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James M. Strong

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Blinding Laser Weapons and Protocol IV: Obscuring the Humanitarian Vision

I. Introduction

Blinding as a method of warfare is not new to the conduct of armed conflict.¹ It is the fast approaching reality of cheap, mass produced, low energy laser² weapons, capable of causing permanent blindness and their potential for widespread use, that has brought renewed international attention.³

The international community has long recognized the necessity of placing humanitarian limitations on both the methods and means of warfare.⁴ Those military measures whose necessity, or utility, are disproportionate to the human suffering they engender are prohibited under both customary and codified international humanitarian law.⁵

The recent Review Conference of the States Parties to the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively

1. After the battle of Balathista, Basil II, the Eastern Emperor of the Byzantine empire, blinded ninety-nine percent of all the Bulgarian soldiers he captured, with one percent allowed to retain vision in one eye in order that they might lead the others home. 1 LEON FRIEDMAN, *THE LAW OF WAR: A DOCUMENTARY HISTORY* 11 (1972).

2. Laser is an acronym for light amplification by the stimulated emission of radiation. JEFF HECHT, *BEAM WEAPONS: THE NEXT ARMS RACE* 23 (1984). This Comment will not address high-energy laser systems which, although they may have incidental anti-personnel effects, are not intended for anti-personnel use.

3. As recently as 1973, experts believed that the use of lasers as anti-personnel devices would be unlikely due to the low cost effectiveness for the purpose. INTERNATIONAL COMMITTEE OF THE RED CROSS: *WEAPONS THAT MAY CAUSE UNNECESSARY SUFFERING OR HAVE INDISCRIMINATE EFFECTS: REPORT ON THE WORK OF EXPERTS* 69 (1973) [hereinafter 1973 ICRC REPORT].

4. In any armed conflict "the right of the parties to choose methods or means of warfare is not unlimited." PROTOCOL I ADDITIONAL TO THE GENEVA CONVENTIONS RELATING TO THE PROTECTION OF VICTIMS OF INTERNATIONAL ARMED CONFLICTS, Dec. 12, 1977, art. 35(1), 1125 U.N.T.S. 3-608 [hereinafter 1977 PROTOCOL I].

5. FRITS KALSHOVEN, *CONSTRAINTS ON WAGING OF WAR* 29-30 (1987).

Injurious or to Have Indiscriminate Effects (hereinafter Weapons Convention),⁶ adopted an Additional Protocol on Blinding Laser Weapons to be annexed to the Weapons Convention as Protocol IV.⁷ Protocol IV was adopted with the intention of limiting the use of blinding laser weapons in light of existing international humanitarian limitations and their effect on the conduct of war.

This Comment will examine humanitarian limitations on the conduct of warfare and the problem that blinding laser weapons present. Specifically, Part II will provide an overview of lasers, with emphasis on current military applications of the laser and their effects on the eye. Part III will address the relevant customary and codified international law applicable to armed conflict and laser weapons. Part IV analyzes the recent Protocol IV annexed to the Weapons Convention, addressing in particular its deficiencies. Finally, Part V concludes that although Protocol IV is a positive attempt at eliminating an excessively injurious weapon, it falls well short of meeting expectations.

II. Lasers and Their Effects on the Eye

The beam of a laser is a very intense stream of similar electromagnetic wavelengths.⁸ Lasers emit radiation with wavelengths in the optical radiation portion of the electromagnetic

6. The Review Conference was held from September 25 to October 13, 1995 in Vienna. UNITED NATIONS, REVIEW CONFERENCE OF THE STATES PARTIES TO THE CONVENTION ON PROHIBITION OR RESTRICTIONS ON THE USE OF CERTAIN CONVENTIONAL WEAPONS WHICH MAY BE DEEMED TO BE EXCESSIVELY INJURIOUS OR TO HAVE INDISCRIMINATE EFFECTS, PROTOCOL ON BLINDING LASER WEAPONS, U.N. Doc. CCW/CONF.I/7 (1995) [hereinafter PROTOCOL IV]. A review conference may be convened at the request of a State Party to "review the scope and operation of this Convention and the Protocols annexed thereto." 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, Apr. 10, 1981, art. 8, para. 3(a), S. TREATY DOC. NO. 25, 103d Cong., 2d Sess. (1994), 19 I.L.M. 1523 [hereinafter Weapons Convention]. A review conference may also consider and decide upon the annexation of additional protocols to the Convention. KALSHOVEN, *supra* note 5, at 151.

7. PROTOCOL IV, *supra* note 6.

8. Whenever a charged particle loses energy in an electric field, electromagnetic radiation is emitted, which is characterized by its wavelength. MAJOR GENERAL BENGT ANDERBERG & DR. MYRON L. WOLBARSH, LASER WEAPONS: THE DAWN OF A NEW MILITARY AGE 16 (1992).

spectrum,⁹ which includes ultraviolet, visible, and infrared wavelengths.¹⁰

The eye functions as a complex optical system, capable of both detecting and focusing certain wavelengths of electromagnetic radiation on to the retina.¹¹ When light radiation enters the eye, it passes through the ocular media,¹² which serves to focus the light on to the retina at the rear of the eye.¹³ Although the retina itself is not much more sensitive to damage from lasers than other parts of the body, the ocular media renders it particularly susceptible because it magnifies the intensity of the laser beam by a factor of approximately 100,000 times.¹⁴

Not all wavelengths of electromagnetic radiation are transmitted to the retina, however; only visible and near-infrared radiation are transmitted.¹⁵ Visible electromagnetic radiation comprises a very narrow part of the entire spectrum, and generally has a wavelength between 400 nanometers and 700 nanometers.¹⁶ Near-infrared radiation generally has a wavelength between 700 and 1400 nanometers and is invisible to the eye.¹⁷ It is only electromagnetic radiation within this wavelength range, 400 to 1400 nanometers, that the ocular media focuses on the retina.¹⁸ This range is known as the "retinal hazard region."¹⁹

A. *The Effect*

The effect of a laser on the eye is a function of many variables, such as distance from the laser source, characteristics of the beam,

9. The electromagnetic spectrum ranges from very long, low frequency wavelengths such as commercial power, to extremely short, high frequency wavelengths such as gamma rays. *Id.* at 14.

10. *Id.* at 15.

11. *Id.* at 67.

12. The ocular media consists of the cornea, the aqueous fluid in the anterior chamber, the lens, and the vitreous. LOUISE DOSWALD-BECK, INTERNATIONAL COMMITTEE OF THE RED CROSS, *BLINDING WEAPONS: REPORTS OF THE MEETINGS OF EXPERTS CONVENED BY THE INTERNATIONAL COMMITTEE OF THE RED CROSS ON BATTLEFIELD LASER WEAPONS* (1989-1991) 148 (1993).

13. The retina is actually an extension of the brain, comprised of complex layers of nerve cells. ANDERBERG & WOLBARSH, *supra* note 8, at 68.

14. ANDERBERG & WOLBARSH, *supra* note 8, at 74-75. If a pair of 7 x 50 binoculars were being used at the time, the intensity of the energy would be 25 times greater still. *Id.* at 74.

15. DOSWALD-BECK, *supra* note 12, at 151.

16. ANDERBERG & WOLBARSH, *supra* note 8, at 70.

17. *Id.* at 70.

18. *Id.*

19. *Id.* at 73.

and atmospheric conditions.²⁰ The least destructive effects would be temporary states of discomfort known as "dazzle" and "flash blindness."²¹ Dazzle occurs when retinal receptors are overloaded by intense light and visual function is severely depressed.²² Flash blindness is similar to dazzle, and occurs when photoreceptors are exposed to a bright flash of light and the photopigments are bleached.²³

Only lasers operating in the visible spectrum are capable of inducing dazzle or flash blindness.²⁴ Both can occur without causing any permanent damage if the eyes have been adjusted to the dark before being exposed to a laser beam at night and the energy level of the laser is low.²⁵ It is not possible, however, to flash blind a person during the daytime without also causing permanent damage.²⁶ The threshold between flash blindness and permanent blinding is very narrow, since the level of energy necessary to flash blind a person is very close to the level necessary to cause permanent damage.²⁷

The more severe effects on the eye take the form of either photodisruption or photocoagulation.²⁸ Photodisruption occurs when laser energy focused within the eye is so intense that it turns living tissue in the eye to a plasma.²⁹ When the electromagnetic field is no longer present, the plasma becomes a gaseous product, leaving a void in the eye.³⁰ The gaseous product forms a cavitation bubble which eventually collapses in an often violent manner.³¹

When a laser's energy is transferred to the eye tissues at a faster rate than can safely be dissipated, the resultant thermal effect

20. DOSWALD-BECK, *supra* note 12, at 145.

21. *Id.* at 121.

