the suspect. Drug intoxication, excited delirium syndrome, or excessive uses of force are factors that are often blamed, but sometimes the mechanism of these deaths is not fully understood. It is possible that worsening acidosis or excessive catecholamine release play a part.' The objective of the study was therefore to determine the effect on markers of acidosis and catecholamines of various tasks intended to simulate common arrest-related situations. The study found that simulations of physical resistance and fleeing on foot led to the greatest changes in markers of acidosis and catecholamines and concluded that these changes may be contributing or causal mechanisms in sudden custodial arrest-related deaths. It found only mild effects from the Taser.[268]

As noted above, there is also concern that the weapons are not being employed as an alternative to lethal force but often as a compliance tool for police.[269] TASER International has stated that Tasers 'are an option as a response to resistance; not an alternative to another response, including lethal force.' It has noted that most law enforcement agencies rate the use of ECDs at above the use of hands and below the use of 'lethal' force.

The US Court of Appeals for the Ninth Circuit in the 2010 case of *Bryan v. MacPherson* declared that:

> We recognize the important role controlled electric devices like the Taser X26 can play in law enforcement. The ability to defuse a dangerous situation from a distance can obviate the need for more severe, or even deadly, force and thus can help protect police officers, bystanders, and suspects alike. We hold only that the X26 and similar devices constitute an intermediate, significant level of force that must be justified by 'a strong government interest [that] compels the employment of such force.'[270]

TASER International has drafted an analysis of the decision in *Bryan v. MacPherson*, which states, *inter alia*, as follows:

> As always, context is critical in determining the justification of uses of force and this case is no exception. Under the specific facts of Bryan, the use of an ECD at that juncture in the officer's interaction with the plaintiff was found to be unjustified. Significantly, there were several established protocols regarding the use of ECDs that were allegedly not followed by the officer. For instance, the court strongly considered the officer's failure to give a preemptive warning to the plaintiff along with the failure to attempt to use less intrusive means to engage compliance in determining that the immediate jump to using the ECD was not justified. In spite of spin to the

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> seconds). The subject was sprayed with eyes and mouth closed and was allowed to rinse the foam off with water after 10 seconds of exposure time. The subject was allowed access to continuous fresh air, running water, and a cooling fan if desired following the exposure.

ibid., p. E62.

[267] Each of the volunteers was given a TASER ECD in lieu of remuneration for their participation in the study.

[268] Dr Jeffrey D. Ho *et al.*, 'Basic Investigation, Acidosis and Catecholamine Evaluation Following Simulated Law Enforcement "Use of Force" Encounters', *op. cit.*, p. E62.

[269] N. Davison, *'Non-Lethal' Weapons*, *op. cit.*, p. 97; see also N. Lewer and N. Davison, 'Electrical Stun Weapons: Alternative to Lethal Force or a Compliance Tool' (Bradford: University of Bradford, 2006). Presentation by Peter Holran, Vice President, Government and Public Affairs, TASER International, to the May 2010 Meeting of Experts.

[270] *Bryan v. MacPherson*, 608 F.3d 614 622, Case No. 08-55622 (9th Cir. (CA) 2010).

> contrary, the decision in Bryan is in line with existing training protocols and established law regarding the proper use of ECDs.
>
> Ultimately, Bryan does serve as a significant and important reminder of multiple points. First, ECDs cause pain and are not risk free, and officers need to consider the risk of secondary injuries from incapacitation and falls in determining when and how to deploy an ECD. Second, ECDs are an 'intermediate or medium, though not insignificant' use of force and every trigger pull must be justified as a separate use of force. Third, as in any 4th Amendment force analysis, an officer must consider the totality of the circumstances, including whether the suspect poses an immediate threat to the safety of the officers or others, whether he is actively resisting arrest or attempting to evade arrest by flight, and the severity of the crime at issue. Fourth, especially when a suspect is not an immediate threat or a flight risk, when officers are attempting to use force to gain voluntary compliance, officers should warn of the impending use of an ECD, assess whether their warnings are clearly heard and understood, and give a reasonable time for volitional compliance with officers' commands. Fifth, there should be regularly scheduled, refresher or remedial training for officers using ECDs. And, officers should be reminded to engage suspects in a manner consistent with their department's use of force protocols, including the consideration of less than intermediate uses of force where appropriate.[271]

There have been numerous allegations of misuse of the weapon.[272] Davison notes, for example, a 2004 review of Taser use by police in one county of Colorado in which a third of the 112 victims had been handcuffed at the time.[273] In June 2009, a 72-year-old great-grandmother in Texas threatened to sue police after an officer 'tasered' her. Kathryn Winkfein was pulled over for speeding in Austin, Texas, and the officer shocked her with the Taser after she resisted arrest and became argumentative. CCTV footage showed her screaming with pain on the ground although police claimed that she was not seriously injured.[274] In 2010, an 85-year-old man was tasered outside his home by police. He was suffering from dementia, but was not violent.[275]

As a consequence of alleged misuse, Tasers have been the subject of a number of court cases and criminal investigations across the world. The authors of the review of Taser use in 2002–2006 cited above refer to the indictment by a grand jury in Louisiana in 2008 of a police officer on a manslaughter charge. The case involved the death of a suspect who was shocked nine times with a Taser.[276]

The 2010 judgment in the US Court of Appeals for the Ninth Circuit (*Bryan v. MacPherson*, referred to above) concerned the allegedly excessive use of force by a police officer who

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[271] Taser, 'Short Synopsis of the Bryan v. McPherson Decision', 6 January 2010, p. 2, www.taser.com/SiteCollectionDocuments/01-06-10%20_CA_%20Bryan%20v%20McPherson%20Synopsis.pdf (accessed 25 January 2010).

[272] A website in the US is dedicated to highlighting instances it claims are of excessive or inappropriate TASER ECD use. See the Stop Taser Abuse Network website, www.stoptasers.net/about/ (visited 17 July 2010).

[273] N. Davison, 'Non-Lethal' Weapons, *op. cit.*, p. 5.

[274] J. Donnison, 'Texan senior sues over stun gun', BBC News online, 10 June 2009, news.bbc.co.uk/2/hi/8094023.stm (accessed 10 May 2010).

[275] Presentation by Angela Wright, Researcher, Amnesty International, to the May 2010 Meeting of Experts.

[276] National Institute of Justice, 'Study of deaths following electromuscular disruption: Interim report' (Washington, DC: Office of Justice Programs, U.S. Department of Justice, 2008), 3, cited by M. D. White and J. Ready, Arizona State University, 'Examining fatal and nonfatal incidents involving the TASER, Identifying predictors of suspect death reported in the media', *op. cit.*, p. 866.

'tasered' the driver of a car he had stopped at a light using the X26 model. According to the Court:

> Upon striking a person,[277] the X26 delivers a 1200 volt, low ampere electrical charge through the wires and probes and into his muscles. The impact is as powerful as it is swift. The electrical impulse instantly overrides the victim's central nervous system, paralyzing the muscles throughout the body, rendering the target limp and helpless…
>
> Bryan [the victim of the TASER ECD] vividly testified to experiencing both paralysis and intense pain throughout his body when he was tasered. In addition, Officer MacPherson's use of the X26 physically injured Bryan. As a result of the taser, Bryan lost muscular control and fell, uncontrolled, face first into the pavement. This fall shattered four of his front teeth and caused facial abrasions and swelling. Additionally, a barbed probe lodged in his flesh, requiring hospitalization so that a doctor could remove the probe with a scalpel. A reasonable police officer with Officer McPherson's training on the X26 would have foreseen these physical injuries when confronting a shirtless individual standing on asphalt. We have held that force can be unreasonable even without physical blows or injuries…[278]

In June 2010, an inquiry found that Canadian police officers were not justified in using a Taser gun on a Polish immigrant at Vancouver airport. Robert Dziekanski, who did not speak English, died after being stunned five times with a Taser in 2007. British Columbia's attorney general said a special prosecutor would examine the possibility of criminal charges against the four officers involved. Thomas Braidwood, the head of the inquiry commission, said police had not been justified in using the Taser, and that Mr Dziekanski had not posed a threat to the officers, as had been claimed. He said that the five jolts and the ensuing struggle with police had 'contributed substantially to Mr Dziekanski's death'.[279]

A case in Georgia in the US came to national prominence in July 2010 when two officers lost their jobs in the wake of repeated tasering of a woman the previous April.[280] According to *The Atlanta Journal-Constitution* (AJC), Janice Wells called the Richland Police Department when she feared a prowler was outside her house in the rural west Georgia town.

> The third-grade teacher had phoned for help. But within minutes of an officer coming to her backdoor, she was screaming in pain and begging not to be shocked again with a Taser. With each scream and cry, the officer threatened her with more shocks.
>
> 'All of it's just unreal to me. I was scared to death,' Wells said in an interview with the AJC. 'He kept tasing me and tasing me. My fingernails are still burned. My leg, back and my butt had a long scar on it for days.'

