

**Centre for Conflict Resolution
Department of Peace Studies**

**Bradford Non-Lethal Weapons Research Project
(BNLWRP)**

Research Report No. 6

**Neil Davison
Nick Lewer**

October 2004

The Bradford Non-Lethal Weapons Research Project (BNLWRP)

The BNLWRP was established at the Centre for Conflict Resolution, Department of Peace Studies in 1995. The project's key objectives are to:

- Review and describe non-lethal weapons (NLWs), which are being developed and deployed.
- Identify and track defence and related research institutes involved in the development and manufacture of NLWs.
- Follow doctrine and policy debates related to the use of NLWs.
- Monitor the operational use of NLWs;
- Examine the impact of NLWs on international laws, arms treaties and conventions.
- Highlight the ethical questions that surround the research, development, deployment and use of such weapons.

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CONTENTS

The Bradford Non-Lethal Weapons Research Project	2
Selected NLW Publications by BNLWRP Staff	5
Acronyms	7
1. Introduction and Commentary	9
2. Focus: <i>Criminal Use of NLWs</i>	13
3. Technologies, Policy, and Associated Issues	17
3.1. Kinetic Energy	17
3.2. Barriers and Entanglements	20
3.3. Electrical	21
3.4. Acoustic	31
3.5. Directed Energy	32
3.6. Riot Control Agents & Malodorants	34
3.7. Biochemical Incapacitating Agents	39
3.8. Combined Technologies	40
3.9. Delivery Systems	42
4. Bibliography Update	45
5. Conferences	46
References	

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Acronyms

ACLU	American Civil Liberties Union
ACPO	Association of Chief Police Officers (England and Wales)
ACPOS	Association of Chief Police Officers Scotland
ADS	Active Denial System
AFRL	Air Force Research Laboratory (U.S. Air Force)
AI	Amnesty International
ARDEC	Army Research and Development Engineering Command (U.S.)
ATL	Advanced Tactical Laser
ATM	Anti-traction materials
BATF	Bureau of Alcohol, Tobacco, and Firearms (U.S.)
BNLWRP	Bradford Non-Lethal Weapons Research Project
BTWC	Biological and Toxin Weapons Convention
BW	Biological Weapons
CAS	Clear-A-Space Device (aka Multi-Sensory Grenade)
CQSR	Close Quarters Shock Rifle
CS	Ortho-chlorobenzalmalononitrile / tear gas
CW	Chemical Weapons
CWC	Chemical Weapons Convention
DE	Directed Energy
DOD	Department of Defense (U.S.)
DOJ	Department of Justice (U.S.)
DOMILL	DSAC Sub-Committee on the Medical Implications of Less-lethal Weapons.
DSAC	Defence Scientific Advisory Council (DSAC) (U.K.)
DSTL	Defence Science and Technology Laboratory (U.K.)
FEL	Free-Electron Laser
HIDA	High Intensity Directed Acoustics
HPM	High Power Microwave
ICRC	International Committee of the Red Cross
ILEF	International Law Enforcement Forum
IPCC	Independent Police Complaints Commission
JNLWD	Joint Non-Lethal Weapons Directorate (U.S.)
KE	Kinetic Energy
LIPC	Laser Induced Plasma Channel Technology
LRAD	Long Range Acoustic Device
MDARS	Mobile Detection Assessment Response System
MPA	Metropolitan Police Authority
MPS	Metropolitan Police Service
MSG	Multi-Sensory Grenade
NATO	North Atlantic Treaty Organisation
NCIS	National Criminal Intelligence Service (U.K.)
NDIA	National Defense Industrial Association
NFDD	Noise Flash Diversionary Device
NIJ	National Institute of Justice (U.S.)
NIO	Northern Ireland Office (U.K.)
NLCS	Non-Lethal Capability Sets (U.S. Military)
NLW	Non-Lethal Weapon
NPIS	National Poisons Information Service (U.K.)
NSWC[DD]	Naval Surface Warfare Center [Dahlgren Division] (U.S. Navy)
NTAR	Non-lethal Technology and Academic Research symposium
NTOA	National Tactical Officers' Association (U.S.)
OC	Oleoresin Capsicum
OFT	Office of Force Transformation (U.S. DOD)

OOTW	Operations Other Than War
PAVA	Synthetic Oleoresin Capsicum (OC)
PEP	Pulsed Energy Projectile
PIS	Police Incapacitant Spray
PSDB	Police Scientific Development Branch (U.K.)
PSNI	Police Service of Northern Ireland
RCA	Riot Control Agent
RGES	Running Gear Entanglement System
TACOM	Tank-automotives and Armament Control (U.S. Army)
TUGV	Tactical Unmanned Ground Vehicle
UAV	Unmanned Aerial Vehicle
VLAD	Vehicle Lightweight Arresting Device
VMADS	Vehicle Mounted Active Denial System
XREP	Extended Range Electronic Projectile

1. INTRODUCTION AND COMMENTARY

Introduction

New non-lethal technologies (weapons and delivery systems) continue to make the news, both for their civil and military applications. Technologies which were considered to be in the realm of science fiction a few years ago, are now beginning to undergo field trials or, in some cases, are being deployed with police and soldiers on active service. As this, and our previous reports have highlighted, the development of acoustic weapons (Long Range Acoustic Device) and microwave weapons (Active Denial System) have proceeded rapidly as have advances in robotic, unmanned vehicles for the delivery of both lethal and non-lethal weapons. We repeat our concern that there is a danger of these new non-lethal technologies being ‘rushed’ into service (1) without thorough testing for harmful health effects, (2) without a deeper consideration of civil and human rights, (3) without full discussion of their impact on arms control treaties and conventions, and (4) without further study of their social and cultural impact. Since many such weapons will have a rheostatic capacity along the non-lethal to lethal continuum, it is important that weapons developers and manufacturers, and those charged with the responsibility of using them, are held clearly accountable and have transparent rules of engagement. Of particular concern are a new generation of biological and chemical weapons. With respect to the health impact, NATO has a panel working on NLW human effects, the Human Factors and Medicine (HFM) Panel 073, which is due to report later this year (2004) on the *Human Effects of Non-Lethal Technologies*.¹