22. *Id.* The effect is similar to that of bright car head lights on a driver's vision at night. ANDERBERG & WOLBARSHT, *supra* note 8, at 145.

23. DOSWALD-BECK, *supra* note 12, at 122. The process of restoring bleached pigment takes several minutes and the exposed area of the retina will be functionally blind until the process is completed. *Id.* A mild form of flash blindness would be comparable to the after-images which result from staring at a light bulb or a photographer's flash. *Id.*

24. *Id.*

25. ANDERBERG & WOLBARSHT, *supra* note 8, at 155.

26. *Id.* This is due partly to the fact that more light is needed to produce flash blindness in the daytime because the pupil is constricted. *Id.*

27. DOSWALD-BECK, *supra* note 12, at 25.

28. *Id.* at 119.

29. *Id.*

30. *Id.*

31. *Id.*

is known as photocoagulation.³² The increase in temperature produces an effect in eye tissue similar to what boiling an egg does to the egg white.³³ Lesions are produced, which will disrupt vision to an extent dependent upon their size and location within the eye.³⁴ Damage to the eye from photocoagulation can occur within micro-seconds.³⁵

The danger of hemorrhaging, with blood seeping forward into the retina or vitreous, is possible with both photodisruption and photocoagulation.³⁶ Damage to the cornea or lens is also possible depending on the wavelength of the laser.³⁷ This type of damage produces image distortion, haze, and blurring of vision which can often be repaired if sophisticated medical attention is immediately available.³⁸

Damage to the retina, although painless, is irreparable and permanent.³⁹ Unless there is severe hemorrhaging, damage to the periphery of the retina will usually lead to only slight visual impairment.⁴⁰ Damage to the central area of the retina causes instantaneous loss of central vision and legal blindness.⁴¹

B. The Military Applications of Low-Energy Lasers

It is necessary to draw a distinction between current laser systems used in conjunction with other conventional weapons and those that are intended solely as weapons.⁴² Designed to assist conventional weapon systems in their effectiveness, both the laser rangefinder and target designator are highly effective in reducing the incidence of collateral damage due to the increased accuracy that they provide.⁴³ As a result, there are fewer indiscriminate civilian casualties since military targets can be pinpointed and

32. ANDERBERG & WOLBARSH, *supra* note 8, at 77.

33. DOSWALD-BECK, *supra* note 12, at 122.

34. *Id.*

35. *Id.* at 32.

36. *Id.* at 123-124.

37. ANDERBERG & WOLBARSH, *supra* note 8, at 149.

38. DOSWALD-BECK, *supra* note 12, at 33.

39. *Id.*

40. *Id.*

41. *Id.*

42. ANN PETERS, HUMAN RIGHTS WATCH ARMS PROJECT, REPORT ON BLINDING LASER WEAPONS: THE NEED TO BAN A CRUEL AND INHUMANE WEAPON 21 (1995).

43. *Id.* at 21. Laser rangefinders and target designators are non-weapons which assist conventional weapons by determining distances to and pinpointing targets with great accuracy. *Id.*

attacked with minimal or no damage to civilian centers.⁴⁴ The Human Rights Watch Arms Project does not oppose the legitimate use of laser rangefinders and designators because they enable more precise deployment of weapons.⁴⁵

Modern rangefinders and designators are not eye-safe,⁴⁶ however; both employ lasers with output wavelengths well within the retinal hazard region.⁴⁷ There are eye-safe lasers with output wavelengths outside the retinal hazard region that could find use; however, at this time no laser matches the practical utility of the type already employed.⁴⁸

1. *Laser Systems Intended as Weapons.*—Low-energy laser weapons utilizing the laser beam as the “primary kill mechanism”⁴⁹ have been developed with the potential for immediate production and military application.⁵⁰ Low energy lasers are effective as weapons only against the eye and similarly sensitive sensors.⁵¹ The optics of sensors, like eyes, are particularly sensitive to laser light because it is their function to magnify incoming electromagnetic radiation.⁵² Although it is always the target in question⁵³ that determines the necessary properties of the laser to be employed, the demarcations between the intended functions of anti-sensor and anti-personnel weapons are somewhat blurred

44. Steve Pagani, *U.N. Conference Urged to Ban Blinding Lasers*, REUTERS, Oct. 4, 1995.

45. *USA Bans ‘Blinding’ Lasers*, JANE’S DEFENCE WEEKLY, Oct. 7, 1995, at 5.

46. Several gunners and tank men were accidentally blinded by the beams from laser rangefinders in the Persian Gulf War. *Thou Shalt Not Blind*, THE ECONOMIST, Oct. 14, 1994, at 54.

47. The retinal hazard region is comprised of electromagnetic radiation within the range of only 400 to 1400 nanometers. ANDERBERG & WOLBARSH, *supra* note 8, at 70.

48. *Id.* at 46.

49. PETERS, *supra* note 42, at 121.

50. *Id.*

51. ANDERBERG & WOLBARSH, *supra* note 8, at 94.

52. *Id.*

53. When determining the target in question it must be remembered that only in cases of electro-optical devices where there is a physical separation between the sensor and the eye, such as viewing a monitor, would the low energy laser not be attacking the eye of the combatant. WILLIAM M. ARKIN, HUMAN RIGHTS WATCH ARMS PROJECT, REPORT ON UNITED STATES BLINDING LASER WEAPONS 5 (1995).

because both operate within the retinal hazard region of the electromagnetic spectrum.⁵⁴

a. Anti-sensor laser weapons.—Anti-sensor laser weapons⁵⁵ are designed to destroy, or render temporarily inoperable, the optical or electro-optical viewing systems of the opponent.⁵⁶ The modern battlefield has become dependent upon the visual enhancement that optical and electro-optical sensors provide their users.⁵⁷

Optical devices such as binoculars and gunsights have been in service for a long time and typically serve to magnify an image through various lenses. Electro-optical devices are somewhat more complex because they provide their operator with enhanced fighting capabilities, such as the ability to see through smoke or fog or to fight effectively at night.⁵⁸ One such device is a thermal viewing system, which employs sensors capable of detecting subtle differences in temperature, and then provides the operator with an enhanced thermal picture.⁵⁹ Another device is the image intensifier. Due to its extreme sensitivity to light, it is capable of intensifying very small amounts of visible light and producing an enhanced image on a viewing screen for the operator.⁶⁰

Sensors are easily made ineffective by laser weapons.⁶¹ At the upper end of its power range, the low-energy laser is capable of “crazing” the glass lenses of an optical or electro-optical device.⁶² Crazing occurs when the thermal effect of the laser’s energy causes the glass to heat and crack, with a frosted effect as a result, making it impossible to see through the glass.⁶³

At lower energy levels, if the laser’s wavelength is one which the electro-optical device’s sensor is designed to receive and enhance, the laser energy will be magnified, and consequently,

54. *Id.* at 93. Unless there is some separation of the eye from the sensor, the eye will always be the true target and the optic will serve only to intensify the beam before it enters the eye. ARKIN, *supra* note 53, at 5.

55. Anti-sensor laser weapons may also properly be called optical and electro-optical countermeasure systems. ANDERBERG & WOLBARSH, *supra* note 8, at 148.

56. DOSWALD-BECK, *supra* note 12, at 97.

57. ANDERBERG & WOLBARSH, *supra* note 8, at 146.

58. *Id.*

59. *Id.* at 147.

60. *Id.*

61. DOSWALD-BECK, *supra* note 12, at 108.

62. *Id.* at 148.

63. *Id.* This effect can be accomplished in less time than it takes to blink an eye. *Id.*

destroying extremely sensitive radiation detectors and rendering the device inoperable.⁶⁴ Similarly, if the wavelength is one which the eye is capable of transmitting, then an optical device will magnify and intensify the image even before the beam reaches the ocular media.