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[277] 'According to the manufacturer, the probes do not need to penetrate the skin of the intended target to result in a successful connection. The probes are capable of delivering their electrical charge through up to two inches of clothing…'
[278] *Bryan v. MacPherson*, 608 F.3d 614, 620, fn 4, Case No. 08-55622 (9th Cir. (CA) 2010).
[279] 'Canada stun gun death "not justified"', *BBC news*, 19 June 2010, www.bbc.co.uk/news/10356485 (accessed 14 October 2010).
[280] Rhonda Cook, '2 officers out of jobs in wake of repeated Tasering of woman', *The Atlanta Journal-Constitution*, 13 July 2010, www.ajc.com/news/2-officers-out-of-568967.html (accessed 15 July 2010).

> The officer in question ... who quit eight days after the incident, remains unrepentant. 'I did what I had to do to take control of the situation,' Smith told the AJC about his decision to repeatedly discharge his Taser. Yet his former boss, Lumpkin Police Chief Steven Ogle, was shocked when he saw the video. 'I couldn't believe it,' Ogle said. 'You don't use it [a Taser] for punitive reasons, to prod someone. It was evident it was an improper use of force. He was an excellent officer other than that incident.'[281]

In the UK, the *Daily Telegraph* has reported that the British Association of Chief Police Officers has said the weapon has been shown to have a significant deterrent effect.[282] Firearms officers in the UK became authorised to carry Tasers in 2004. The Home Office authorised officers to use the weapons in a wider range of circumstances from July 2007. Officers had been able to use the high-voltage weapons only in circumstances when they could have used a conventional firearm but the new rules allowed Tasers to be used in less serious incidents, although only when they still faced violence or threats of violence. Non-firearms officers were authorised to use the weapons—provided they were given additional training—in September 2007 under a pilot scheme involving 10 forces. The following year the Home Office expanded the scheme to all 43 forces in England and Wales and use of the stun guns increased by nearly a third.[283]

In June 2009, the UK Independent Police Complaints Commission (IPCC) brought in new rules which meant police forces had to pass all complaints about Tasers to the police watchdog. In September 2010, it was reported that the company that supplied the Taser guns used by the British police in the stand-off with gunman Raoul Moat in July had breached its licence. The

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[281] *ibid*. CNN's reporting of the incident included the following exchange between an interviewer and a former police officer:

RICK SANCHEZ [CNN anchor]: Andy, first of all, let me share with you some new information. One of those officers has been suspended and the other has been fired. I think you would agree they should probably have been suspended and fired, if not both fired at this point, right?

ANDY HILL [Retired Police Officer, Phoenix Police Department]: Not only that, but I'm sure depending upon what the internal investigations could show, there might be cause to look into some criminal charges if she was restrained already when she was tased. That's a tough one.

SANCHEZ: … I don't understand why it's so hard for police departments in the United States to teach their officers that these tasers are not toys. They're not going to be used like flashlights, that they have an effect. And that they're supposed to be used for compliance, to warn people that you'll use if they stop doing something or if they don't do something, not to start tasing someone and then start making demands of them. That just doesn't make any sense, Andy.

HILL: That's almost like retribution. What's inside that taser tells you how long the duration the trigger is pulled, how many times. It's very helpful in investigations.

CNN Transcripts, 15 July 2010, transcripts.cnn.com/TRANSCRIPTS/1007/15/rlst.01.html (visited 17 July 2010).

[282] 'Raoul Moat: Northumbria Police topped Taser league table', *Daily Telegraph*, 11 July 2010, www.telegraph.co.uk/news/uknews/law-and-order/7884051/Raoul-Moat-Northumbria-Police-topped-Taser-league-table.html (accessed 13 July 2010).

[283] Police officers have on occasion volunteered to be stunned by a Taser to show its effects. In 2007, North Wales chief constable Richard Brunstrom was seen shouting 'bloody hell' in a video as he was stung by the weapon. Mr Brunstrom was hit with the Taser for 1.5 seconds before telling his officers: 'That was long enough, thanks.' See, e.g., the videos available on YouTube, at: www.youtube.com/watch?v=3Vx_PqJg0tA&NR=1; and www.youtube.com/watch?v=02Zwg8Xnop0 (accessed 15 July 2010).

XRep Taser, which is fired from a 12-gauge shotgun, was being tested by the Home Office before being approved for use by police forces in England and Wales. Pro-Tect Systems was licensed to supply the Taser guns to the Home Office for testing, but was not licensed to supply them to police. According to a press report, there was no suggestion that any blame should be attached to the officers involved and the UK Home Office stressed that police could use any weapon they saw fit as long as its use was 'lawful, reasonable and proportionate'.[284]

Armed police fired two Tasers at Mr Moat in an 'effort to stop him taking his own life' at the Riverside park area in Rothbury, Northumberland, in the early hours of 10 July 2010. The stand-off brought to an end one of the biggest manhunts in British history, triggered when Moat shot his former girlfriend, killed a man, and blinded a police constable. But the precise sequence of events regarding the discharge of the XRep Tasers in relation to Moat firing his sawn-off shotgun had not been established as of October 2010 and was under investigation by the IPCC. Steve Reynolds of the IPCC told the inquest: 'The review of tactics will consider the deployment and use of the XRep Taser.'[285]

In Australia in early October 2010, a video was released in which an unarmed Aboriginal man, thought to be mentally ill, was seen being tasered 13 times by police officers.[286] The incident occurred in Perth in 2008, and was released as part of a report on the use of taser guns by the Western Australian police.[287] The premier of the state, Colin Barnett, condemned the incident as an 'unjustified use of excessive force', while the state's attorney general expressed surprise that no charges had been brought against the police officers shown in the film. He also promised to look at toughening the guidelines for the use of taser stun guns and to make sure they are only used in dangerous and life-threatening situations. Tasers were introduced to provide police officers with an alternative to handguns, but the Corruption and Crime Commission (CCC) report found that there is a growing tendency to use them for compliance and for those resisting arrest.[288] The CCC report also found Tasers were being used disproportionately against Aboriginal people.[289]

Subsequently, Western Australia's Police Commissioner Karl O'Callaghan, speaking to officers through a video presentation, said:

> The response by some of those officers responsible for the watchhouse incident in 2008 was a gross over-reaction and serious breach of Taser useage policy. (…)

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[284] W. Johnson and H. Macknight, 'Moat Taser gun was not licensed for police use', *The Independent*, 28 September 2010, www.independent.co.uk/news/uk/crime/moat-taser-gun-was-not-licensed-for-police-use-2091727.html (accessed 14 October 2010).

[285] *ibid.*

[286] He was actually tasered 14 times according to the Western Australia police fact sheet on the incident. See 'WA Police – Perth Watch House Taser Incident Facts', available at: www.police.wa.gov.au/LinkClick.aspx?fileticket=owgUt6Npd4w%3d&tabid=1730 (visited 14 October 2010).

[287] It subsequently transpired that the same man was tasered a further 11 times in prison. See, *supra*, Introduction, p. 1.

[288] N. Bryant, 'Australian police taser video sparks anger', *BBC News*, Sydney, 5 October 2010, www.bbc.co.uk/news/world-asia-pacific-11473752 (visited 14 October 2010).

[289] N. Cox, 'Top cop issues fresh Taser warning', *PerthNow*, 13 October 2010, www.perthnow.com.au/news/western-australia/top-cop-issues-fresh-taser-warning/story-e6frg143-1225938368443 (visited 14 October 2010).

> In 2007, Tasers were issued to frontline officers to prevent injury either to the officers or to members of the public. I do not expect you to risk injury from a physical attack. I maintain that position today. I also said at the time that Tasers were not to be used to enforce compliance. They are not an instrument to be used in the face of non-compliance unless accompanied by a physical attack. (…)
>
> It will be very difficult to convince me that you are acting in self defence if, for example, you Taser someone in the back, someone who is already lying on the ground or is turning away. Multiple Taser strikes on the same person will also be very closely scrutinised.[290]

5.1.2 Other electrical weapons

Lewer and Davison also note the development of weapons that can deliver incapacitating shocks without the need for wires, using a laser beam to enable an electrical charge to be delivered to the target person or vehicle.[291]

Jaycor, a US company, reported several years ago that it had developed 'wireless stun gun technology' that could deliver 'electric shocks to individuals at ranges up to 25 feet without conductive wires. An electrified conductive fluid is ejected from a gun at high velocity, making contact with stationary or moving targets. The single stream of fluid delivers a high-voltage pulse capable of delivering a shock even through thick protective clothing.'[292] According to the company:

> The liquid stun gun has significant advantages over the handheld electric stun devices or the electric stun devices with attachment wires capable of being projected toward targets up to 15 feet away. The liquid stun gun can engage one or more persons, and does not require attachment wires with barbed tips, which often must be surgically removed. The water stream may be moved among targets until the selected target is positively engaged before the high voltage is applied. This feature can be used to avoid stunning innocent bystanders or hostages.
>
> This wireless stun gun technology can also be used in conjunction with a vehicle-mounted water cannon for use in crowd or riot control. Water can be sprayed on the crowd, delivering debilitating but not lethal shocks. In certain military applications the electrical current could be controlled to deliver potent electrical shocks to equipment as well as individuals.[293]

It appears, however, that this product development has been discontinued in favour of the 'Sticky Shocker', a form of stun gun that shoots out a sticky electrified projectile as opposed to a dart.[294]

5.2 International humanitarian law

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[290] *ibid.*
[291] D. Hambling, 'Stun weapons to target crowds', *New Scientist*, 19 June 2004, p. 24, cited by N. Lewer and N. Davison, 'Non-lethal technologies—an overview', *Disarmament Forum*, Issue 1, 2005, p. 41.
[292] Jaycor, 'Water Cannon', web.archive.org/web/20040626083201/http://www.jaycor.com/eme/watcan.htm (visited 21 April 2010).
[293] *ibid.*
[294] See, e.g., Jaycor, 'Sticky Shocker', www.jaycor.com/eme_ltl_sticky.htm (visited 21 April 2010).