Misuse and Torture

Yet again, the issue of the misuse of NLWs as technologies for punishment, torture and political repression needs to be underlined.² Throughout the report we give examples where this has occurred. Another issue relates to concerns over insufficient testing of some NLWs that are already used widely. In a report from March 2004 Amnesty International commented on the latter issue in relation to chemical irritants (or riot control agents):

AI is concerned that substances [chemical irritants] whose safety has been inadequately tested by manufacturers are being adopted by security forces and used in what amounts to live experiments on civilian populations – experiments that continue even when people have reported short-term extreme suffering and long term health problems.³

The AI report is critical of the European Unions commitment to take action against torturers and torturing states because its policy is not reflected in its controls on the equipment that can be used for torture. AI advocates that some of the equipment should be banned outright, and stricter export controls put on other non-lethal technologies. Of importance here are electroshock weapons, a concern we have identified many times in previous BNLWRP reports. Whilst the UK has banned electrical stun weapons (see the section on Criminal Use in this report) there still remain loopholes in UK legislation that allow dealers to ‘broker’ sales,⁴ although the Government has pledged to tighten these up. The AI report also analyses proposed EC Trade Regulations aimed at tightening controls and concludes that whilst there are weaknesses in it, the initiative is a positive one that should ‘prove an important landmark in the combating of torture and cruelty around the world’.

As one section of this BNLWRP report describes, criminals are increasingly using NLWs during robberies and assaults.

The Taser

The rather lengthy section in this BNLWRP report on the Taser reflects the continuing popularity of the weapon amongst civil police forces and some army units, despite the controversy surrounding allegations that its use has contributed to the deaths of over 50 persons. The debate was particularly fuelled in the United States after two articles by Alex Berenson (*New York Times*) and Robert Anglen (*Arizona Republic*) highlighted inconsistencies in the testing of Tasers for harmful bioeffects. Subsequent discussions revealed disagreement amongst medical experts as to the weapons' potential lethal effects during routine use.

We have also drawn attention to calls for a set of agreed guidelines and a consistent policy on the appropriate use of the Taser throughout the U.S. As can be seen in section 3.3.iv of this report, rules and restrictions on Taser usage vary widely. Since the recent deaths claimed to be linked to Tasers, they have been receiving increasing attention and publicity and some law enforcement agencies are beginning to review the conditions of their operational employment. This is particularly important, for example, when a Taser is used on people who may be heavy drug users or have underlying health conditions that leave them in a weakened condition.⁵

Iraq

As we noted in *BNLWRP Report No.5*, Non-Lethal Capability Sets have been deployed in Iraq by the US military made up of a variety of basic non-lethal weapons such as: hand batons; shields and protective equipment; OC cartridges, canisters, grenades, and dispensers; rubber, wood, and bean bag projectiles; stingball grenades; flash-bang rounds; bullhorns; and caltrops. Taser weapons and the Long Range Acoustic Device (LRAD) have also been issued to some troops. Recently *Stars and Stripes*⁶ reported that, in an experiment called 'Project Sheriff', the Pentagon's Office of Force Transformation (OFT) was planning to fit a few Army and Marine vehicles (the Army's new Stryker AVC and the Marine's LAV) with a selection of lethal and non-lethal weapons systems. NLWs being considered for this are the millimetre-wave Active Denial System (ADS), which is being developed in partnership with Raytheon (see previous *BNLWRP Reports*) and the LRAD.

According to media reports, Project Sheriff is being rapidly developed in response to concerns over mounting numbers of civilians killed and injured in urban war fighting in Iraq. However, it is important to note that this 'system of systems' will combine lethal and non-lethal weapons. Although new non-lethal weapons systems such as the Active Denial System are often portrayed as primarily tools for crowd control and other situations where civilians may be caught up in conflict areas, the US military clearly sees the integration of such weapons as a way of gaining a tactical advantage in a variety of war fighting scenarios. The use of non-lethal weapons to enhance the effectiveness (i.e. lethality) of conventional weapons may be a more likely outcome than the 'humanitarian' use of NLWs to increase the threshold for the use of lethal force. An industry notice requesting information to assist with the programme issued by the Pentagon in February 2004 gives an indication of future uses:

Project 'SHERIFF' is an OFT initiative to develop and rapidly field a series of operational prototypes integrating directed energy and kinetic systems, both lethal and non-lethal; active protection, active defense technology; and a variety of advanced sensors, all mounted on armored vehicles in order to provide a fundamentally new set of tactical capabilities for land combat. It is intended to provide not only mobile, protected, and tunable, precision effects and scalable lethality, but also engagement sequences that are faster than current systems by an order of magnitude, making it a potentially paradigm-breaking capability package for urban operations as well as other combined arms warfare scenarios within both major combat operations and stability operations. In the near term, a key focus will be to explore millimeter-wave technologies as a potential counter to the operational challenges of close-range urban area RPG and IED ambushes. Ultimately, however, SHERIFF is intended to advance a prototype of combined physical and psychological effects, as opposed to simply combined arms, on the tactical battlefield. It must be stressed that SHERIFF is not intended to be solely focused on any one narrow range of scenarios.⁷

United States

Party Convention Concerns

During the run up to the 2004 Republican and Democratic Conventions U.S. police departments announced plans to deal with possible mass demonstrations and protests, which had the potential of becoming violent. As well as the usual range of NLWs (Tasers, plastic bullets and pepper spray) the New York Police Department revealed that they had bought two LRADs (at \$35,000 each) which were to be used for 'safety announcements and directions' and not as acoustic weapons.⁸ In a 'Campaign Fact Sheet' the Democratic Convention Presidential contender John Kerry promises further investment in precision weapons including directed energy weapons that have both lethal and non-lethal effects.⁹

Small and Rural Law Enforcement Agencies

A US National Institute of Justice (NIJ) report *Law Enforcement Technology – Are Small and Rural Agencies Equipped and Trained?*¹⁰ conducted a national survey of these agencies to 'understand the technology and technology training needs and capabilities and to determine to what extent they have adopted new criminal justice related technologies into their operations'. One finding noted that they are underutilising less lethal weapons and that most agencies surveyed gave their officers a 'no competence rating' associated with less lethal weapons and indicated a demand for training in this area.