The Stingray Combat Protection System (hereinafter Stingray) is an American anti-sensor weapon.⁶⁵ The Stingray scans the battlefield for sensors with a low-power near-infrared laser.⁶⁶ If the beam encounters a sensor, a small fraction of the laser pulse is reflected back to the Stingray which instantaneously locks onto the sensor and increases the level of laser energy, overloading or jamming the sensor.⁶⁷ The Stingray is a large system, mounted onto a platform such as a Bradley Fighting Vehicle.⁶⁸ Two operational prototypes were deployed during the Persian Gulf War but were not used due to the short duration of the conflict.⁶⁹

b. Anti-personnel laser weapons.—Anti-personnel laser weapons are designed with the sole intended function of disabling the opponent's vision by attacking the eyes.⁷⁰ Distinguishing between anti-personnel and anti-sensor weapons becomes quite problematic as both can employ lasers with similar wavelengths capable of damaging both battlefield sensors and eyes.⁷¹ However, the intended function of the laser weapon will influence its design and production so that it will perform as optimally as intended.

The British Royal Navy has deployed a ship-based anti-personnel laser weapon, the Laser Dazzle Sight (hereinafter LDS), since the early 1980s.⁷² The laser weapon is intended to produce a dazzle effect on the cockpit of enemy warplanes, temporarily flash blinding the pilots.⁷³ The LDS was used by British warships during the Falklands campaign to disturb the vision of attacking aircraft pilots.⁷⁴ The British Minister for Defense Procurement has since stated that British armed forces do not currently possess

64. *Id.*

65. ARKIN, *supra* note 53, at 11.

66. DOSWALD-BECK, *supra* note 12, at 107.

67. *Id.* at 107.

68. ARKIN, *supra* note 53, at 11.

69. *Id.* at 12.

70. DOSWALD-BECK, *supra* note 12, at 97.

71. *Id.*

72. ARKIN, *supra* note 53, at 14.

73. *Id.*

74. PETERS, *supra* note 42, at 20.

any laser weapon "designed permanently to blind enemy troops or to disrupt their eyesight temporarily."⁷⁵

The Laser Countermeasure System (hereinafter LCMS) was developed for the United States Army primarily to "detect, jam, and suppress threat fire control, optical, and electro-optical subsystems."⁷⁶ The LCMS is a laser system mounted onto an M-16 rifle which is to be "employed by the individual soldier to find and disrupt threat optical and electro-optical surveillance devices."⁷⁷ Although seemingly an anti-sensor weapon, the LCMS is actually a dual purpose weapon, capable of serving in an anti-personnel capacity.⁷⁸ According to the Army, once the target is acquired, one of the intended functions of the LCMS would be to "negate the capabilities of threat electro-optical device or *impair the vision of an OED operator*."⁷⁹ The LCMS at maximum ranges is capable of dazzling, and at a range of 1,000 meters or less, can cause permanent blindness to anyone employing an optical device such as binoculars.⁸⁰

Unlike other countries with laser weapon capabilities, China makes no pretenses about the intended purposes of its ZM-87 Portable Laser Disturber.⁸¹ Displayed recently at a weapons show in Manila, its manufacturer claims that one of the weapon's primary functions is to "injure or dizzy the eyes of an enemy combatant."⁸²

75. David Fairhall, *Britain Halts Work on Laser Weapons*, THE GUARDIAN, May 23, 1995, at 5.

76. Lockheed Sanders Fact Sheet, Laser Countermeasure System (LCMS) AN/PLQ-5 (1994) (quoted in ARKIN, *supra* note 53, at 8).

77. U.S. Army Night Vision and Electronic Sensors Directorate Fact Sheet, "Laser Countermeasure System," (obtained April 1995 under Freedom of Information Act) (quoted in ARKIN, *supra* note 53, at 8).

78. This is true, even though the Director of Strategic and Tactical System stated that "U.S. laser weapons and, specifically the Laser Countermeasure System, are designed to produce optical and electro-optical disruption and are neither designed nor intended to produce permanent vision impairment in people." Letter from George R. Schnieter, Director, Strategic and Tactical Systems, Office of the Under Secretary of Defense, to Human Rights Watch (June 9, 1995) (quoted in PETERS, *supra* note 42, at 8 n.32).

79. Department of the Army, Office of the Judge Advocate General, Memorandum, Subject: AN/PLQ-5 Laser Countermeasure System; Law of War Review, (Sept. 16, 1994) (quoted in ARKIN, *supra* note 53, at 8) (emphasis added).

80. *Id.*

81. Bradley Graham, *Pentagon Shifts, Seeks Laser Weapons Curbs*, WASH. POST, Sept. 20, 1995, at A3.

82. ZM-87 Portable Laser Disturber Fact Sheet, China North Industries Corp, (obtained 1995) (quoted in PETERS, *supra* note 53, at 11). The ZM-87 is capable of injuring the human eye at a distance of two to three kilometers and if a magnifying optic is employed the distance would be increased to five kilometers. *Id.* In addition, its capability for producing flash blindness is effective to ten

There are no complete defensive measures to low energy, anti-personnel laser weapons. The optimal anti-personnel laser would employ wavelengths within that part of the spectrum which the eye transmits, since the energy required would be low.⁸³ To achieve maximum psychological impact, an invisible laser operating outside the visible spectrum would be employed.⁸⁴ The weapon would be capable of producing lasers with multiple wavelengths in order to make protection near impossible.⁸⁵

There are goggles which provide wavelength specific protection from lasers, but they are effective only in blocking known lasers of a certain wavelength.⁸⁶ Laser weapons capable of emitting lasers of several different wavelengths render complete protection impossible unless all of the threat wavelengths are known.⁸⁷ One possibility for protection, according to the U.S. Air Force, is to wear an opaque patch over one eye, so the wearer would retain the visual capability of one eye at least.⁸⁸

III. International Law of Armed Conflict

International law regulates the means, methods, and weaponry of war in an attempt at preserving humanity in recognition of the ever present reality of war.⁸⁹ The law of armed conflict comprises both the customary, or generally recognized principles and rules of international law, and those rules codified in international agreements.⁹⁰

Even though citizens take up arms for their state, they "do not cease on this account to be moral beings, responsible to one another and to God."⁹¹ Worldwide peace has proven elusive. Therefore, the necessity for rules of conduct, intended to regulate the actions of combatants during the inevitable waging of war,

kilometers. *Id.* The ZM-87 transmits two laser pulses at different wavelengths, making defensive procedures less effective. Michael Dynes, *Red Cross Calls for a World Ban on Blinding Laser Guns*, THE TIMES, Sept. 8, 1995.

83. ANDERBERG & WOLBARSH, *supra* note 8, at 149.

84. *Id.* at 149.

85. DOSWALD-BECK, *supra* note 12, at 130.

86. *Id.* at 141.

87. *Id.* Tunable lasers can emit beams of any wavelength and an effective filter would allow no visible transmission at all, thereby rendering it useless. *Id.*

88. DOSWALD-BECK, *supra* note 12, at 130.

89. KALSHOVEN, *supra* note 5, at 159.

90. 1977 PROTOCOL I, art.2(b), *supra* note 4.

91. Francis Lieber, Instructions For the Government of Armies of the United States in the Field, art. XV, [hereinafter Lieber Code], in FRIEDMAN, *supra* note 1, at 158.

remains paramount.⁹² The regulation of armed conflict stems from the humanitarian belief that the “progress of civilization should have the effect of alleviating, as much as possible, the calamities of war.”⁹³

A. *The Seeming Paradox of the Law of Armed Conflict*

International law governing the waging of war is *prima facie* paradoxical, but the extent of the paradox depends on which view of the nature of man that one has. For Thomas Hobbes, the common nature of man served only to foster a war of all against all, a state of mere survival.⁹⁴ Existence was “nasty, poor, brutish, and short.”⁹⁵ Legal order served to extricate man from this state of constant war and act as an artificial restraint to protect him from that which was his very nature. Laws governing the conduct of war then appear highly paradoxical, for armed conflict can only represent the ultimate breakdown of legal restraints.⁹⁶

Conversely, if man is by nature a social creature, then a condition of violence is not natural but a “divergence from a more co-operative norm.”⁹⁷ Armed conflict is therefore, a direct affront to society’s normal state of peace.⁹⁸ The laws of armed conflict then represent a reality-based measure which recognizes the inevitability of both the outbreak of war and more importantly, its ultimate resolution. Recognition of the inevitable resolution of conflict and a return to the traditional legal order necessitates that conduct during a conflict be regulated. For Hilaire McCoubrey,⁹⁹ this recognition requires an awareness that the “greater the degree of barbarity manifested in the conduct of military operations, the

92. JEAN PICTET, *DEVELOPMENT AND PRINCIPLES OF INTERNATIONAL HUMANITARIAN LAW* 79 (1985). There have been only 250 years of general peace in the past 3,400 years, and on average over the past 5,000 years one million persons have been killed per year. *Id.*

93. Declaration Renouncing the Use in War of Certain Explosive Projectiles, Dec. 11, 1868, Preamble, 138 Consol. T.S. 297 [hereinafter *St. Petersburg Declaration*].