There is no specific provision of international humanitarian law governing the use of electrical weapons. As with any weapons, they would need to accord with the general principles set out in Section 3.1.1 above. In general, they would not appear to be either inherently indiscriminate or to be 'of a nature' to cause superfluous injury or unnecessary suffering. A TASER ECD 'landmine' has been developed,[295] but this would not fall within the definition laid down in the *1997 Anti-Personnel Mine Ban Convention* as it does not contain explosives.

According to the US Department of Defense, it is planned to include Tasers in the Air Force's new non-lethal capability sets called Escalation-of-Force Kits. These new kits, which are still in the development stage, include four mission-specific modules: crowd control, convoy, entry control, and hasty/snap checkpoint missions.[296]

5.3 International human rights law

According to the former UN Special Rapporteur on Torture, a number of 'non-lethal' weapons, 'in particular electro-shock weapons, lend themselves to abuse as they can be used to inflict great pain without leaving major visible traces of injury. The range of devices relying on high voltage electro-shock technology is said to have expanded throughout the 1990s, and electro-shock batons and stun guns were followed by the production of stun shields, dart-firing stun guns, stun belts and tear gas stun weapons.' The Special Rapporteur noted that electro-shock devices 'are alleged to have been used to torture or ill-treat persons in prisons, detention centres or police stations in at least 76 countries in every region of the world.'[297]

More recently, with respect to the use of TASER X26 ECD, the UN Committee against Torture, which monitors the implementation of the *1984 UN Convention Against Torture*, stated in 2007 that:

> The Committee is deeply concerned about the recent purchase by the State party of electric 'Taser X26' weapons for distribution to the Lisbon Metropolitan Command, the Direct Action Corps, the Special Operations Group and the Personal Security Corps. The Committee is concerned that the use of these weapons causes severe pain constituting a form of torture, and that in some cases it may even cause death, as recent developments have shown… The State party should consider relinquishing the use of electric "Taser X26" weapons, the impact of which on the physical and mental state of targeted persons would appear to violate articles 1 and 16[298] of the Convention.[299]

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[295] See, e.g., www.taser.com/products/military/Pages/ShockwaveMilitary.aspx. See also Wright, S., 'Climate Change & The New Techno-Politics of Border Exclusion & Zone Denial', School of Applied Global Ethics, Leeds Metropolitan University, 2009, citing also D. Murphy, 'Taser Anti-Personnel Munition', 2002, www.dtic.mil/ndia/2002mines/murphy.pdf (accessed 10 May 2010).

[296] J. Bowen, Strategic Communication Office, Joint Non-Lethal Weapons Directorate, 'Focus of the Month: Non-Lethal Capability Sets: Helping to Minimize Civilian Casualties', undated but April 2010, p. 7, www.jnlwp.com/PDF/FotM%20Jan%202010%20NLCS%20FINAL.pdf (accessed 22 April 2010).

[297] 'Study on the situation of trade in and production of equipment which is specifically designed to inflict torture or other cruel, inhuman or degrading treatment, its origin, destination and forms', *op. cit.*, §13, citing Amnesty International, *Stopping the torture trade*, AI index: ACT/40/002/2001, 26 February 2001.

[298] Under Article 16:

> Each State Party shall undertake to prevent in any territory under its jurisdiction other acts of cruel, inhuman or degrading treatment or punishment which do not amount to torture as defined in article 1, when such acts are committed by or at the instigation of or with the consent or acquiescence of a public official

At the same time, in the context of policing in the UK, a staff member of Amnesty International UK has written specifically on the deployment of Tasers:

> Amnesty International is not opposed to deployment of Tasers as an alternative to lethal force, nor does it seek a total ban on the device. However, Amnesty International is particularly concerned by the widespread deployment of a potentially lethal electro-shock weapon. That is when they are not restricted to deployment only the highest level of the force continuum, i.e. just below the point at which lethal force would be used. It should also be made clear here that the use of a Taser is clearly preferable to the deployment of a firearm as an alternative to lethal force.[300]

Amnesty International has also stressed that Tasers should be used only by specially trained officers.[301]

> or other person acting in an official capacity. In particular, the obligations contained in articles 10, 11, 12 and 13 shall apply with the substitution for references to torture or references to other forms of cruel, inhuman or degrading treatment or punishment.
>
> The provisions of this Convention are without prejudice to the provisions of any other international instrument or national law which prohibit cruel, inhuman or degrading treatment or punishment or which relate to extradition or expulsion.

[299] 'Conclusions and recommendations of the Committee against Torture: Portugal', Thirty-ninth session, Geneva, 5-23 November 2007, UN doc. CAT/C/PRT/CO/4, 19 February 2008, §14.

[300] O. Sprague, 'The Deployment of Taser Weapons to UK Law Enforcement Officials: An Amnesty International Perspective', *Policing*, Vol. 1, No. 3 (2007), p. 309.

[301] Presentation by Angela Wright to the May 2010 Meeting of Experts.

6. DIRECTED ENERGY WEAPONS

> *'Of all the various battlefield injuries, blindness of combatants would be by far the most serious, both to the soldier and to his or her country.'*[302]

6.1 Overview of the weapons and their impact

Directed energy weapons use different sorts of electromagnetic energy to achieve their objectives: low-power diode laser, high-energy chemical laser, millimetre wave, or high-power microwave.[303] Research in these weapons originally focused primarily on the possibilities of their use for ballistic missile defence, including in space.[304]

Laser weapons include low- and high-power systems. Devices called 'illuminators', or 'dazzlers', which are already available, use a low-power diode laser to temporarily blind or obscure vision.[305] The US Joint Non-Lethal Weapons Program has reported that 'optical distractors' are visible laser devices that have reversible effects on vision and which are:

> ideal for non-lethal applications, as the optical energy is collimated. Thus, the precision effects can be delivered very accurately with little to no collateral damage. This allows the user to precisely deliver the optical energy at long ranges while minimizing the total power output of the device. The effect is very similar to the glare off a windshield from a setting sun…. Future and ongoing developmental efforts aim to increase the military effectiveness of optical distractors by increasing the effective range, improving daylight performance capabilities, and optimizing the effective spot size based on the specific military application.[306]

A combination of factors affects risk and severity of injury, such as power level, beam divergence, distance from source, and duration of exposure; together, these variables affect the amount of energy entering the eye. Viewing through magnifying optics (e.g. binoculars) significantly increases the hazard. In developing low-energy 'dazzlers' there has been a preference for green lasers, as the eye is more sensitive to green light and they are more effective in daylight.[307] The effects of using lasers at night can remain for 30 minutes or more.[308] Moreover, as discussions at the May 2010 Meeting of Experts highlighted, there is a risk that 'dazzlers' will have increasing power output until the risk of permanent eye damage is very high.

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[302] E. DeVour, 'Possible Psychological and Societal Effects of Sudden Permanent Blindness of Military Personnel caused by Battlefield Use of Laser Weapons', in L. Doswald-Beck (ed.), *Blinding Weapons, Reports of the Meetings of Experts convened by the International Committee of the Red Cross on Battlefield Laser Weapons, 1989–1991*, ICRC, Geneva, 1993, p. 50.
[303] N. Lewer and N. Davison, 'Non-lethal technologies—an overview', *Disarmament Forum*, Issue 1, 2005, p. 42.
[304] Presentation by Juergen Altmann to the May 2010 Meeting of Experts.
[305] N. Lewer and N. Davison, 'Non-lethal technologies—an overview', *op. cit.*, Issue 1, 2005, p. 43.
[306] Joint Non-Lethal Weapons Program, 'Future Capabilities: Optical Distractor', undated, www.jnlwp.com/future_capabilities/optical_distractor.asp (accessed 10 May 2010).
[307] Green laser weapons are said to have been deployed in Iraq and Afghanistan since 2006. There have been accidents and injuries from their use in Iraq. Presentation by Neil Davison to the May 2010 Meeting of Experts.
[308] Presentation by Neil Davison to the May 2010 Meeting of Experts.