Border Issues

In his testimony at the Senate Committee on Commerce, Science and Transportation, of 17th June 2004, Charles McQueary (Under Secretary, Directorate of Science and Technology, U.S. Department of Homeland Security) commented on the 'special nature of our partnership with our northern and southern neighbours as we address the subject of border security'.¹¹ Key areas of concern for the U.S, Mexico and Canada are related to protecting their border regions and achieving a secure flow of people and goods. The Science and Technology Directorate (ST) of the US Department of Homeland Security has been working with the Border and Transportation Security (BTS) Directorate on the Arizona Border Control Initiative in evaluating new technology to support the operation. These include the acoustic LRAD to enable patrol agents to communicate with persons at a long distance. No mention was made in the testimony of its possible use as a NLW.

In August Mexican and U.S. diplomats were meeting over linguistic confusion related to the use of PepperBalls (see previous BNLWRP reports) fired by the compressed air PepperBall launch system used by the Texas Border Patrol.¹² These are similar to paint ball capsules but filled with OC powder derived from chilli pepper (or the synthetic version PAVA) that causes irritation to eyes and respiratory system (see RCAs section of this report for more on health effects of OC/PAVA). Pepper balls had been fired on 81 occasions during 2002-2003 with no associated deaths or serious injuries, but reports had reached the Mexican press that the Border Patrol was using rubber bullets (not pepper balls) in an indiscriminate and almost 'festive hunt' of unregistered Mexican migrants. Mexicans were furious with their Government for entering into an agreement (which had the objective of reducing the use of lethal weapons) with the U.S. apparently permitting this. The confusion had arisen because, according to the article by Stevenson, 'the paintball term is hard to describe in Mexico, where the sport has yet to catch on widely' and the newspapers were describing the system as 'rubber bullets filled pepper'. This is because there is no literal translation for the PepperBall system so they had been called 'balas de goma' (rubber bullets).

As we pointed out earlier, there is a danger of cultural confusion when using some NLWs – this is a small but interesting case study of what can happen.

Education

The JNLWD newsletter *Safeguarding Peace....Safeguarding Lives*¹³ reports on a new education programme being designed by its Joint Profession Military Education (JPME) Programme in partnership with the Marine Corps Research University at Penn State. Preparation has almost been completed for a web-based non-lethal weapons course especially for junior personnel that will provide college credit and stimulate further interest in NLWs technology, policy and human effects.

2. FOCUS: *Criminal Use of NLWs*

Concerns in the UK over criminals arming themselves with various non-lethal weapons were raised in mid 2003 by the National Criminal Intelligence Service (NCIS) who warned of increasing numbers of stun guns being intercepted in the post and during police searches of suspects.¹⁴ In an earlier report, *BNLWRP Research Report No. 4*¹⁵, we highlighted an investigation by *The Observer*¹⁶ in 2003 that cited evidence of criminals increasingly arming themselves with stun guns and CS sprays in the UK. *The Observer* obtained data from Customs and Excise showing that whilst the number conventional firearms seized had halved; the number of electrical stun guns had almost doubled. *The Guardian*¹⁷ subsequently obtained a copy of a May 2003 NCIS report warning of the trend for criminal use of NLWs:

Numerous stun weapons are being recovered from scenes of crimes, found on suspects, and seized during searches carried out for other offences. There are also many reports of this type of weapon being used despite no weapon being recovered.¹⁸

Apparently the report warned that police were ill prepared to deal with suspects armed with these weapons and that criminals may prefer such weapons over guns since being caught would carry a lighter sentence. It also emphasised the problem of availability of these weapons:

Ease of access to the weapons is a definite problem, as orders can be placed online and packages delivered directly to the door with little or no risk to the consumer. The weapons are inexpensive and still provide an effective threat or act as an acceptable fashion accessory.¹⁹

The Observer investigation team had easily managed to purchase a 200,000-volt stun gun and a 25ml CS spray over the Internet in late 2003 even though both are illegal in the UK.²⁰ Other media reports in the UK have continued to warn of the availability of stun guns over the Internet, from auction sites for example.²¹ A brief Internet search recently conducted by the BNLWRP found that stun-guns and pepper spray continue to be available from large auction web sites as well as more specific weaponry auction sites. These weapons sold by numerous online shops selling 'self-defence' products, which are popular in the US in particular. The majority of web-based shops we visited did warn of restrictions on export/import of such weapons and indicated that they could not ship to the UK. However, some leave the responsibility for adhering to export/import regulations with the customer. Other sites do not mention regulations and say that they will ship internationally. One site mentioned in the original *Observer* investigation still advertises its ability to flout these laws: "We successfully deliver stun guns anywhere in the world!"

Smuggling is another route by which such weapons enter the UK. For example, in April 2004 Customs seized 49 stun guns and 32 telescopic metal batons at Seaforth Docks in Liverpool. The weapons were discovered in a container from Thailand containing furniture.²² In early July 2004 two men appeared in court having been caught smuggling weapons components sufficient for making 50 stun guns from Thailand into Birmingham airport.²³ In June 2004 an article in a Scottish tabloid newspaper reported that hundreds of cans of CS spray are being smuggled into Scotland and sold in pubs in Glasgow.²⁴

On 30 June 2004 the Association of Chief Police Officers raided houses across England and Wales in an effort named 'Operation Bembridge' to arrest people who had acquired illegal weapons from the internet such as "...stun guns, CS spray and blank firing imitation weapons

which can be readily converted into live weapons.”²⁵ In Scotland, Strathclyde Police and Customs and Excise launched a campaign at Glasgow airport warning people not to bring weapons into the country on their return from holiday destinations in Europe where they can be purchased more easily. Ornamental swords, flick knives and other bladed weapons comprise the majority of weapons seized. However, a senior Scottish Customs official warned that stun guns are growing problem:

...a rising number of electric shock lighters and electric shock pens detected this year and, when added to the continuing stun-gun seizures, we are concerned at this growing trend.²⁶

Stun guns disguised as mobile phones, which are made by a company in Taiwan²⁷, are also widely available from Internet sites selling ‘personal defence’ products.