94. THOMAS HOBBS, *LEVIATHAN* 100 (Michael Oakeshott ed., 1962).

95. *Id.*

96. HILAIRE MCCOUBREY, *INTERNATIONAL HUMANITARIAN LAW: THE REGULATION OF ARMED CONFLICT* 2 (1990).

97. *Id.* at 3.

98. PICTET, *supra* note 92, at 63. The Lieber Code states that “Peace is their normal condition; War is the exception.” Lieber Code, *supra* note 91, art. XXVIII.

99. Mr. McCoubrey is a Lecturer in Law at the University of Nottingham, and a renowned scholar in the field of international humanitarian law.

more difficult the . . . process of normalization of relations is likely to be."¹⁰⁰ The laws of armed conflict recognize war as an unnatural and temporary state of relations after which there must be reconciliation between the parties.¹⁰¹ To this end, they emphasize that humanitarian principles must govern and serve to restrain the conduct of the parties during a conflict.

B. *The Methods or Means of Warfare Are Not Unlimited*

Jean Pictet¹⁰² states that humanitarian concerns have served as inspiration for the "Principle of the Law of War." He defines the Principle as follows: "the right of the parties to the conflict to choose methods or means of warfare is not unlimited."¹⁰³ This principle of limitation has served as a foundation for the development of the international humanitarian law of armed conflict.¹⁰⁴

Undeniably predicated upon humanitarian concerns, the law of the Hague has historically concerned itself with regulating the means and methods of conducting warfare. To this end, Article 22 of the Hague Regulations states that the "right of belligerents to adopt means of injuring the enemy is not unlimited."¹⁰⁵ This principle is now regarded as customary international law.¹⁰⁶

C. *Proportionality*

The principle of proportionality demands a balancing of the necessities of war and the principles of humanitarian law.¹⁰⁷ It

100. MCCOUBREY, *supra* note 96, at 3, 4.

101. St. Augustine wrote that "[p]eace should be the object of your desire; war should be waged only as a necessity, and waged only that God may by it deliver men from the necessity and preserve them in peace." FRIEDMAN, *supra* note 1, at 7.

102. Jean Pictet has a long history of involvement in the field of international humanitarian law notably, serving as Director of the International Committee of the Red Cross (ICRC), and from 1974 to 1977 as head of the ICRC delegation to the Diplomatic Conference on the Reaffirmation and Development of International Humanitarian Law applicable in Armed Conflicts. PICTET, *supra* note 92, at VII. The author is also recognized as having first proposed the term 'humanitarian law', which has found widespread acceptance and application since. *Id.* at 1.

103. *Id.* at 63.

104. KALSHOVEN, *supra* note 5, at 29.

105. Convention II Respecting the Laws and Customs of War on Land, *entered into force* Sept. 4, 1900, section II, ch. 1, art. XXII, 1 Bevens 247 [hereinafter 1899 Hague Convention II].

106. KALSHOVEN, *supra* note 5, at 18.

107. The 1868 St. Petersburg Declaration stated it as the need "to reconcile the necessities of war with the laws of humanity." 1868 St. Petersburg Declaration, *supra* note 93.

requires that those military measures which are disproportionate to the human suffering they cause be prohibited.¹⁰⁸ Although military necessity and humanitarian laws have historically been viewed as being fundamentally opposite,¹⁰⁹ the two can be reconciled.¹¹⁰ Not only can there be, but there must be, for the conduct of armed conflict must comport with the demands of humanitarian law.¹¹¹

1. Military Necessity and Laser Weapons.—It must not be forgotten, that the object of war is to so incapacitate the enemy's armed forces that they concede.¹¹² The Lieber Code,¹¹³ provided that the object of war could not serve to justify all means and limited military necessity to only those measures "which are indispensable for securing the ends of the war, and which are lawful according to the modern law and usages of war."¹¹⁴ Some courses of action are of ultimate necessity for securing military advantage, while others represent varying gradations on a scale of military necessity.¹¹⁵ For some, military necessity "is nothing other than the claim that certain things are allowed in armed conflict; on no other ground than that they must be done."¹¹⁶ Determining which measures are indispensable and which are merely expedient is often problematic.¹¹⁷

Implicit in a determination of military necessity, for purposes of imposing limitations on weapons, is an analysis of the military

108. ANDERBERG & WOLBARSH, *supra* note 8, at 204.

109. PICTET, *supra* note 94, at 62.

110. William G. Downey, *The Law of War and Military Necessity*, 47 AM. J. INT'L L. 251 (1953).

111. PICTET, *supra* note 92, at 62.

112. The St. Petersburg Declaration declared that "the only legitimate object which states should endeavor to accomplish during war is to weaken the military force of the enemy . . ." St. Petersburg Declaration, *supra* note 93.

113. Lieber Code, *supra* note 91. Francis Lieber drafted a code of regulations "as authorized by the laws and usages of war" for a government commissioned board which was subsequently promulgated in 1863 as General's Orders No.100, entitled "Instructions for the Government of Armies of the United States in the Field." FRIEDMAN, *supra* note 1, at xvii.

114. Lieber Code, *supra* note 93, art. XIV.

115. At the root of the difficulty lies the uncertainty as to what exactly military necessity implies. INGRID D. DELUPIS, *THE LAW OF WAR* 335 (1987).

116. KALSHOVEN, *supra* note 5, at 160. The opposing claim is "that even in armed conflict certain things are not allowed, because they amount to an intolerable encroachment of humanity." *Id.*

117. DELUPIS, *supra* note 115, at 332. A State engaged in an armed conflict will do its utmost to win but, this objective may be more easily attainable if the State resorts to inhumane warfare. *Id.* at 333.

utility in employing such weapons.¹¹⁸ In reality, where there have been successful prohibitions or limitations of a weapon, the weapon did not possess any real military utility.¹¹⁹ Following the announcement of a new Department of Defense policy on blinding lasers,¹²⁰ a review of the Department's laser programs was conducted.¹²¹ As a result of this review, the LCMS program was promptly terminated.¹²² Even though the Army had claimed the LCMS was an anti-sensor weapon, one official involved in the decision to terminate the program was quoted as saying:

But what's the purpose of temporarily messing up a sensor on, say, an enemy tank when you still have the tank coming at you and you have other ways of eliminating it? For the laser to be effective, it would have to be used to blind the opposition. But trying to blind temporarily is very hard, and trying to blind permanently is not our policy.¹²³

Senior Pentagon civilians had concluded that the LCMS had little military utility and although not violative of the new policy, was not in keeping with its spirit.¹²⁴

2. *Unnecessary Suffering.*—It is axiomatic that combatants are permitted under the laws of armed conflict to employ weapons capable of killing other combatants. However, combatants are not permitted “to use methods or means of warfare exclusively designed to injure soldiers with the injurious effects lasting, not

118. Although one pound of botulism toxin would theoretically be sufficient to exterminate the population of the earth, because there are too many unknown factors that would accompany its use, the military utility of this weapon is negligible at best. PICTET, *supra* note 92, at 55.

119. JULIUS STONE, *LEGAL CONTROLS OF INTERNATIONAL CONFLICT*, 551 n.23 (1973). Stone writes that “rules that grow up are rules touching the old and more marginal weapons, not weapons which by their novelty and efficiency are more likely to be decisive.” *Id.* at 551.

120. The new policy “prohibits the use of lasers specifically designed to cause permanent blindness of unenhanced vision,” while recognizing that “accidental or incidental eye injuries may occur on the battlefield as the result of the use of legitimate laser systems.” News Release, Office of Assistant Secretary of Defense, *Department Of Defense Announces Policy on Blinding Lasers*, Sept. 1, 1995, in PETERS, *supra* note 42, at 48.