Damage to the eyes is potentially of the utmost seriousness ('an overwhelming personal catastrophe', in the words of one medical professional)[309] as it is

> well accepted that vision is our most important sense, perhaps accounting for 90% or more of our sensory input. While other senses, such as hearing and touch, may facilitate post-blindness adjustment to one's life experience, none of the other senses can come close to replacing sight.[310]

High-energy lasers are typically lethal[311] but are also being investigated for 'non-lethal' applications. Thermal laser weapons use infrared lasers to heat the skin to cause pain but not permanent injury.[312] Planned anti-*matériel* uses for high-energy lasers include 'bursting automobile tires, rupturing fuel tanks, selectively cutting through electrical or communications lines, or setting fires.'[313]

A prototype weapon using **millimetre wave** technology was said to have been sent for testing by US forces in Afghanistan but was subsequently withdrawn.[314] According to Lewer and Davison:

> The Active Denial System (ADS) is a weapon that uses millimetre wave energy to heat up water molecules in the subcutaneous layers of the skin, causing a painful burning sensation. The radiation acts in a dose-dependent manner and so exposure duration is critical in terms of safety.[315]

The ADS emits a roughly two-metre-wide beam to a distance of 500 metres and beyond. It penetrates to 0.35mm and does not therefore reach the internal organs. Pain is caused to a person

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[309] Cf. L. Doswald-Beck (ed.), *Blinding Weapons, Reports of the Meetings of Experts convened by the International Committee of the Red Cross on Battlefield Laser Weapons, 1989–1991*, *op. cit.*, p. 52.

[310] E. DeVour, 'Possible Psychological and Societal Effects of Sudden Permanent Blindness of Military Personnel caused by Battlefield Use of Laser Weapons', in L. Doswald-Beck (ed.), *Blinding Weapons, Reports of the Meetings of Experts convened by the International Committee of the Red Cross on Battlefield Laser Weapons, 1989–1991*, Geneva, 1993, p. 47. It has also been asserted that sensory compensation (whereby if a person is blind, the other senses become more capable) is:

> a myth, nothing more. A blind man may be able to use auditory information to avoid obstacles while walking, but there is nothing mystical about it; the person has been forced to learn to attend to aspects of auditory information that are equally available to you or me. The basic capabilities of the other senses do not improve. The person's skill at using them may improve to a degree.

D. Warren, 'Psychological Effects of Total Permanent Blindness occurring in Early Adulthood', in L. Doswald-Beck (ed.), *Blinding Weapons*, *op. cit.*, p. 53.

[311] For example, the Advanced Tactical Laser is a chemical laser system being developed by the US military, which would be lethal if used against humans. N. Lewer and N. Davison, 'Non-lethal technologies—an overview', *op. cit.*, p. 43.

[312] Presentations by Jürgen Altmann and by Neil Davison to the May 2010 Meeting of Experts.

[313] National Research Council, *An Assessment of Non-lethal Weapons Science and Technology*, (Washington, DC: National Academies Press, 2003), p. 29, books.nap.edu/openbook/0309082889/html/index.html (accessed 10 January 2010).

[314] See, e.g., www.wired.com/dangerroom/2010/07/pain-ray-recalled-from-afghanistan/.

[315] N. Lewer and N. Davison, 'Non-lethal technologies—an overview', *Disarmament Forum*, Issue 1, 2005, p. 42, citing M. R. Murphy *et al.*, 'Bio-effects Research in support of the Active Denial System (ADS)', in *Proceedings of the 2nd European Symposium on Non-Lethal Weapons, 13–14 May 2003* (Germany: European Working Group on Non-Lethal Weapons, 2003). Also relevant factors are the power setting used and range. Email from Jürgen Altmann, 2 August 2010.

if the skin is heated by 10 Kelvin (to an absolute temperature of 43–45 degrees centigrade), with the maximum pain levels reached at 20 Kelvin (higher temperatures only cause more intense burns, not greater pain).

The US has claimed that the 'human effects research and independent reviews of the ADS make it the most studied and reviewed non-lethal weapon in Department of Defense history. … Throughout the research program, the Human Effects Advisory Panel, an independent panel of non-government science and medical experts, also reviewed the program. … In a 2008 review of the program, this panel concluded there is low risk of serious injury from exposure to the ADS beam.'[316] Jürgen Altmann notes that the ADS:

> produces a beam of electromagnetic millimetre waves; such radiation is absorbed in the upper 0.4 mm of skin. ... With a power of 100 kilowatts, the beam can heat the skin of target subjects to pain-producing temperature levels within seconds. With a prototype weapon, mounted in a military multi-purpose vehicle, the effects have been tested on hundreds of volunteers. In order to produce pain while preventing burn injury, the power and duration of emission for one trigger event is controlled by a software program. Model calculations show that with the highest power setting, second- and third-degree burns with complete dermal necrosis will occur after less than 2 seconds. Even with a lower setting of power or duration there is the possibility for the operator to re-trigger immediately.[317]

The US has reportedly claimed that millimetre wave weapons heat the flesh to 50°C: just enough to cause pain, but not enough for any permanent damage.[318] Altmann has questioned the accuracy of this claim, noting that:

> In January 2007 a media day with live demonstrations of ADS system 1 was held at Moody AFB, Georgia. A deployment date of 2010 was mentioned; press reports said that the beam heats the skin to 50°C without lasting harm, not mentioning the fact that this depends on the beam being switched off immediately when such a temperature is reached….
>
> … the ADS provides the technical possibility to produce burns of second and third degree. Because the beam of diameter 2 m and above is wider than human size, such burns would occur over considerable parts of the body, up to 50% of its surface. Second- and third-degree burns covering more than 20% of the body surface are potentially life-threatening – due to toxic tissue-decay products and increased sensitivity to infection – and require intensive care in a specialised unit.[319]

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[316] Joint Non-Lethal Weapons Program, 'Active Denial System, A cutting edge non-lethal technology to minimize casualties and collateral damage', undated, www.jnlwp.com/ads.asp (accessed 10 May 2010).

[317] J. Altmann, 'Millimetre Waves, Lasers, Acoustics for Non-Lethal Weapons? Physics Analyses and Inferences', *op. cit.*, p. 5. See also, e.g., S. Orbons, 'Do Non-Lethal Capabilities License to "Silence"?', *Journal of Military Ethics*, Vol. 9, No. 1 (2010), pp. 88–89.

[318] *ibid.*

[319] J. Altmann, 'Millimetre Waves, Lasers, Acoustics for Non-Lethal Weapons? Physics Analyses and Inferences', *op. cit.*, pp. 18, 24. For an analysis of disabilities resulting from burns, see in general the report on the second working group of experts convened by the ICRC on 5–7 November 1990, in L. Doswald-Beck (ed.), *Blinding Weapons*, *op. cit. Cf.* also Wright, S., and C. Arthur, 'Targeting the pain business. US-based Raytheon is marketing microwave weapon systems that "fill the gap between shout and shoot". But who will use them and why?', *Guardian*, 5 October 2006, www.guardian.co.uk/technology/2006/oct/05/guardianweeklytechnologysection (accessed 10 May 2010).

Further, Altmann has noted that nothing has been published on the beam power, beam widening, and intensity of discharge versus distance to target when the ADS is fired, nor have safety precautions against overdose or any 'rules of engagement' been made public. In April 2007, an accident during testing led to an individual receiving at short range for four seconds a full power setting that was appropriate for long range. The correct setting would have been 50% power for one second, thus the subject got an eightfold dose.. The subject received second-degree burns on his leg and spent two days in a specialised burn treatment clinic as a result.[320]

The US Joint Non-Lethal Weapons Program is looking to identify millimetre wave sources that will help minimise the size, weight, and system cost of an effective Active Denial System. Several concepts are being explored, ranging from reducing the size of existing sources through the development of solid-state-arrays, to developing the next generation of light-weight, highly efficient millimetre wave sources.[321] Dr Jürgen Altmann observes that: 'Because 0.4mm of water absorbs 86% of the power, heavy rain or dense fog will strongly impede propagation.'[322]

High-power microwave (HPM) weapons deliver a burst of electromagnetic energy designed to degrade or destroy the circuits of electronic equipment. They are not used against human beings. There are two main types of HPM weapons: wide-band weapons that release a burst of radiation over a broad frequency range generated by a high explosive or an electromagnetic generator; and narrow-band weapons that are electrically driven and are directed at specific targets. Other applications for HPM weapons include their potential for stopping vehicles by disabling onboard computer control systems.[323]