According to Customs and Excise, regulations governing stun guns and chemical irritant sprays are as follows:

1. Electric shock devices known as 'stun guns' require a DTI import licence for legal importation, whether they are brought in commercially or privately. This will only be issued if the importer is authorised by the Home Office to possess weapons prohibited under Section 5 of the Firearms Act 1968
2. Import controls are established by an Open General Import Licence granted under the Import of Goods (Control) Order 1954. Any firearm, within the meaning of the Firearms Acts 1968 to 1997, that is less than one hundred years old is subject to these controls.
3. In the case of imitation or replica firearms, these are regarded as a firearm under the Firearms Act 1982 if:
 - it has the appearance of being a firearm; and
 - is so constructed or adapted as to be readily convertible into a firearm.
4. Additionally under FA, s 5(1)(b) any weapon of whatever description designed or adapted for the discharge of any liquid, gas or other thing is classified as a firearm. UK law is very strict about who can import or export, own or move firearms and ammunition.
5. It is also against the law to import without the proper authority:
 - electric shock devices 'stun guns';
 - self defence pepper sprays and CS gas canisters; and
 - high-powered air rifles and pistols.²⁸

The major problem of availability of these weapons is a very difficult one for British authorities to deal with since restrictions vary enormously between countries. In the majority of US States, for example, it is legal for citizens to buy and own such weapons. In the US Taser International, who provide electrical stun weapons to police departments across the country and also to UK police departments, have recently (September 2004) launched a ‘citizens’ version of their X26 model Taser. As we have mentioned in previous reports, some police officers in the US are concerned that wider availability of increasingly advanced stun weapons might encourage more criminal use, although others argue that the high price (\$999.00) will discourage the use of this particular weapon initially.²⁹ It is clear, however, that stun guns and pepper spray continue to be used for a variety of crimes including assaults and robberies. (It is worth noting that stun guns were banned in the UK in response to an incident in which one was used to rob a postman.³⁰). The BNLWRP carried out a scan of mainly UK and US media sources over the past few months to look for reports of criminal use of non-lethal weapons and discovered numerous incidents. The reports we found are

summarised in *Table 1* on the next page. Of course the table does not represent a comprehensive study but it does indicate regular criminal use of stun guns and pepper spray and the types of crimes they are being used for. Some advocates of the wide availability of such weapons to the general public in the US for self defence purposes argue that it is not the weapon that is 'inherently bad' and that any weapon and numerous other items not designed as weapons can be misused if that is the intent of the user. However, such a simplified argument, which closely resembles the rhetoric of the pro-gun lobby, misses the point. Such weapons are clearly particularly effective in facilitating the types of crimes described in *Table 1*. Increasing the marketing of these weapons to the public and increasing their availability will surely lead to greater misuse. A combination of suitability for crime and availability is a dangerous one. One only has to look at the wide availability of handguns in the US and their corresponding use for crime. Whilst it is possible to debate the causes of gun crime, it is not possible to dispute that availability of guns is surely the limiting factor to misuse. Without controls on public availability, crimes facilitated with non-lethal weapons will increase. Unfortunately, as illustrated by the ease with which these weapons are purchased over the Internet or smuggled from abroad and then used in crimes, domestic controls might not offer sufficient protection.

*Table 1: Examples of crimes committed using non-lethal weapons.**

** Compiled from primarily UK and US media reports between June and September 2004.*

Month (2004)	Country	Weapon Used	Incident
January	USA	Stun gun+	A man alleged to have used a stun gun on his former girlfriend before raping her. ³¹
March	Japan	Pepper spray	Pepper spray used against a shop clerk during an £18 million robbery of a Tokyo jewellery shop. ³²
May	UK	Stun gun	A teenager used a stun gun on a young woman at a bus stop before using it on a bus driver whilst he was driving. ³³
June	Portugal	Pepper spray	English football fans accused of throwing pepper spray at some Portuguese teenagers. ³⁴
June	USA	Stun gun	A woman attacked with a stun gun whilst walking home late from a restaurant. ³⁵
June	USA	Stun gun	A man with a record of domestic abuse arrested for using a stun gun on his 5-year-old daughter during an argument with his girlfriend. ³⁶
June	UK	Stun gun	Three burglars broke in to a couple's house, assaulted a man and his wife, and used a stun gun on the man before stealing £6,500. ³⁷
July	USA	Stun gun	Two men broke into a house, stripped and handcuffed two women who lived there before shocking them with a stun gun owned by one of the women for self-defence purposes. ³⁸
July	Japan	Stun gun	A man broke into a female colleague's house and attacked her with a stun gun. ³⁹
August	USA	Stun gun	A robbery of a Blockbuster video shop by a man armed with a stun gun. ⁴⁰
August	Australia	Pepper spray	A mother was attacked with pepper spray in a shopping centre car park and her 3-week-old baby was snatched from her. ⁴¹
August	UK	Stun gun	A group of youths used assaulted a 15-year-old boy and his girlfriend before using a stun gun on him and stealing his neck chain. ⁴²
August	USA	Pepper spray	A shoplifting suspect accused of using pepper spray on a security guard. ⁴³
August	Malaysia	Stun gun	A man used a stun gun on a security guard whilst attempting to rob a jewellery shop. The guard recovered and shot and killed him with his handgun. ⁴⁴
August	UK	Taser	A man shot with a Taser stun gun during a road rage incident. ⁴⁵
August	USA	Stun gun	A man used a stun gun to hold his ex-girlfriend hostage in her home. ⁴⁶
September	USA	Stun gun	A man used a stun gun against his estranged wife, reportedly shocking her 80 times. ⁴⁷
September	UK	Pepper Spray	Two teenagers sprayed pepper spray into a moving tram following an earlier argument. ⁴⁸
September	UK	Stun gun	Robbers in Londonderry broke into a house and demanded money. Stun gun used on the owner and his teenage son threatened with the weapon. ⁴⁹
Unknown ++	USA	Stun gun	Four men received six-month jail sentences for attacking a woman at her home and using a stun gun on her and her dog for over an hour. ⁵⁰
Unknown	UK	Stun gun	A group of teenagers used a stun gun to rob an elderly man of his cigarettes. ⁵¹