121. Memorandum for Secretary of the Army, Subject: Termination of the Laser Countermeasure System (LCMS), Oct. 5, 1995. A day before the new policy was announced, the Army contracted with Lockheed Sanders to produce seventy-five LCMS units at a cost of \$16.8 million. Graham, *supra* note 81, at A3.

122. *Id.*

123. *Id.*

124. Bradley Graham, *Army Laser Weapon Becomes First Casualty of New Policy*, WASH. POST, Oct. 13, 1995, at A4.

only for the duration of the conflict, but for the rest of their lives."¹²⁵

The goal of waging war is to render the opposing combatants "*hors de combat*"¹²⁶ but humanitarian law requires that a combatant be rendered *hors de combat* for the duration of the conflict only.¹²⁷ This comports with the theory that for a combatant to be taken out of action: (1) he should not be injured if he can be made a prisoner; (2) he should not be killed if he can be injured; and, (3) if light injury is sufficient, then grave injury should be avoided.¹²⁸ Considering the nature of war, this theory may seem paradoxical,¹²⁹ but to retain as much humanity as possible throughout the conduct of hostilities requires that it be permissible to use only as much force as necessary to render a combatant *hors de combat* for the duration of the conflict, and no more.

a. *The St. Petersburg Declaration.*—The principle of customary international law prohibiting the use of weapons which cause unnecessary suffering first found expression in the 1868 St. Petersburg Declaration.¹³⁰ Gathering in St. Petersburg,¹³¹ an

125. ANDERBERG & WOLBARSH, *supra* note 8, at 211.

126. A person is *hors de combat* if:

- (a) he is in the power of an adverse Party;
- (b) he clearly expresses an intention to surrender; or
- (c) he has been rendered unconscious or is otherwise incapacitated by wounds or sickness and, therefore, is incapable of defending himself; provided that in any of these cases he abstains from any hostile act and does not attempt to escape. 1977 PROTOCOL I, art. 41(2), *supra* note 4.

127. PETERS, *supra* note 42, at 27.

128. 1973 ICRC REPORT, *supra* note 3, at 13.

129. Robert Bunker succinctly and graphically described this paradox: "it is more acceptable for a high-velocity round from a modern assault rifle to shatter the skull of an opposing soldier and kill him via massive cerebral trauma than to use a low-powered laser that blinds him as a by-product of counteroptical fire." Robert Bunker, *U.S. Must Seize the Future With Tactical Laser Development*, DEFENSE NEWS, Sept. 3, 1995, at 15.

130. The 1868 St. Petersburg Declaration stated that:

Considering the progress of civilization should have the effect of alleviating as much as possible, the calamities of war:

That the only legitimate object which states should endeavor to accomplish during war is to weaken the military force of the enemy;

That for this purpose, it is sufficient to disable the greatest possible number of men;

That this object would be exceeded by the employment of arms which uselessly aggravate the sufferings of disabled men, or render their death inevitable;

That the employment of such arms would, therefore, be contrary to the laws of humanity.

international military commission declared a prohibition on the use of explosive projectiles weighing less than four hundred grams.¹³² The military commission determined that the explosive bullets were capable of rendering only one man *hors de combat* at a time; the same as a non-explosive bullet was capable.¹³³ Since a non-explosive bullet would alone be sufficient to render a combatant *hors de combat*, the explosive bullet served only to uselessly aggravate the injury.

In banning the munition, the commission declared that they had "fixed by a common accord the technical limits within which the necessities of war ought to yield to the demands of humanity."¹³⁴ Although now a principle of customary international law, application of the prohibition against unnecessary suffering has proven to be difficult due to its vagueness.¹³⁵

b. The 1899 Hague Convention.—In 1899, an international conference was once again convened with a focus on prohibiting or limiting the use of certain weapons.¹³⁶ Concerned that the economic cost of preparing for war might eventually lead to war, the Russian Foreign Minister wrote, "if this state of affairs be prolonged, it will inevitably lead to the very cataclysm which it is designed to avert, and the impending horrors of which are fearful

St. Petersburg Declaration, *supra* note 93.

131. Representatives from sixteen states (Austria-Hungary, Bavaria, Belgium, Denmark, France, Great Britain, Greece, Italy Netherlands, Portugal, Prussia and the North German Confederation, Russia, Sweden and Norway, Switzerland, Turkey, and Wurtemberg) met for three sessions in November of 1868, with the treaty being formally signed on Dec. 11, 1868. ADAM ROBERTS & RICHARD GUELFF, *DOCUMENTS ON THE LAWS OF WAR* 29, 32 (2d ed. 1989).

132. The munition banned by the Declaration was a small calibre explosive bullet originally designed to be used against material, but when modified to explode upon contact with soft material such as human flesh, was found to be effective against combatants as well. MCCOUBREY, *supra* note 96, at 155. However, the view has also been expressed that the munition had little relevance to modern warfare in the first place. STONE, *supra* note 119, at 552.

133. KALSHOVEN, *supra* note 5, at 13.

134. St. Petersburg Declaration, *supra* note 93. The commission also realized that future limitations on weapons would be necessary "in view of future improvements which science may effect in the armament of troops." *Id.*

135. KALSHOVEN, *supra* note 5, at 30. Apart from instances of express limitations on weapons, States will not easily limit the use of a weapon once it has been incorporated into their arsenal under the principle prohibiting unnecessary suffering. *Id.*

136. The Conference was convened through the initiative of Tsar Nicholas II of Russia, with representatives from twenty-six states meeting in the Hague from May 18 to July 29, 1899. ROBERTS & GUELFF, *supra* note 131, at 35.

to every human thought."¹³⁷ The First Hague Peace Conference declared limitations on three types of weapons¹³⁸ and adopted a Convention With Respect to the Laws and Customs of War on Land, with Annexed Regulations.¹³⁹ The 1899 Hague Convention II was the first successful codification of comprehensive international laws of war.¹⁴⁰ The origins of the 1899 Hague Convention II can be found in the 1874 Declaration of Brussels,¹⁴¹ the Lieber Code, and the 1868 Declaration of St. Petersburg. Stating in the preamble to the 1899 Hague Convention II that its provisions were "inspired by the desire to diminish the evils of war so far as military necessities permit," the Convention continues in the tradition of the 1868 St. Petersburg Declaration.¹⁴² Representatives at the Hague were cognizant of the imperative nature of the principle of proportionality, (i.e., the balancing of military necessity against the requirements of humanity).¹⁴³

The 1899 Hague Declaration 3¹⁴⁴ provided a direct prohibition against the use of 'dum dum' bullets,¹⁴⁵ which were defined as "bullets which expand or flatten easily in the human body."¹⁴⁶ This type of bullet would expand upon impact, causing much more damage upon entering the flesh than an ordinary bullet. Once again, it was no more effective than regular bullets at rendering combatants *hors de combat*. It instead served only to uselessly

137. MCCOUBREY, *supra* note 96, at 155, 6.

138. The 1899 Hague Peace Conference expressly provided in three declarations, prohibitions on: (1) the launching of projectiles and explosives from balloons; (2) projectiles diffusing asphyxiating gases; and, (3) the use of expanding bullets. MCCOUBREY, *supra* note 96, at 156.

139. 1899 Hague Convention II, *supra* note 105.

140. ROBERTS & GUELFF, *supra* note 131, at 43. KALSHOVEN, *supra* note 5, at 14.

141. Although the 1874 Brussels Declaration represented a comprehensive declaration on the laws of war which pre-dated the 1899 Hague Convention II, it was never ratified and never entered into force. ROBERTS & GUELFF, *supra* note 131, at 43. "The laws of war do not allow to belligerents an unlimited power as to the choice of means of injuring the enemy." Declaration of Brussels Concerning the Laws and Customs of War (1874), art. XII, in FRIEDMAN, *supra* note 1, at 194.

142. 1899 Hague Convention II, Preamble, *supra* note 105.

143. KALSHOVEN, *supra* note 5, at 15.

144. Declaration 3 represents a direct application of the prohibition against unnecessary suffering found in the 1868 St. Petersburg Declaration. KALSHOVEN, *supra* note 5, at 30.