6.2 International humanitarian law

The use of directed energy weapons would need to be able to respect the principle of distinction: i.e. to be able to distinguish military objectives from civilians and civilian objects. Particular concern has, for example, been expressed over the potential of HPM weapons for destruction of civilian electronic infrastructure—including hospital equipment and heart pacemakers.[324] According to NATO, most 'non-lethal' weapons are discriminate. However, 'some technologies will need to be addressed. For instance, the use of a High Power Microwave system to disrupt enemy communications within a city that could also impact a hospital in the vicinity of the military objective could be indiscriminate.'[325]

In the case of use of such weapons against combatants, there would be attention paid to the rules against weapons of a nature to cause superfluous injury or unnecessary suffering. The use of lasers intended to blind is prohibited by Protocol IV of the Convention on Certain Conventional

[320] Email from Dr Jürgen Altmann, 2 August 2010.
[321] Joint Non-Lethal Weapons Program, 'Future Capabilities: Active Denial Technology (ADT)', www.jnlwp.com/future_capabilities/ADT.asp (accessed 10 May 2010).
[322] See J. Altmann, 'Millimetre Waves, Lasers, Acoustics for Non-Lethal Weapons? Physics Analyses and Inferences', *op. cit.*, p. 25.
[323] N. Lewer and N. Davison, 'Non-lethal technologies—an overview', *Disarmament Forum*, Issue 1, 2005, p. 42.
[324] *ibid.*, p. 42.
[325] NATO Research and Technology Organisation, 'Non-Lethal Weapons and Future Peace Enforcement Operations', *op. cit.*, Annex C.

Weapons (CCW), and the risks of 'dazzlers' would therefore need to be carefully assessed given worries over eye safety in relation to these weapons.[326] According to a 2006 NATO report, dazzling lasers and laser-transported electrical means would not be prohibited under the protocol.[327] According to Article 2 of Protocol IV, however:

> In the employment of laser systems, the High Contracting Parties shall take all feasible precautions to avoid the incidence of permanent blindness to unenhanced vision. Such precautions shall include training of their armed forces and other practical measures.

Moreover, Davison, cites an earlier (2004) NATO report, which noted that 'excessive power levels can have serious consequences for human targets.'[328]

With respect specifically to the Active Denial System, Altmann argues that:

> Collateral damage is not much of a problem. Use in armed conflict would bring much less injury than flamethrowers which count as legitimate weapons. However, such use is not very probable because the system is large, needs to be exposed for action and is vulnerable to many kinds of light weapons.[329]

6.3 International human rights law

Directed energy weapons could potentially infringe a number of rights, depending on the characteristics, use, and long-term effects of specific weapons, including the right to life, the right to freedom from torture and other cruel, inhuman or degrading treatment or punishment, the right to protest, and might also have implications for the enjoyment of the right to health and the right to private life.

Burns are especially serious injuries. According to one expert, who presented on disabilities resulting from burns at expert meetings convened by the ICRC at the beginning of the 1990s:

> One common denominator of burn injuries in all settings is *disfigurement* which greatly alters the ability of the injured person to function as a social individual and places him[/her] in an aberrant course in the pursuit of his[/her] life. A third-degree burn[330] does not heal without a scar. …

[326] N. Lewer and N. Davison, 'Non-lethal technologies—an overview', *op. cit.*, p. 43. For a detailed analysis of the impact of lasers on the eyes, see in particular the report on the first working group of experts convened by the ICRC on 31 May to 1 June 1990, in L. Doswald-Beck (ed.), *Blinding Weapons, op. cit.*

[327] NATO Research and Technology Organisation, 'Non-Lethal Weapons and Future Peace Enforcement Operations', *op. cit.*, Annex C.

[328] N. Davison, *'Non-Lethal' Weapons* (London: Palgrave Macmillan, 2009), p. 181, citing NATO, 'Non-Lethal Weapons and Peace Enforcement Operations', RTO-TR-SAS-040, 2004, Chapter 3, p. 9.

[329] Altmann, J., 'Millimetre Waves, Lasers, Acoustics for Non-Lethal Weapons? Physics Analyses and Inferences' (Germany: Deutsche Stiftung Friedensforschung, 2008), p. 5. The categorisation of flamethrowers as lawful weapons is contested, as described above with respect to incendiary weapons.

[330] First-degree burns cause minor epithelial damage to the skin, with redness and discomfort. Second-degree (partial thickness) burns go incompletely through the skin. Third-degree (full thickness) burns destroy all elements of the skin, with damage going into the subcutaneous fat. All layers of the skin are destroyed, including nerve endings. Presentation by Norman R. Bernstein, in L. Doswald-Beck (ed.), *Blinding Weapons, Reports of the Meetings of Experts convened by the International Committee of the Red Cross on Battlefield Laser Weapons, 1989–1991*, Geneva, 1993, p. 232.

> Serious burns often damage tendons, muscle tissue, and bone. The burn wound is an *open wound* through which body fluids escape and through which infection rapidly enters. Edema rapidly follows, which can compromise the circulation to fingers and toes. … [I]t is still likely that a severely burned patient … [anyone with 35% or greater third-degree injury] would require a period of five years and 20 major surgical procedures with general anaesthesia.[331]

In this regard, with respect to the Active Denial System, Altmann argues that in situations of internal security:

> Taking into account that the operator may be up to one km away, in such circumstances overdoses with severe burn injuries could only be prevented if technical devices would reliably limit the skin temperature, i.e., would limit beam power or duration depending on target distance and would prevent re-triggering on the same person before a certain cooling time has passed.[332]

Moreover, if the intent is to cause people to move away from the beam, this may not be feasible if the ADS or similar system is used against a crowd. It may simply cause panic and create a stampede for, as the beam is invisible, victims will not know how to escape the beam. As one participant at the May 2010 Meeting of Experts noted, it is hard to see how the weapon can be used in accordance with international human rights law and without causing unacceptable harm to members of the public. As noted in the Introduction above, it has, though, been deployed to a prison in Los Angeles.

The use of laser 'dazzlers' has potentially significant human rights law implications, notably for the right to health and freedom from inhuman treatment. The risk of being blinded or burnt by an agent of the State is likely to be taken very seriously by human rights bodies.

[331] *ibid.*, pp. 229, 230, and 233.
[332] J. Altmann, 'Millimetre Waves, Lasers, Acoustics for Non-Lethal Weapons? Physics Analyses and Inferences', *op. cit.*, p. 5.

7. ACOUSTIC WEAPONS

> *'It is possible to produce sound levels at several tens of metres distance which evoke pain in unprotected ears. Such levels bring a direct risk of permanent hearing damage. ... There may be special situations in which acoustic weapons provide additional possibilities for legitimate violence, for example with hostage taking or attacks against ships. ... On the other hand the opponents can protect their ears whereas hostages would be affected.'*[333]

7.1 Overview of the weapons and their impact

Acoustic weapons could potentially use audible sound, infrasound, or ultrasound. In the audible range, perhaps the best known example of what could be considered a weapon—although this is disputed—is the Long Range Acoustic Device (LRAD), designed to deliver warning messages over ranges of up to one kilometre.[334] The LRAD is said to have been used by US forces in Afghanistan and Iraq.[335] According to the US:

> Acoustic Hailing Devices (AHD) are non-lethal, non-kinetic, long-range hailing and warning devices. The devices use advanced directed acoustic energy technology to provide a non-lethal warning capability at a greater range than many other non-lethal systems available to U.S. forces.[336]

The LRAD Corporation (formerly the American Technology Corporation)[337] has supplied 'Acoustic Hailing Devices' to the US Army, Navy, and Coast Guard.[338] Dr Jürgen Altmann notes that The New York Police Department had deployed two LRADs during protests at the Republican Convention in August 2004, but did not use them because the protesters to be addressed were at close range.[339] Their deployment in drones has been mooted.[340]

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[333] Presentation by Jürgen Altmann to the May 2010 Meeting of Experts.
[334] N. Lewer and N. Davison, 'Non-lethal technologies—an overview', *Disarmament Forum*, Issue 1, 2005, p. 41.
[335] *ibid.*, p. 42, citing CNN, 'Troops get high tech noisemaker', CNN.com, 3 March 2004, edition.cnn.com/2004/TECH/ptech/03/03/sonic.weapon.ap/ (visited 12 April 2010); and C. Miller, 'Can a Crying Baby Stop a Riot?', *Law Enforcement Technology*, Vol. 31, No. 3 (2004), p. 8.
[336] Joint Non-Lethal Weapons Program, 'Developing Capabilities', www.jnlwp.com/developing_capabilities/default.asp (accessed 10 May 2010).
[337] LRAD Corporation, 'Stockholders Approve American Technology's Name Change to LRAD Corporation' 25 March 2010, www.lradx.com/site/content/view/345/55/ (accessed 10 May 2010).
[338] Joint Non-Lethal Weapons Program, 'Acoustic Hailing Devices (AHD) Fact Sheet', February 2008, www.jnlwp.com/misc/fact_sheets/AHD%201%20Feb%2008.pdf (accessed 10 May 2010).
[339] J. Altmann, 'Millimetre Waves, Lasers, Acoustics for Non-Lethal Weapons? Physics Analyses and Inferences', *op. cit.*, p. 46.
[340] See, e.g., D. Hambling, 'Future police: Meet the UK's armed robot drones' 10 February 2010, www.wired.co.uk/news/archive/2010-02/10/future-police-meet-the-uk's-armed-robot-drones (visited 17 October 2010).