+ The term stun gun is used where the media report gave no further definition of the electrical weapon. In one case a report did specifically refer to a Taser. (the difference being the ability to shoot at distance rather than direct contact only)

++ Where month is given as 'unknown' it is because the media report does not mention the date of the actual incident.

3. TECHNOLOGIES,⁵² POLICY AND ASSOCIATED ISSUES

This section (a) highlights non-lethal technology developments, weapons usage, and policy related issues since Report No.5 was published in May 2004, and; (b) identifies less recent sources we have not previously referred to which we think contribute to these elements. Readers are directed to previous reports and publications for a more thorough description of the variety of NLWs.⁵³

3.1. KINETIC ENERGY

L21A1 Baton Round

In early May it emerged that prior to the fatal shooting by UK police of a man in Cornwall in possession of a sword and knives their baton gun twice failed to fire.⁵⁴ In a subsequent documentary screened on 6 August 2004⁵⁵ the Liberal Democrat MP for North Cornwall claimed that the Home Office were already aware of a problem with the baton gun following a report from North Wales police warning the Association of Chief Police Officers (ACPO) of the potential for malfunction.⁵⁶ The newly formed Independent Police Complaints Commission (IPCC) is investigating the shooting.

In a separate incident, a man under siege in a pub in South Warwickshire, UK, armed with an air gun that he was pointing at police, gave himself up after a baton round was fired and hit him on the hand.⁵⁷ In September UK police use a baton round to disarm a man with a sword after use of CS gas was not successful in subduing him.⁵⁸

Drag-Stabilized / Beanbag Rounds

In the US, Armour Holdings, Inc. will pay compensation to the family of a 49-year-old woman killed after being shot by police with a drag-stabilised projectile ('23DS Drag-Stabilized') from a 12-gauge shotgun. The round reportedly hit her in the chest, 'causing her ribs to fracture and lacerate her heart'.⁵⁹ According to the same news report Armour Holdings recently settled another case for over \$300 million after a less-lethal round penetrated into a man's chest. Armour Holdings manufacture a variety of 'less-lethal' munitions and chemical devices, which are marketed by their subsidiary Defense Technology / Federal Laboratory. Projectiles for a 12-gauge, 37mm and 40mm guns include wood baton, rubber baton, foam baton, rubber ball, and drag-stabilized/beanbag. Other projectiles include sponge tipped rounds, rubber ball grenades, and explosive 'distraction' devices. Chemical devices include: OC, CN, and CS aerosols; and OC, CN and CS chemical grenades and 12-gauge rounds.⁶⁰

A paper from 2003 entitled *Injury patterns related to use of less-lethal weapons during a period of civil unrest* investigated injuries from beanbag rounds in a US city during a 'period of civil unrest' in 2001. It concluded:

Review of the medical literature reveals a consistent injury pattern related to the use of plastic and rubber bullets. The newest weapon system, the beanbag gun, has an injury pattern with limited documentation in the medical literature. As we have demonstrated, the newest generation of less-lethal

weapons can produce significant morbidity, but has not yet been shown to produce the mortality associated with earlier generation rounds.⁶¹

As with other projectiles the injuries are very much dependent on part of the body struck. The National Research Council report on NLWs from 2003 noted: “control of trauma level from blunt projectiles remains a serious problem.”⁶² Strikes in the head, neck and chest can result in very serious injury or death. Targeting the arms and legs is the safest option according to experts in this area.⁶³ One problem for someone firing such projectiles can be ensuring that it hits where it was aimed. As mentioned in *BNLWRP Research Report No. 4*, Scientists at the Applied Research Laboratory at Penn State University, studying 80 different impact munitions were “...struck by the general inaccuracy of these munitions.”⁶⁴ A similar study conducted by the U.K. Police Scientific and Development Branch (PSDB) evaluated 36 different impact projectiles and only 2 of those were considered sufficiently accurate to be taken forward for further evaluation.⁶⁵

Other Projectile Systems

Earlier in the year the US Army sent out a notice ‘seeking sources’ for a non-lethal kinetic energy projectile system that could deliver variable force:

The capability of the system would provide the ability to automatically and/or manually adjust the kinetic impact energy delivered to the target to compensate for different target engagement ranges, preferably beyond current non-lethal small arms maximum effective ranges of 50m.⁶⁶

A new rocket shaped munition from an Italian weapons manufacturer, the ART (Ammunition at Reduced Time of Flight), was recently being touted as a non-lethal weapon for use in naval 76mm cannons. One of the proposed uses put forward by the company is for disabling the rudder of a vessel without sinking it. This effect, however, is made possible by increased accuracy rather than any inherent non-lethal design:

The projectile, lighter and more aerodynamic than a conventional shell, heads toward the target at 1.5 times the speed of a conventional round. Because of its speed, the ART is less affected by wind and target motion and therefore far more accurate than a conventional round. It is so accurate, company officials said, that it is effective as a “non-lethal” weapon.⁶⁷

Another version of the ART carries a 3kg explosive warhead.