145. The name was derived from the British Indian arsenal of Dum-Dum, near Calcutta, where the munition was first manufactured. ROBERTS & GUELFF, *supra* note 133, at 39.

146. MCCOUBREY, *supra* note 96, at 156.

aggravate injuries and cause unnecessary suffering; unnecessary in the sense that the injury inflicted is far greater than that necessary for a combatant to be rendered *hors de combat*.¹⁴⁷

c. The 1907 Hague Convention.—A second Hague conference was convened in 1907 in order to consider matters unresolved by the first conference.¹⁴⁸ The 1907 Hague Convention IV replaced the 1899 Hague Convention II, with only minor revisions. Article 23(e) states that in addition to specific prohibitions on weapons it is “especially forbidden . . . [t]o employ arms, projectiles, or material calculated to cause unnecessary suffering.”¹⁴⁹ Not only did the 1907 Hague Convention IV address limitations on means, but it also placed express limitations on some methods of warfare as well.¹⁵⁰

Recognizing the inherent inability of the 1907 Hague Convention IV to regulate entirely the conduct of war,¹⁵¹ the preamble contains an extremely important clause which serves to cover unforeseen situations.¹⁵² This clause serves to protect combatants in circumstances not previously expressly regulated, by providing that the conduct of war will always implicitly be governed by existing principles of customary international law.¹⁵³ Through widespread acceptance, the principles and rules embodied in the

147. In other words, the suffering is not justified by the military utility and therefore unnecessary. KALSHOVEN, *supra* note 5, at 29.

148. ROBERTS & GUELFF, *supra* note 131, at 43. This need for a second conference was foreseen and provided for in the Final Act of the First Hague Peace Conference of 1899. *Id.*

149. Convention IV Respecting the Laws and Customs of War on Land, Oct. 18, 1907, art. 23(e), 36 Stat. 2277, 3 Martens Nouveau Recueil (ser. 3eme) 461-503 [hereinafter 1907 Hague Convention IV]. In addition, Convention IV confirmed that the “right of belligerents to adopt means of injuring the enemy is not unlimited.” *Id.* at art. 22.

150. *Id.* at art. 23(a), art. 23(b), art. 28.

151. The preamble to the 1907 Hague Convention states that it has not “been found possible at present to concert regulations covering all the circumstances which arise in practice.” *Id.*

152. The Martens Clause, named for its author the Russian Delegate to the conference, appears in the preamble and states that in situations not covered by the regulations “the inhabitants and the belligerents remain under the protection and the rule of the principles of the law of nations, as they result from the usages established among civilized peoples, from the laws of humanity, and the dictates of the public conscience.” *Id.* at Preamble.

153. KALSHOVEN, *supra* note 5, at 14.

Hague Regulations have themselves become recognized as customary international law.¹⁵⁴

d. Unnecessary suffering and the laser weapon.—The conduct of modern warfare and the medical care available are such that an estimated fifty percent of wounded combatants can expect to return to duty within fifty days.¹⁵⁵ Fully, sixty percent of those combatants rendered *hors de combat* by a conventional weapon experience total recovery from their injuries.¹⁵⁶ The blinding effects of a laser, however, render a combatant *hors de combat* for not only the duration of the conflict, but for life.

Vision accounts for ninety percent or more of our sensory input and there are no prosthetic devices available to replace sight.¹⁵⁷ Loss of sight is destructive to the individual's self-image.¹⁵⁸ Perceptual and motor skills, mobility, and communication are all impaired. They can only be improved through extensive re-education and rehabilitation.¹⁵⁹ Instantaneous loss of sight would be a traumatic experience, especially for a young soldier. Blinding lasers would cause just that unnecessary suffering which is prohibited by customary international law.

It is relevant to look at the social, as well as the psychological, damage caused by the use of lasers to blind.¹⁶⁰ Interviews of soldiers revealed that the fear of mutilation by injury is greater than the fear of death. Additionally, of all the possible injuries, blindness is feared the most.¹⁶¹ This deep-seated fear of blindness could contribute to increases in the number of combatants returning home with post-traumatic stress disorder (hereinafter PTSD).¹⁶² Blindness carries with it profound consequences for the victim and society.¹⁶³ The possibility of large numbers of incapacitated soldiers¹⁶⁴ returning home from combat,¹⁶⁵ depen-

154. This recognition occurred by the second World War and continues today. *Id.* at 18.

155. DOSWALD-BECK, *supra* note 12, at 183.

156. *Id.* at 335.

157. *Id.* at 47.

158. *Id.* at 204.

159. *Id.* at 183.

160. PETERS, *supra* note 42, at 25.

161. DOSWALD-BECK, *supra* note 12, at 288.

162. *Id.* at 287. Since the development of PTSD appears dependent on the duration of the stress experience, if the combatant is blinded while already suffering from an anxiety (such as the fear of being blinded by a laser) he is more likely to develop PTSD. *Id.*

163. *Id.* at 258.

164. ANDERBERG & WOLBARSH, *supra* note 8, at 212.

dent on others for support, would put a tremendous strain on both private and public resources.¹⁶⁶ The total impact of attempting to reintegrate soldiers blinded by lasers back into society would be burdensome and prolonged.¹⁶⁷

IV. The 1980 Weapons Conference and Protocol IV

Although limitations on weapons had long been recognized as being within the purview of the law of the Hague, the 1980 Weapons Convention is an amalgamation of customary international law,¹⁶⁸ the law of Geneva, and the efforts of both the International Committee of the Red Cross (hereinafter ICRC) and the United Nations.¹⁶⁹

A. *The 1980 Weapons Convention*

The Ad Hoc Committee on Conventional Weapons¹⁷⁰ addressed the issue of limitations on specific conventional weapons in four separate sessions convened in Geneva from 1974 to 1977, but came to no formal resolution on the matter.¹⁷¹ The ICRC made conventional weapons a focus at the ICRC Conference of Government Experts on the Use of Certain Conventional Weapons as well, which met originally in Lucerne in 1974, and the follow-up conference in Lugano in 1976.¹⁷² In 1977, the United Nations

165. Eye injuries requiring medical treatment could account for between twenty-five and fifty percent of all battlefield wounds if large numbers of anti-personnel lasers were deployed, whereas without any laser weapons deployed, the expected percentage of eye injuries would only be six to nine percent of all injuries. DOSWALD-BECK, *supra* note 12, at 315-16.

166. *Id.* at 50. There would be a tremendous demand placed upon rehabilitation, vocational, and personal counseling resources. *Id.*

167. *Id.* at 51.

168. The preamble states that the Weapons Convention is based in part "on the principle of international law that the right of the parties to an armed conflict to choose methods or means of warfare is not unlimited, and on the principle that prohibits the employment in armed conflicts of weapons, projectiles and material and methods of warfare of a nature to cause superfluous injury of unnecessary suffering." Weapons Convention, Appendix A, *supra* note 6.

169. ROBERTS & GUELFF, *supra* note 131, at 471.

170. The committee was part of the Diplomatic Conference on the Reaffirmation and Development of International Humanitarian Law Applicable in Armed Conflicts. *Id.* at 471.

171. *Id.* In 1977, the Geneva Conference adopted resolution 22(IV) which recommended the convening of a separate conference no later than 1979, for the purpose of prohibiting or restricting the use of certain conventional weapons. *Id.*

172. DELUPIS, *supra* note 115, at 181.

resolved that a UN conference concerning conventional weapons would be convened in 1979.¹⁷³

Preparatory sessions were held in Geneva and were attended by representatives of eighty-five states.¹⁷⁴ On September 10, 1979, the first session of the Weapons Conference¹⁷⁵ was convened in Geneva and attended by representatives from eighty-two states.¹⁷⁶ Following the second session, the Convention and the three additional protocols were adopted by the Conference on October 10, 1980, and entered into force on December 2, 1983.¹⁷⁷

The actual prohibitions or restrictions on weapons appear in the individual protocols and not in the text of the Convention. It was not certain whether States would agree to all the prohibitions or restrictions and it was, therefore, decided to put them in three separate protocols.¹⁷⁸ In order for a State to become a Party to the Convention, it must only "consent to be bound by any two or more of these Protocols."¹⁷⁹

The United States was not a State Party to the Convention.¹⁸⁰ Realizing that States not parties to the Convention would only be invited as observers to the 1995 Review Conference,¹⁸¹ and that even when a State ratifies the Convention it only becomes a State Party six months later,¹⁸² the Senate finally ratified the Convention in March of 1995.¹⁸³

173. United Nations Resolution 32/152 (1977). See ROBERTS & GUELF, *supra* note 131, at 471.

174. *Id.*

175. The United Nations Conference on Prohibitions or Restriction of Use of Certain Conventional Weapons Which May be Deemed to be Excessively Injurious or to Have Indiscriminate Effects. Weapons Convention, *supra* note 6.