LRAD Corporation, as well as the US Department of Defense, has, though, contested the assertion that the LRAD is a 'weapon'. In October 2009, for example, Robert Putnam, who works in media and investor relations for the company, claimed that the LRAD:

> is not a weapon, military or otherwise; it is an effective long-range communications device used to clearly broadcast critical information, instructions and warnings. …
>
> LRAD creates standoff and safety zones, supports the resolution of uncertain situations and potentially prevents the use of deadly force. We believe this is highly preferable to the real instances that happen almost every day around the world where officials use guns and other lethal and nonlethal weapons to disperse protesters or end SWAT situations.
>
> While LRAD can broadcast very loudly (up to 152 decibels at 1 meter away), law enforcement personnel are trained on its proper use and have full control of the audio output through a prominently positioned volume control knob. LRAD's broadcasts can be easily and quickly adjusted based on situational use. Also, sound pressure levels drop off very quickly over distance.
>
> Unlike tear gas, Tasers, rubber bullets, pepper spray and other nonlethal and lethal responses, LRAD can be modulated in response to protesters' actions. The deterrent tone is attention-getting and highly irritating, as are police and fire sirens and other warning sounds.[341]

The company has also claimed that in maritime situations LRAD 'resolves uncertain situations and potentially saves lives on both sides of the device by combining powerful voice commands and deterrent tones with focused acoustic output to clearly transmit highly intelligible instructions and warnings well beyond 3000 meters. … What makes LRAD unique is its ability to transmit messages with exceptional voice intelligibility and tonal clarity in a highly directional beam, even over significant ambient noise. LRAD's directionality reduces the risk of exposing nearby personnel or peripheral bystanders to harmful audio levels.'[342]

LRADs have reportedly been used in repelling pirate attacks off the coast of Somalia on a number of occasions.[343] For instance, in November 2009, a security team aboard the motor vessel Maersk-Alabama responded to an attack on the vessel 560 nautical miles off the northeast coast of Somalia by using evasive manoeuvres, LRADs and small arms fire, causing the suspected pirates to break off their attack.[344] It has been observed that:

> Individual ships have adopted different onboard deterrents. Some use rudimentary measures such as fire hoses, deck patrols, or even carpet tacks to repel pirates. Others use a nonlethal electric screen with a loudspeaker system that emits a pitch so painful it keeps pirates away.[345]

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[341] R. Putnam, 'LRAD no weapon', TribLive, Pittsburgh, 27 October 2009, www.pittsburghlive.com/x/pittsburghtrib/opinion/letters/s_649951.html#at (accessed 10 May 2010).
[342] LRAD Corporation, 'Maritime Applications', www.lradx.com/site/content/view/287/110 (accessed 10 May 2010).
[343] See, e.g., *ibid.*
[344] N. Schaeffer (Mass Communication Specialist 2nd Class), 'M/V Maersk-Alabama Repels Suspected Pirate Attack', US Naval Forces Central Command, Press Release #195-09, Manama (Bahrain), 18 November 2009, www.cusnc.navy.mil/articles/2009/195.html (accessed 10 May 2010).
[345] S. Hanson, 'Combating Maritime Piracy', Backgrounder, Council on Foreign Relations, Updated 7 January 2010, www.cfr.org/publication/18376/combating_maritime_piracy.html (accessed 28 June 2010).

It is widely believed, however, that the potential for the use of acoustic devices as weapons has been exaggerated.[346] According to Jürgen Altmann:

> Acoustic weapons will probably not fulfil their early promise. In particular, they will not incapacitate opponents.
>
> Many types of acoustic weapons would be large and difficult to handle, thus the interest of military and police may remain limited to hailing and warning devices.[347]

Thus, high frequencies can only feasibly be diffused to any distance at high levels but there is a potential for permanent hearing damage, while at moderate levels the impact is largely annoyance and the aural effects can be mitigated by ear plugs. Low frequencies cannot be formed into a directed beam and incapacitating effects are only achieved at a level that would also cause permanent hearing damage.[348]

The US has noted its research into focused acoustic devices, which are being investigated for their potential to project sound energy to tactical ranges. One method being developed uses 'an array of speakers arranged to create a directional beam of high-intensity sound. Another method leverages the focusing of an audible (muzzle-safe) ultrasound to create an audible sound source at the target. The devices have the potential to deliver an unambiguous warning to approaching personnel on foot or in vehicles at great distances. They can give the user ample time to assess the intent of those approaching.'[349]

Although the LRAD is called a hailing and warning device, not a weapon, as Altmann notes, at close range damage to hearing is possible, and it has been used as a weapon[350] (as the term is defined in this paper). The determinant issue will be not what the LRAD or similar devices is labelled by a manufacturer, but its likely effects on people when used in practice.

7.2 International humanitarian law

The use of any acoustic weapons would need to be able to respect the principle of distinction: i.e. to be able to distinguish military objectives from civilians and civilian objects. This is potentially a challenge given the distances at which these weapons may affect persons.

In the case of use of such weapons against combatants, attention would need to be paid to the rules against weapons of a nature to cause superfluous injury or unnecessary suffering. However, a proposed analogy with the prohibition on blinding as a method of warfare, whereby it could be

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[346] Presentation by Michael Crowley to a meeting of the Geneva Forum on 'Non-lethal' Weapons in Policy, Practice and Law, Geneva, 26 November 2009 (author's notes); see also J. R. Jauchem and M. C. Cook, 'High-intensity acoustics for military nonlethal applications: a lack of useful systems', *Military Medicine*, Vol. 172 (2007) No. 2, pp. 182–189, cited in J. Altmann, 'Millimetre Waves, Lasers, Acoustics for Non-Lethal Weapons? Physics Analyses and Inferences', *op. cit.*, p. 44, fn. 159.

[347] Presentation by Jürgen Altmann to the May 2010 Meeting of Experts.

[348] N. Davison, *'Non-Lethal' Weapons*, *op. cit.*, pp. 186–187.

[349] Joint Non-Lethal Weapons Program, 'Future Capabilities: Focused Acoustics', www.jnlwp.com/future_capabilities/focused_acoustics.asp (accessed 10 May 2010).

[350] J. Altmann, 'Millimetre Waves, Lasers, Acoustics for Non-Lethal Weapons? Physics Analyses and Inferences', *op. cit.*, p. 53.

argued that causing permanent or even prolonged loss of hearing could be captured by this rule, may not be appriopriate since, as noted above, the eye provides 90% of sensory input, the ear accordingly provides much less. Moreover, permanent hearing loss is not necessarily complete loss and prolonged hearing loss means that such loss is only temporary.[351]

7.3 International human rights law

Acoustic weapons could potentially infringe a number of rights, depending on the use, characteristics, and short- and longer term effects of specific devices, including the right to freedom from torture and other cruel, inhuman or degrading treatment or punishment, and might have implications for the enjoyment of the right to health. Neil Davison has noted that such weapons are often categorised as 'hailing devices', by which it may be sought to avoid export controls and legal review on weapons.[352]

Altmann has noted that:

> LRAD can work in two modes: Voice, with the level limited to 121 dB in 1 m, and Tone (for warning) with up to 151 dB in 1 m. In the voice mode, it achieves beyond 500 m hailing range…. In the high-power warning mode the sound in front of the [LRAD] system is at levels dangerous to unprotected hearing. In order to prevent permanent hearing damage, the exposure has to be limited to a few seconds out to 50 m[etres] distance.[353]

He notes that the US National Institute for Occupational Safety and Health (NIOSH) has recommended that 'for workers, the time-weighted average of the A-weighted sound level over eight hours must not exceed 85 dB(A). E.g. the duration at 110 dB(A) must not exceed 1.5 minutes, at 120 dB(A) 9 seconds, at 129 dB(A) 1 second. In the range 130–140 dB(A) the duration has to be shorter than 1 second. Another rule stipulates that levels above 140 dB(A) must not occur at all, and if necessary, by use of hearing protectors.'[354] He suggests that in order to prevent hearing damage, technical devices should be introduced that limit the sound power and/or duration of the LRAD depending on the distance to the target subject or subjects.[355]