Researchers at the University of Florida in Gainesville together with Lockheed Martin have developed a prototype sticky bullet called the SPLAT – Sticky Polymer Lethal Agent Tag. The tip of the bullet, which is fired from a paintball gun, is made of a polymer that will stick to most surfaces.⁶⁸ It’s perceived function is for detection or surveillance purposes via integrated electronic sensors, however the technology perhaps invites application to non-lethal projectiles.

Water Cannon

A recent article in *The Daily Telegraph* reminds us that there are still more British troops currently deployed in Northern Ireland than there are in Iraq. Tensions rose on 12 July 2004, during the Orange Order’s marching season, when the Parades commission restricted the

marching route in the Ardoyne area of Belfast. The Parachute regiment and the police were called in:

...Belfast witnessed its worse rioting for two years with the police having to deploy the water cannon to maintain order. Ten Paras and 25 police were injured.⁶⁹

As mentioned in the our last report the Belgian designed water cannons were recently approved for use by the Police Service of Northern Ireland (PSNI) following a medical evaluation by DSAC Sub-Committee on the Medical Implications of Less-lethal Weapons (DOMILL) published in March 2004.⁷⁰

In mid-August 2004 *Reuters* reported the use of water cannons in South Korea to disperse around 7,000 people protesting against the decision to send additional troops to Iraq.⁷¹

3.2 BARRIERS AND ENTANGLEMENTS

The X-Net (as described in BNLWRP No.5), which is now called the Vehicle Lightweight Arresting Device (VLAD) by the US military, has been successfully used by Marines at a vehicle checkpoint in Haiti during April 2004. VLAD was developed and manufactured by QinetiQ, U.K. and the net is made from a strong polyethylene called Dyneema:

Two rows of unique barbed spikes on the leading edge of the net pierce the front tyres of the target vehicle; the net then envelops the front tyres and is pulled tight under the vehicle. This stops the wheels from rotating, bringing the vehicle to a standstill in a similar distance to that of an emergency traffic stop.⁷²

A 'Boat Trap Entanglement System' has undergone testing by Foster Miller Inc. and received an additional \$266,000 from the U.S. Coast Guard for further development. A canister is dropped from a helicopter in front of a vessel, and an X-shaped net is deployed and propelled into the path of the target vessel.⁷³

'Stingers' have long been in use with UK police forces. These are low-tech devices consisting of a 15ft. long mat of hollow stainless steel spikes which puncture a tyre, and then break off so that the tyres deflate slowly in 20 to 30 seconds – without risk of dangerous blow-out.⁷⁴

In July 2004 the US Department of Justice (DOJ) sent out a notice 'seeking sources' for a dual lethal/non-lethal fence system to use at three high security prisons (USP McCreary, USP Coleman II, and USP Terre Haute). According to the announcement they want to install electric fences incorporating 'high voltage energizers' to deliver either a lethal or a non-lethal electric shock:

The Lethal/Non-lethal high voltage energizer shall have the ability to operate in the following modes: * Non-lethal only * Lethal only * Non-lethal 1st, 2nd and or 3rd attempt then automatically convert to Lethal * Non-lethal, but gateable with other technologies to automatically activate Lethal.⁷⁵

3.3 ELECTRICAL

Taser

(i) *UK Police Forces*

The firearms units of five police forces have been using the Taser since April 2003 and the one-year trial was due to finish in April 2004. The independent review of the trial was carried out by PricewaterhouseCoopers (PWC) and resulted in the publication of a Final Report at the end of the one-year period.⁷⁶ However, the report has not been made publicly available. Following the initial trial period ACPO had wanted to extend the trial to include firearms officers in all police forces with the five original forces allowed to deploy the weapon more widely.⁷⁷ However, in May 2004 the Home Office decided that the use of the Taser should remain restricted to ‘trained armed officers who can only fire them in situations where they would otherwise have drawn their handguns’.⁷⁸ Subsequently, on 15 September 2004, the Home Office announced that the trial would be extended to the firearms units of all forces in England and Wales but that the guidelines for use would stay the same for all forces.⁷⁹ During the initial trial period (April 2003 – April 2004) the Taser was “used”⁸⁰ 60 times although it was only fired 13 times. 40 times it was aimed at a person but not fired.⁸¹

A Metropolitan Police Authority (MPA) report, published on 10 September 2004, provides some additional information on the use of the Taser by the Metropolitan Police Service (MPS) in London.⁸² The MPS, who were responsible for over 50% of Taser “uses” during the initial year period and have 500 officers trained to use the weapon, used the Taser 42 times between 21 April 2003 and 8 July 2004. Of these it was aimed (red laser dot only) 22 times, ‘sparked’ as a show of force three times, used in drive-stun mode twice, and actually fired 15 times. The MPA report noted that in 15 incidents where the Taser was “used”, mental health issues were noted:

This includes several incidents where Taser has been used to pre-empt attempted suicides. The use of drugs has been noted on two occasions and the use of alcohol has been noted on five occasions where Taser has been used.⁸³

The MPA report also provides some insight into the PWC Final Report on the initial trial period since it summarises its’ conclusions. One conclusion, also made in the executive summary of the PWC Interim Report,⁸⁴ is that the aiming or ‘sparking’/‘arcing’ the Taser has in many cases been sufficient to de-escalate potentially violent situations. Another makes it clear that many police officers want fewer restrictions on the use of the Taser:

The trial guidelines dictated that Tasers are only deployed alongside conventional firearms and in circumstances in which it is judged appropriate for firearms officers to carry firearms. Many of those involved in the trial – senior as well as operational officers – considered that this restriction meant that opportunities to use Taser to resolve violent or potentially violent incidents that did not meet the criteria for firearms deployment had been missed.