176. The second session was convened on Sept. 15, 1980 and was attended by representatives of seventy-six states. *Id.*

177. *Id.*

178. KALSHOVEN, *supra* note 5, at 149.

179. Weapons Convention, *supra* note 6.

180. *Id.* The United States encouraged other States to ratify the Convention and its Protocols, but neither the Reagan nor the Bush administrations submitted it to the Senate for advice and consent to ratification. *Global Landmine Crisis: United States Senate Appropriations/Foreign Operations FY 95 Foreign Operations Appropriation* FEDERAL DOCUMENT CLEARING HOUSE, May 13, 1994, (statement of Cyrus R. Vance, Former Secretary of State).

181. Weapons Convention, art. 8, para. 3(a), *supra* note 6.

182. *Id.* at art. 5, para. 2.

183. Department of State Dispatch, *Non-proliferation Priorities for 1995*, Mar. 13, 1995, Vol. 06 No. 11.

B. Protocol IV

At the Review Conference, delegates had a draft protocol proposed by Sweden with which to work.¹⁸⁴ The protocol that emerged eventually from the Review Conference is one of guarded language and compromise. It is, however, parallel in language and effect to the official United States policy on blinding lasers.¹⁸⁵ Protocol IV will be annexed to the Weapons Convention if ratified by twenty states,¹⁸⁶ and will enter into force six months after annexation.¹⁸⁷

1. *Protocol IV in Brief.*—Article 1 sets forth the class of laser weapon that is to be banned by the protocol. It states that 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.”¹⁸⁸ Only those laser weapons designed, either as a primary or secondary function, to blind are proscribed. Article 1 also provides for a ban on the transfer of such weapons to any State or non-State entity by a High Contracting Party.¹⁸⁹

184. PETERS, *supra* note 42, at 33. The draft protocol emerged from meetings of the Group of Governmental Experts while preparing amendments to the Weapons Convention, and stated (with alternative wording in brackets):

Article 1

It is prohibited to employ laser beams of a nature to cause permanent blindness [serious damage] against the eyesight of persons as a method of warfare.

Article 2

It is prohibited to [produce and] employ laser weapons primarily designed to blind [permanently].

Article 3

Blinding as an incidental or collateral effect of the legitimate employment of laser beams on the battlefield is not covered by this prohibition.

Id.

185. Department of Defense News Release, *supra* note 122. Secretary of Defense William Perry announced the new policy as prohibiting the use of lasers “specifically designed to cause permanent blindness,” but went no further because of the vital nature of lasers to the military. *Id.*

186. Weapons Convention, art. 8, para. 2(b), *supra* note 6. Additional protocols “shall be adopted in the same manner as this Convention” and “shall be annexed thereto.” *Id.*

187. *Id.* at art. 5, para. 3. A protocol annexed to the Convention “shall enter into force six months after the date by which twenty states have notified their consent to be bound by it.” *Id.*

188. PROTOCOL IV, art. 1, *supra* note 6.

189. *Id.*

Article 2 provides that when employing any laser system, the High Contracting Parties "shall take all feasible precautions to avoid the incidence of permanent blindness to unenhanced vision."¹⁹⁰ The necessary precautionary measures for the High Contracting Parties must take are to include "training of their armed forces and other practical measures."¹⁹¹

Article 3 is a corollary to Article 1 and provides some definition concerning what laser systems are not to be considered as designed, as either a primary or secondary purpose, to cause permanent blindness. It does this by stating that 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."¹⁹² Anti-sensor laser weapons are therefore, not prohibited, so long as legitimately employed.

Article 4 defines permanent blindness for purposes of the protocol as "irreversible and uncorrectable loss of vision which is seriously disabling with no prospect of recovery."¹⁹³ It goes on to define serious disability as "equivalent to visual acuity of less than 20/200 Snellen measured using both eyes."¹⁹⁴

2. *Deficiencies of Protocol IV.*—Protocol IV is a positive attempt to prevent the use of inhumane laser weapons before their mass introduction onto the battlefields of tomorrow.¹⁹⁵ It is a progressive limitation on a weapon that has not yet been introduced, but whose humanitarian consequences have been realized and deemed disproportionate to its potential military benefit.¹⁹⁶ Like the other three protocols annexed to the Weapons Convention, the final draft of Protocol IV was shaped by the forces of compromise.¹⁹⁷ Instead of seizing the opportunity to comprehen-

190. *Id.* at art. 2.

191. *Id.*

192. Protocol IV, art. 3, *supra* note 6 (emphasis mine).

193. *Id.* at art. 4.

194. *Id.*

195. In this respect it is similar to the 1899 Hague Convention banning the use of Asphyxiating Gases and the 1925 Prohibition against bacteriological warfare. PICTET, *supra* note 94, at 55.

196. Julius Stone writes that States in general "only come to a common view on regulating or prohibiting new weapons after the potentialities of those weapons are fully explored, and when no one of them can rely on obtaining or maintaining the lead in their use." STONE, *supra* note 119, at 551.

197. The positions of States prior to the Convention were often times quite far apart, and the eventual protocols which emerged reflect the necessary compromises. KALSHOVEN, *supra* note 5, at 147.

sively ban the use of lasers to blind as a method of warfare;¹⁹⁸ to institute regulation and enforcement measures; and to protect combatants from the threat of permanent blindness; the delegates instead compromised.

a. Limits means not methods.—In marked departure from article 1 of the proposed draft protocol, there is no language in Protocol IV providing that blinding as a method of warfare is prohibited.¹⁹⁹ It was the intention of the draft protocol that a prohibition on the method, not just the means, would “establish the international norm that common and systematic use of lasers to blind is unacceptable and unlawful.”²⁰⁰ Apart from the customary international law provisions in the Preamble to the Weapons Convention,²⁰¹ there is no overarching policy governing the use of lasers to blind.

Prior to the 1995 Weapons Convention Review Conference, the need for a provision prohibiting blinding as a method of warfare was recognized by various individuals and nongovernmental organizations as paramount. In a July 31, 1995, letter to Defense Secretary William Perry, forty-eight United States legislators requested that he “actively support efforts to seek an international prohibition on the use of lasers for the purpose of blinding as a method of warfare.”²⁰² The Human Rights Watch Arms Project organization²⁰³ had stressed that language prohibiting blinding as a method of warfare, was the most important part of the draft protocol.²⁰⁴ Senator Patrick Leahy (D-VT) and Representative Lane Evans (D-IL) stated in a letter to Secretary of State Warren Christopher, that without a clear policy supporting

198. Methods of warfare has been defined as tactics or other deliberate and systematic actions intended to harm or neutralize the enemy. PETERS, *supra* note 42, at 35.

199. Focusing on the methods of warfare would necessarily include an explicit ban on the “deliberate and systematic antipersonnel use of any kind of lasers that would cause superfluous injury or unnecessary suffering.” ANDERBERG & WOLBARSH, *supra* note 8, at 213.