By way of further comparison, a study of the *vuvuzela* (an African horn used by South African football supporters and subsequently popularised by the 2010 Football World Cup) found that the device's output at up to 2 metres averaged between 113 and 131 db. The study, which was reported in the *South African Medical Journal* in February 2010, noted that according to South African occupational noise exposure legislation, at the lowest recorded intensity of 113 db, subjects should not be exposed for more than 1 minute without hearing protection. It therefore

[351] Email from Jürgen Altmann to the author, 30 May 2010.
[352] Presentation to a meeting of the Geneva Forum on 'Non-lethal' Weapons in Policy, Practice and Law, Geneva, 26 November 2009 (author's notes).
[353] J. Altmann, 'Millimetre Waves, Lasers, Acoustics for Non-Lethal Weapons? Physics Analyses and Inferences', *op. cit.*, pp. 45, 6.
[354] *ibid.*, p. 49.
[355] *ibid.*, pp. 6–7.

concluded that no person within a 2-metre radius of a vuvuzela, including the person blowing it, should be exposed to it continually for more than a minute.[356]

Altmann concludes that:

> For use by security personnel other than hailing and warning, an evaluation in the context of police law and human rights is needed. One can make the case that producing permanent hearing damage while attempting to repel criminals who do not shy away from firing at people, is fully justified. However, this consideration should be made explicitly and systematically before such use, with tests and evaluation, as with other types of police weapons and equipment.[357]

On 25 June 2010, a Canadian Court ordered the Toronto Police Service to amend their operating standards for the sonic cannon in order to ensure that the public was not placed at undue risk of hearing damage by its use. The Court found that, even with the most recent iteration of the standard operating procedures released by the Toronto Police Service, there remained 'a very real likelihood that demonstrators may suffer damage to their hearing'. To ensure public safety, the Court prohibited the Toronto Police Service from using the 'alert' function unless they agreed to abide by more restrictive limits on its use.[358]

The case was brought by the Canadian Civil Liberties Association, which stated that it:

> continues to have serious concerns regarding the use of the sonic cannons, particularly in downtown Toronto. Justice Brown recognized that there is a serious issue regarding whether the sonic cannons are weapons, and therefore require approval by the province prior to their use. He also found that training had been "compressed", and that the devices were "novel", police had a "lack of experience with them", and there was an "absence of scientific or medical articles on the effect of their use".' The tests done by the OPP [Ontario Provincial Police] were insufficient, even according to their own experts, and took place on an airstrip – a significantly different setting from an urban environment, where large buildings and reflective surfaces can significantly change the behaviour of sound.[359]

[356] D. W. Swanepoel, J. W. Hall III, D. Koekemoer, 'Vuvuzela – good for your team, bad for your ears', *South African Medical Journal*, Vol. 100, No. 2 (February 2010), pp. 99–100.
[357] J. Altmann, 'Millimetre Waves, Lasers, Acoustics for Non-Lethal Weapons? Physics Analyses and Inferences', *op. cit.*, p. 52.
[358] See *CCLA v. Toronto Police Service*, 2010 *ONSC* 3525, 25 June 2010, and report by the Canadian Civil Liberties Association, 'CCLA welcomes court ruling further restricting LRAD use', 25 June 2010, ccla.org/2010/06/25/ccla-welcomes-court-ruling-further-restricting-lrad-use/ (visited 19 October 2010).
[359] *ibid*.

8. CONCLUSIONS AND RECOMMENDATIONS

8.1 Conclusions

It is clear that certain weapons termed non-lethal may have an important role to play in offering alternatives to the use of other weapons, especially firearms. Based on discussions at the May 2010 Meeting of Experts, however, this paper affirms that the terminology of 'non-lethal' or 'less-lethal' as an independent overarching category should be avoided whenever possible as the term is both inaccurate and inappropriate. This paper has suggested that 'non-kinetic-energy weapons termed non-lethal' be preferred where reference is being made to such direct energy, electro-shock, chemical, and acoustic weapons.[360]

In many instances, doctrine, training, and standing operating procedures for the use of non-kinetic-energy (NKE) weapons give rise to significant concern. The aim espoused by some whereby these weapons would be somehow more humanitarian is often—but not always—belied by both the ways in which they are intended to be used, based on doctrine, as well as the ways in which they are actually used. For example, certain NKE weapons are used when the employment of firearms would be either inappropriate or even unlawful, in particular to 'force' individuals or groups to comply with instructions from the authorities. They thus have the potential to subvert traditional methods of law enforcement, particularly policing, because they discourage law enforcement officials from using non-violent methods of persuasion.[361] In situations where NKE weapons might indeed be seen as an alternative to the use of firearms and less likely to result in the death of those targeted, training of law enforcement officials or the operational procedures which they are given do not appear to have systemically instilled knowledge of the risks of using certain weapons in certain scenarios.

8.1.1 The legality of the use of NKE weapons

The use of chemical incapacitants for law enforcement risks re-legitimising chemical and even biological weapons and should be rejected even in extreme situations. The Moscow siege showed that the consequences for hostages may be death or prolonged suffering and they can certainly not be considered a safe alternative to other options for dealing with a hostage situation. The use of tear gas and other riot control agents should be strictly controlled with a presumption against the use of tear gas in confined spaces except in the most exceptional circumstances. Research has shown that in certain situations tear gas has been used with firearms as a force-

[360] Similarly, the word 'weapon' should be preferred to 'device', when it is clear that what is being used is indeed a weapon. Otherwise, for example, there might be a risk of States avoiding the necessary legal review required by Article 36 of *1977 Additional Protocol I* by not labelling new systems as 'weapons'? Indeed, as Neil Davison has noted, there is a tendency among certain governments or their armed or police forces to prefer terms such as 'capabilities' or 'technologies' to weapons; calmatives' or 'advanced riot control agents' to chemical weapons; 'conducted energy devices' to electrical weapons; 'optical distractors' to laser weapons; 'active denial technology' to radiofrequency weapons; and acoustic hailing devices to acoustic weapons. Presentation by Neil Davison to the May 2010 Meeting of Experts.

[361] Thereby engendering what is sometimes referred to as 'lazy-cop syndrome'.

multiplier, making lethal force more lethal, for example to create panic and to channel people so that they may be attacked and killed with firearms.

Electro-shock weapons have reduced the threshold for the use of weapons against 'non-compliant' individuals as well as being employed, in a number of instances, for torture and other forms of cruel, inhuman, or degrading treatment. These weapons should be used only by those who have been specially trained and in clearly defined circumstances where an individual is at risk to himself or others.

Certain directed energy weapons, notably high-power microwaves, may be indiscriminate in their effects and therefore their use may be unlawful in populated areas in a situation of armed conflict. 'Dazzlers' have an as-yet unknown level of risk of causing permanent blindness, but under Article 2 of CCW Protocol IV, in using 'laser systems', States Parties are required to take 'all feasible precautions to avoid the incidence of permanent blindness to unenhanced vision. Such precautions shall include training of their armed forces and other practical measures.'

In situations of law enforcement, the risk to the victims of the use of dazzlers may constitute inhuman treatment. When used against the driver of a car coming to a checkpoint, even if dazzling is only for a few instants, there is a clear and significant risk of provoking a car crash. Millimetre wave systems appear to be reliant on careful dosage by the operator and the level of risk of second- and even third-degree burns being caused would similarly appear to preclude their use in law enforcement.

It is not yet clear to what extent currently available acoustic 'hailing devices' can be considered weapons (although they appear to be clearly used as such in repelling pirate attacks off the coast of Somalia). More research is needed into how these instruments are used and what injuries have been sustained, as well as what injuries would ensue with alternative means of repulsion, by those caught by the sound waves before any definitive conclusions can be drawn.

8.2 Recommendations for future action

In accordance with Article 36 of *1977 Additional Protocol I*, any new weapon or any weapon newly acquired is required to be carefully assessed to ensure that it complies with the principles and rules of international humanitarian law and whether its use may infringe international human rights law.[362] The ICRC's *Guide to the Legal Review of New Weapons, Means and Methods of Warfare: Measures to Implement Article 36 of Additional Protocol I of 1977*[363] serves as an excellent basis for such an assessment. In addition, during the negotiation of Article 36, a proposal was considered whereby a committee of States Parties would be convened to be

[362] According to the ICRC commentary on the provision:

> the article is intended to require States to analyse whether the employment of a weapon for its normal or expected use would be prohibited under some or all circumstances. A State is not required to foresee or analyse all possible misuses of a weapon, for almost any weapon can be misused in ways that would be prohibited.

[363] ICRC, A Guide to the Legal Review of New Weapons, Means and Methods of Warfare: Measures to Implement Article 36 of Additional Protocol I of 1977, Geneva, 2007.

responsible for drawing up a list of weapons or methods of use which would fall under the prohibitions contained in the Protocol. It is perhaps time to take another look at this idea.