The MPS had certainly hoped for wider use to be authorised:

Within the MPS the specialist officers that have been identified for Taser training are TSG [Territorial Support Group] officers. A working group has been set up and a two-day training package has been written for non Authorised Firearms Officers (AFO's). Should the Home Office decision be to widen the scope of the trial to other specialist officers then the training of the TSG could commence at short notice.⁸⁵

Examples of recent Taser use (actual firing) in the UK include an incident where it was used to disarm a man wielding a Samurai sword in June 2004,⁸⁶ and another occasion in early September 2004 when the Metropolitan Police's armed response unit dealt with a man who had entered MI5 Security Service headquarters in London armed with a machete by shocking him twice with a Taser and before arresting him.⁸⁷ As for other incidents involving firearms, the Independent Police Complaints Commission (IPCC) investigates all Taser uses. The Chair of the IPCC, Nick Hardwick, was supportive of the recent Home Office decision to allow all police firearms officers in England and Wales to use the Taser but warned against misuse:

We will expect the police service to refer all incidents to us in which Tasers are discharged. We are conscious that Tasers could be misused and we will scrutinise any misuse.

The key to their successful deployment lies in continuing to provide clear guidance and adequate training.⁸⁸

According to a July 2004 report in *The Scotsman* Home Secretary David Blunkett was thought to have been considering a number of appeals against the use of Tasers by civil liberties campaigners, including Liberty, especially given a number of deaths in the US linked to the use of the weapon.⁸⁹ (see section (iii) below)

In Scotland, Ian Gordon (Deputy Chief Constable of Tayside) has called for Scotland's eight police forces to be equipped with Taser stun guns.⁹⁰ Gordon planned to present a report with this recommendation to ACPOS in September 2004.⁹¹

The UK distributor of the Taser weapon in the UK is a company called Protect Systems, based in Northampton.⁹²

(ii) *US Orders*

During May and June Taser International Inc. continued to win large orders. For example the United States Military placed a \$1.8 million⁹³ order, the Dayton Police ordered X26 versions worth \$436,000, and large orders were received from Florida, North Carolina, Las Vegas and Chattanooga Police Departments.⁹⁴ Subsequently Taser announced three further orders in August from police departments in Arizona, Florida, and California, and one order from an "unnamed law enforcement agency."⁹⁵ Further announcements in August cited orders by Sheriff's Offices in Milwaukee (130 Taser X26), Douglas County (115 Taser X26), Martin County in Florida (230 Taser X26), Palm Beach County in Florida (205 Taser X26), Orange County (90 Taser X26),⁹⁶ El Paso Police Department in Texas (374 Taser X26), San Jose Police Department in California (250 Taser X26), Knoxville Police Department in Tennessee (117 Taser X26), and Hillsborough County Sheriff's Office in Florida (300 Taser X26).⁹⁷ On 15 September 2004 three more orders for US police departments were announced: Louisville Metro Police Department in Kentucky (550 Taser X26), Long Beach Police Department in California (260 Taser X26), and Miami-Dade County

Police Department in Florida (175 Taser X26).⁹⁸ Also in September, Taser received an order for 360 Taser X26 weapons for use by the United States Army National Guard.⁹⁹

(iii) *Controversy in the US Continues*

In June 2004 Taser demanded that Amnesty International “withdraw its request for Georgia law enforcement officials to suspend their Taser conducted energy weapon use”.¹⁰⁰ Amnesty, along with other human rights and civil liberties campaigning organisations (such as ACLU), argued that there is insufficient knowledge about potentially harmful biomedical effects of the weapon, pointing out that over 50 Taser related deaths had occurred. According to Ed Jackson, Amnesty’s national media director in Washington D.C. “there is enough evidence emerging to cause serious concern”.¹⁰¹ In its response Taser listed 15 studies/medical reviews relating to the use of the Taser.¹⁰²

Two articles, one by Robert Anglen in *The Arizona Republic*¹⁰³, and another by Alex Berenson, published in *The New York Times*¹⁰⁴, fuelled the debate further. Anglen reported that “medical examiners in three cases involving suspects who died in police custody cited Tasers as a cause or a contributing factor in the deaths”.¹⁰⁵ Berenson’s article particularly received wide coverage. Picking up on previously voiced concerns by Amnesty, Berenson again noted 50 deaths associated with Taser use, including 6 during the month of June 2004. Core to Berenson’s article was what he identified as a lack of vigorous and independent testing of Taser effects claiming that “the company’s primary safety studies on the M26, which is far more powerful than other stun guns, consists of tests on a single pig in 1966 and on five dogs”. Berenson continued “Company paid researchers, not independent scientists, conducted the studies, which were never published in a peer reviewed journal. Taser has no full-time medical director and has never created computer models to simulate the effect of its shocks, which are difficult to test in human clinical trials for ethical reasons”. In 1996 Dr Stratbucker (now Taser’s part-time medical director) shocked the pig 48 times, each shock with a strength equal to that of the M26, and in 1999 Dr Stratbucker and Dr Mcdaniel, at the University of Missouri, shocked five anaesthetised dogs about 200 times with the M26. Berenson’s article concluded by commenting on the deaths of the 6 who died after a Taser had been used on them in June 2004.

Taser responded rapidly to these accusations, strongly refuting Berenson’s article particularly pointing out that an estimated 5,000 incidents have occurred when the Taser has “saved life or averted bodily injury”. Also that over 100,000 police officers have volunteered to be hit by the weapon, with no deaths as a result. (Some commentators have noted the very different conditions in which police officers volunteer to receive a short ‘hit’ with the Taser in comparison with real-life incidents.) In reply to Berenson’s point regarding lack of medical studies Taser stated “We personally find it ironic that Mr Berenson first assails our medical testing because Taser International paid for it, then he castigates us for not having paid for more studies”.¹⁰⁶

One of the victims cited in *The Arizona Republic* article, James Borden, died in an Indiana jail after receiving multiple shocks from a Taser. The official autopsy concluded that the 47-year old died from a heart attack ‘due to an enlarged heart,

pharmacologic intoxication and electrical shocks.¹⁰⁷ However Taser Inc. refused to accept the results and they hired another expert in forensic pathology, Dr. Cyril Wecht, to review the autopsy materials. Reportedly Wecht "...based his report on a review of medical documents, photographs and case reports but not an examination of Borden's body."¹⁰⁸ Wechts' report states '...it is difficult for me to perceive how the electrical effects of the Tasers would have been able to permeate these heavy layers of fatty tissue and produce an adverse effect'.¹⁰⁹ The report continued that underlying pathology was 'directly and causally attributable' to Mr Borden's death.