200. PETERS, *supra* note 42, at 33.

201. See *supra* note 168 and accompanying text.

202. PETERS, *supra* note 42, at 44.

203. Human Rights Watch is a nongovernmental organization established in 1978 to monitor and promote the observance of internationally recognized human rights. PETERS, *supra* note 42, at 49. The Arms Project was established in 1992 to monitor and prevent arms transfers to governments or organizations grossly violating internationally recognized human rights and the laws of war, and to promote freedom of information regarding arms transfers worldwide. *Id.*

204. PETERS, *supra* note 42, at 33.

an international prohibition on the use of lasers to blind as a method of warfare, it was their belief that "an effective international protocol to achieve this goal will be difficult, if not impossible to achieve."²⁰⁵ In spite of these efforts, the proposed prohibition against blinding as a method of warfare was left out of the final draft.²⁰⁶

The United States, among other countries, had been fearful that a general prohibition against the use of lasers to blind would open combatants to charges of engaging in war crimes for accidental blinding by laser systems.²⁰⁷ This fear was unfounded since a prohibition against blinding as a method of warfare would "ban the use of all practices that deliberately cause blindness;" but it would also implicitly "protect personnel who use such non-weapon laser systems as laser rangefinders and target designators that can cause blindness incidentally or accidentally."²⁰⁸

Without a general policy prohibiting deliberate blinding as a method of warfare, the scope of the protocol and its effectiveness are greatly reduced. Under international law, a specific weapon is not considered banned unless there is a treaty addressing the use of that specific weapon.²⁰⁹ All present and future weapons with the potential to blind are not prohibited by Protocol IV unless they are designed specifically to blind. Unless there is a specific prohibition in a future international treaty, they will continue to avoid prohibition. If there had been a broader, more inclusive prohibition against blinding as a method of warfare in Protocol IV, then present and future laser systems would be evaluated by how they are actually used during a conflict, not by their designer's intended function. If a laser weapon's function is not primarily to blind combatants, then its use is permissible under Protocol IV with no future judgment to be made upon the weapon, even if its later use were found to be anti-personnel.

b. No objective standard.—Without some objective standard for determining whether a laser system is specifically designed to blind as a combat function, the distinction drawn in the

205. Letter from Senator Leahy and Representative Evans to Secretary of State Warren Christopher (Sept. 14, 1995), in PETERS, *supra* note 42, at 41.

206. PROTOCOL IV, *supra* note 6.

207. *Pentagon Cancels Controversial Laser*, L.A. TIMES, Oct. 13, 1995, at A16.

208. PETERS, *supra* note 42, at 33.

209. ANDERBERG & WOLBARSH, *supra* note 8, at 212.

Protocol becomes virtually meaningless.²¹⁰ The United States has stated that it “does not possess, nor is it developing, laser weapons designed or intended primarily to permanently blind enemy combatants.”²¹¹ Intentions and realities often differ and, for precisely this reason Human Rights Watch favors language prohibiting laser weapons that “have blinding as a primary effect” over a prohibition against laser weapons specifically designed to blind.²¹²

It is possible to arrive at an objective standard for determining what laser systems are designed to blind. It must be remembered that it is always the target in question which determines the qualities of the laser to be employed.²¹³ In light of this fact, there are necessary parameters which serve to constrain the options for producing effective anti-personnel laser systems.²¹⁴ The designer of an effective low energy laser weapon must carefully select a laser with certain desired properties in order to produce a weapon that will be as effective as possible.²¹⁵ The ICRC has developed what can be considered the technical specifications for the ideal characteristics of an effective anti-personnel system.²¹⁶ While recognizing that proscribing laser weapons with certain technical specifications could encourage avoiding compliance by simply employing lasers with different specifications, there must also be recognition of the necessity of some guidelines in determining which laser weapons are designed to intentionally blind.

210. In a resolution supporting a protocol on blinding laser weapons, the European Parliament supported language prohibiting the use of laser weapons that “can cause” blindness. PETERS, *supra* note 42, at 33.

211. Letter from Assistant Secretary of Defense Holmes to Representative Evans and Senator Leahy (Mar. 27, 1995), in PETERS, *supra* note 42, at 5, n.13.

212. PETERS, *supra* note 42, at 34. A ban on lasers based on design or function would “justify use of tactical laser weapons on the grounds that they are not primarily designed to blind . . . but that they are designed primarily . . . to disrupt electro-optical and optical instruments,” with blinding as an incidental or collateral effect. *Id.*

213. ANDERBERG & WOLBARSH, *supra* note 8, at 93.

214. DOSWALD-BECK, *supra* note 12, at 129.

215. ANDERBERG & WOLBARSH, *supra* note 8, at 150.

216. DOSWALD-BECK, *supra* note 12, at 133. A suitable specification might be:

| | |
|-------------------|-----------------------------------|
| wavelength: | invisible, between 800 and 1400nm |
| pulse duration: | around 1 ns |
| energy per pulse: | 1 J |
| beam divergence: | 0.25 mrad |
| repetition rate: | between 20 and 200 Hz. |

Id.

some objective standard for determining what laser weapons are intended as anti-personnel, article 3 presents a tremendous loophole for those desirous of skirting the prohibitions of the protocol. Except for blatant cases, such as the Chinese ZM-87, where the laser weapon is promoted as being capable of blinding, dual purpose laser weapons with the potential for anti-personnel use will not be covered by the prohibition. This is due to the inherent difficulty of attempting to “distinguish between a laser designed to blind and other lasers intended for alternate purposes.”²¹⁷

Any laser weapon employing an optical device which does not provide for a physical separation from the eye, such as a television screen, when used it against a combatant will in fact be targeting the eye since the laser will blind the combatant before it destroys the optical device.²¹⁸ Even in the case of electro-optical devices, the laser would normally only temporarily jam the device, in the same way that bright headlights on a car would affect a driver’s vision, forcing the combatant to switch to an optical device where the eyes would be unprotected.²¹⁹

An anti-sensor weapon such as the Stingray scans the battlefield and detects laser pulses reflected back by optical devices. There is no way for the weapon to distinguish between an electro-optical device and an optical device that a combatant is looking through before it then fires a stronger laser pulse at the optical device in order to overwhelm and destroy it.²²⁰ Once again, the eye would be damaged before the optical device.

d. Lack of enforcement provisions.—Unlike other codified agreements of international law, the Weapons Convention contains no provisions for implementation and enforcement.²²¹ The only thing that it does require is that state parties undertake to disseminate the Convention and its annexed Protocols as widely

217. Graham, *supra* note 81, at A3. The United States has stated that it “does not possess, nor is it developing, laser weapons designed or intended primarily to permanently blind enemy combatants.” ARKIN, *supra* note 53, at 5.

218. Steve Pagani, *U.N. Conference Urged to Ban Blinding Lasers*, REUTERS WORLD SERVICE, Oct. 4, 1995.

219. William M. Arkin, *The Pentagon’s Blind Ambition*, N.Y. TIMES, May 10, 1995, at A23.

220. DOSWALD-BECK, *supra* note 12, at 108. Distinguishing between an optical and an electro-optical device would be impossible because the reflection from the optical lens would appear like that from an electro-optical sensor. *Id.*

221. KALSHOVEN, *supra* note 5, at 152.

as possible in their countries and their armed forces.²²² In contrast, the 1977 Geneva Protocol I contains numerous provisions defining what actions constitute grave breaches under the protocol,²²³ the consequences to superiors and commanders for failing to repress such breaches,²²⁴ the necessity of mutual assistance in criminal proceedings,²²⁵ and the formation of international fact-finding commissions for investigating alleged breaches.²²⁶ There are no such provisions to be found anywhere in the Weapons Convention. The Human Rights Watch Arms Project recognized this deficiency as resulting in the failure to implement the substantive provisions of Protocol II to the Weapons Convention and emphasized the necessity of incorporating a verification and enforcement scheme into Protocol IV.²²⁷ Proposed verification provisions were a major stumbling block to delegates at the Review Conference in failing to amend Protocol II.²²⁸ Without any verification or enforcement mechanisms, Protocol IV is toothless and cannot significantly affect the development, production, and use of laser weapons that blind.

V. Conclusion

Protocol IV is a positive attempt at prohibiting a weapon whose military utility is far outweighed by its grave humanitarian consequences. Blinding lasers are violative of both customary and codified international laws of armed conflict. Although certain classes of laser weapons escape express prohibition, they still are violative of the spirit of the humanitarian law of armed conflict. It must be remembered that the Martens Clause always provides humanitarian protection for combatants, for the principles of customary international law are always applicable to the means and methods of warfare. Protocol IV is a positive first step but far from being a final step.

James M. Strong

222. Weapons Convention, art. 6, *supra* note 1.

223. 1977 Protocol I, art. 85, *supra* note 6.

224. *Id.* at art. 86, 87.

225. *Id.* at art. 88.

226. *Id.* at art. 90.

227. PETERS, *supra* note 42, at 33.

228. Christopher Bellamy, *U.S. Cancels Laser Weapon That Can Cause Blindness*, THE INDEPENDENT, Oct. 14, 1995, at 17.