The Geneva Academy of International Humanitarian Law and Human Rights has committed to elaborate a *Guide to the Review and Use of Weapons under International Human Rights Law*. The Guide is intended to assist States and arms manufacturers on the human rights law and criminal justice considerations that should be taken into account in the development of new weapons or the use of existing NKE weapons. Certain NKE weapons appear to be wholly inappropriate for use in law enforcement. Others will be subject to the principles of necessity and proportionality/reasonableness. Given the almost ubiquitous nature of electrical weapons, the Guide will seek to identify standing operational procedures for these weapons that respect international human rights law.

To further buttress this work, it will be important for certain international standards, notably the *1990 Principles on the Use of Force and Firearms*, to be reviewed to see whether they can be amended to address NKE weapons or whether new standards, perhaps specific to NKE weapons, are needed. This issue should therefore be put on the agenda of the annual meetings of the Commission on Crime Prevention and Criminal Justice[364] beginning in 2011, which will feed into the Thirteenth Congress on Crime Prevention and Criminal Justice, to be held in Qatar in 2015.

Similarly, the UN Secretary-General's 1999 Bulletin on the observance by UN forces of international humanitarian law[365] needs to be revised to take account of international human rights law, including with respect to their use of NKE weapons. A study is underway at the University of Essex in the UK to review the possibilities, usefulness, and challenges for describing the standards on the observance of human rights by UN peacekeeping forces.[366]

Where weapons are deemed to be likely to violate customary rules of international humanitarian law or have been shown to do so in practice, a treaty will almost certainly be the most effective way to reduce or end their use since reliance on customary law may be insufficient to prevent excessive humanitarian suffering (although customary rules may provide a valuable legal basis for arguing that a weapon or certain uses should be prohibited or restricted). Furthermore, it is almost self-evident that clear and simple rules are more likely to be respected than complex ones.

However, a technique that is proving increasingly influential in preventing the use of weapons to commit human rights violations or which may violate humanitarian law is through addressing the

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[364] The Commission, which arose from a ministerial meeting held in Versailles in 1991, is a subsidiary body of the Economic and Social Council. The Commission develops, monitors, and reviews the implementation of the UN Crime Prevention and Criminal Justice programme and facilitates the coordination of its activities. The Commission provides substantive and organizational direction for the quinquennial UN Congress on Crime Prevention and Criminal Justice. See UN Office on Drugs and Crime, 'The Commission on Crime Prevention and Criminal Justice', www.unodc.org/unodc/en/commissions/CCPCJ/ (visited 12 July 2010).

[365] See, e.g., 'Observance by United Nations forces of international humanitarian law', *International Review of the Red Cross*, No. 836, 31 December 1999, pp. 812–817, available at: www.icrc.org/web/eng/siteeng0.nsf/html/57JQ7L (accessed 15 July 2010).

[366] See University of Essex, 'The United Nations Peacekeeping Law Reform Project', 24 May 2010, www.essex.ac.uk/plrp/project/ (visited 15 July 2010).

manufacturers or suppliers of certain weapons through disinvestment campaigns. In the US, the Alien Tort Claims Act has proved to be a way of influencing corporate behaviour. More broadly, the future Arms Trade Treaty[367] may also prove to be an important mechanism in this regard.[368]

The issue of NKE weapons is not currently on the agenda of the Human Rights Council. This should be rectified, for instance through the appointment of a dedicated Special Rapporteur to study the human rights implications of NKE weapons.

Finally, there is a need for ongoing monitoring of the use, impact, and legality of NKE weapons. The 'data to policy' link has become something of a cliché in humanitarian circles, but its fundamental tenets remain justified. An annual meeting of experts to review and adopt an annual report on developments in NKE weapons and legal reviews would be one way to facilitate this process.

[367] In 2006, the UN General Assembly requested the UN Secretary-General to establish a group of governmental experts to look into 'the feasibility, scope and draft parameters for a comprehensive, legally binding instrument establishing common international standards for the import, export and transfer of conventional arms'. The report of that group, concluded in 2008, prompted the General Assembly to start discussions focused on a possible arms trade treaty, open to all UN Member States. At the end of October 2009, after years of discussions and debates, the vast majority of governments – 153 in total – agreed on a timetable to establish a 'strong and robust' Arms Trade Treaty (ATT) with the 'highest common standards' to control international transfers of weapons. There is currently no global treaty on the conventional arms trade. Preparatory committee meetings began in New York in July 2010, and two further meetings are foreseen in 2011–2012, leading to a diplomatic conference in 2012 which could adopt an ATT.

[368] The Geneva Academy has created a legal blog on the progress in the preparatory committees, available at armstradetreaty.blogspot.com.

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'Study on the situation of trade in and production of equipment which is specifically designed to inflict torture or other cruel, inhuman or degrading treatment, its origin, destination and forms, submitted by Theo van Boven, Special Rapporteur on torture, pursuant to resolution 2002/38 of the Commission on Human Rights', UN doc. E/CN.4/2003/69, 13 January 2003.

ANNEXES

Annex 1. List of participants at the May 2010 Meeting of Experts

David ATWOOD, Director, Quaker United Nations Office, Geneva

Dr Jürgen ALTMANN, Technische Universität Dortmund, Germany

Maya BREHM, Researcher, UNIDIR, Geneva

Dr Stuart CASEY-MASLEN, Senior Researcher, Geneva Academy of International Humanitarian Law and Human Rights (ADH)

Dr Silvia CATTANEO, Coordinator, The Geneva Forum

SongHa CHAE, Project Officer, ADH

Professor Andrew CLAPHAM, Director, ADH

Dr Robin COUPLAND, Advisor on armed violence and the effects of weapons, International Committee of the Red Cross (ICRC), Geneva

Michael CROWLEY, Project Coordinator, Bradford Non-lethal Weapons Research Project, Department of Peace Studies, Bradford University, UK

Dr Neil DAVISON, Royal Society, UK

Professor Louise DOSWALD-BECK, ADH

Peter T. HOLRAN, Vice President Government and Public Affairs, TASER International

Sandra LENDENMANN, Department of Public International Law, Federal Department of Foreign Affairs, Switzerland

Dr Masa MINEHATA, Disarmament Research Centre, Bradford University

Dr Sjef ORBONS, Senior Research Scientist, Faculty of Military Sciences, Netherlands Defence Academy

Professor Brian RAPPERT, University of Exeter, UK

Dr Mark STEINBECK, Medical Adviser on the Effects of Weapons, Arms Unit, ICRC, Geneva

Angela WRIGHT, Researcher, Amnesty International UK

Professor Steve WRIGHT, Applied Global Ethics, Leslie Silver International Faculty, Leeds University, UK

Annex 2. Extracts from the *1993 Chemical Weapons Convention*

Article II. Definitions and Criteria

For the purposes of this Convention:

1. “Chemical Weapons” means the following, together or separately:

(a) Toxic chemicals and their precursors, except where intended for purposes not prohibited under this Convention, as long as the types and quantities are consistent with such purposes;

(b) Munitions and devices, specifically designed to cause death or other harm through the toxic properties of those toxic chemicals specified in subparagraph (a), which would be released as a result of the employment of such munitions and devices;

(c) Any equipment specifically designed for use directly in connection with the employment of munitions and devices specified in subparagraph (b).

2. “Toxic Chemical” means:

Any chemical which through its chemical action on life processes can cause death, temporary incapacitation or permanent harm to humans or animals. This includes all such chemicals, regardless of their origin or of their method of production, and regardless of whether they are produced in facilities, in munitions or elsewhere.

(For the purpose of implementing this Convention, toxic chemicals which have been identified for the application of verification measures are listed in Schedules contained in the Annex on Chemicals.)

7. “Riot Control Agent” means:

Any chemical not listed in a Schedule, which can produce rapidly in humans sensory irritation or disabling physical effects which disappear within a short time following termination of exposure.

9. “Purposes Not Prohibited Under this Convention” means:

(a) Industrial, agricultural, research, medical, pharmaceutical or other peaceful purposes;

(b) Protective purposes, namely those purposes directly related to protection against toxic chemicals and to protection against chemical weapons;

(c) 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;

(d) Law enforcement including domestic riot control purposes.

Annex 3. Protocol on Blinding Laser Weapons (Protocol IV to the 1980 Convention on Certain Conventional Weapons), 13 October 1995

Article 1

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

Article 2

In the employment of laser systems, the High Contracting Parties shall take all feasible precautions to avoid the incidence of permanent blindness to unenhanced vision. Such precautions shall include training of their armed forces and other practical measures.

Article 3

Blinding as an incidental or collateral effect of the legitimate military employment of laser systems, including laser systems used against optical equipment, is not covered by the prohibition of this Protocol.

Article 4

For the purpose of this protocol ‘permanent blindness’ means irreversible and uncorrectable loss of vision which is seriously disabling with no prospect of recovery. Serious disability is equivalent to visual acuity of less than 20/200 Snellen measured using both eyes.