Since then *The Arizona Republic* have been continuing their investigation, seeking out autopsy reports for 44 Taser associated deaths in the US between September 1999 and March 2004. In an article on 6 August 2004 they cite the autopsy of a man who died in June 2002 after being shocked with a Taser, stating:

It marks the fourth case in which a medical examiner has cited Taser as a cause or a contributing factor in the death of a suspect in police custody. In two other cases, medical examiners said the stun gun could not be ruled out as a cause of death.¹¹⁰

There have been other reports of deaths associated with Taser use in the US since the original *NYT* and *Arizona Republic* articles were published. In the case of a man who died after a being hit with the Taser in Anderson County, Carolina (16 August 2004), according to reports, the coroner who found that Taser contributed to his death was pressured by Taser Inc. to revise the autopsy.¹¹¹ Taser Inc. denied pressuring the coroner.¹¹² A follow up article in the *Arizona republic* on 16 September 2004 gave an update on their investigation stating that they had identified 71 deaths following police use of the Taser in the US and Canada and that medical examiners had cited the Taser as a cause of death in two cases, a contributing factor in four others, and could not be ruled out in a further two cases.¹¹³ An *Arizona Republic* synopsis of all 71 cases is provided in another article.¹¹⁴

Meanwhile officials in British Columbia, Canada announced an investigation into the death of a man in Vancouver following the police use of a Taser, which marked the fifth Taser related death in Canada.¹¹⁵ Another man died after being hit with a Taser in Ontario, Canada and the coroner subsequently ruled the cause of death to be a drug overdose.¹¹⁶ Both men were under the influence of cocaine at the time of their being shot with a Taser.

Amnesty International have long cautioned that a shock from a Taser may be more deadly to those under the influence of drugs¹¹⁷, citing a forensic pathologists' report from 1991 which stated:

while the use of Tasers may be generally safe in healthy adults, pre-existing heart disease, psychosis, and the use of drugs including cocaine, PCP, amphetamines and alcohol may substantially increase the risk of fatality. Since Tasers are likely to be used on psychotic or intoxicated individuals, in whom the medical history is unknown, the priorities for use among law enforcement's "non-lethal" armamentarium must be carefully considered.¹¹⁸

Bleetman and Steyn who carried out a medical review of Advanced Taser on behalf of Taser International Inc., have previously argued that these types of death in custody are likely not influenced by the Taser since animal models do not show a correlation and:

Risk factors for death in 'tasered' subjects appear to be no different from known risk factors for death in custody (drugs, exhaustion, bizarre behaviour leading to arrest etc).¹¹⁹

In their discussion they do include one caveat:

The authors of this report have personally found that there is a small time-period after experiencing a short discharge from the Advanced Taser during which there is both a physiological and psychological reaction. This reaction might possibly exacerbate the effects of illicit drugs. However a similar exacerbation may well be caused by other methods of restraint or physical conflict.¹²⁰

However, apparently in response to these recent deaths, The Canadian Association of Chiefs of Police have announced a comprehensive review:

The Canadian Association of Chiefs of Police (CACP) has asked for a unique and comprehensive review of scientific research, field reports, and data on the use of Tasers in police work in Canada and around the world. The Canadian Police Research Centre (CPRC), a partnership of the CACP, the Royal Canadian Mounted Police (RCMP) and the National Research Council (NRC), will conduct this initiative.¹²¹

An incident in the US illustrates the dangers of secondary effects due to the use of Tasers. A 55 year-old man died after the police use of a Taser caused him to fall and hit his head, resulting in a fatal brain haemorrhage.¹²²

Taser is awaiting testing from the Joint Non-Lethal Weapons Human Effects Center of Excellence which it hopes will answer critics main concerns.¹²³

Although the controversy continues, the Taser remains popular with U.S. police officers and many forces are buying more Taser guns.¹²⁴ As of June 2004 Massachusetts and New Jersey were the only two U.S. states that did not allow police to use electronic weapons.¹²⁵ In July, however, the Governor of Massachusetts signed a bill allowing police use of electrical weapons in the State.¹²⁶

Milwaukee Police have released a report on Taser usage and, according to a news report, they used the Taser 105 times between 16 March and 31 July 2004:

The reports also show seven out of 10 of the suspects were sober, just over half had been committing crimes and 70% were injured in some way by the Taser, though none seriously in those first 12 weeks of use. One suspect was seriously injured in early July when he fell and hit his head on the street after being shot by the Taser, but he recovered.¹²⁷

In the US police officers patrol in high schools and they are equipped, as is any other officer in the US, with various weapons including a gun, a baton, and pepper spray. It is unsurprising therefore that, as Tasers are deployed more widely by US police forces, they will no doubt increasingly find their way into schools, as they have in the Kansas City area.¹²⁸

As Amnesty International has noted, private security firms are seen as a large market for Taser stun guns.¹²⁹ As these firms start to take up the weapons more widely, regulating their use will become increasingly difficult. In Manitoba, Canada, justice officials have taken Tasers away from one private firm that had been hired to

supervise bylaws such as ‘noise complaints, improper parking and illegal campfires’ in some rural areas. Apparently some of the private guards had overstepped the mark by ‘policing’ other traffic offences that only police officers have the authority to handle.¹³⁰

(iv) *Inappropriate Use and Policy on Use*

The Taser is used by police in certain situations to reduce the amount of force that would normally be used, for example in apprehending people who are armed with knives.¹³¹ However, in the US there have been a number of cases in the news recently where the use of a Taser seems to have been inappropriate and in contravention with the principle of proportionality for police use of force. In our last report¹³² we drew attention to the use of a Taser to subdue a 14 year-old schoolgirl who had become aggressive. Several more recent incidents have involved the use of a Taser on children or elderly people.¹³³ Perhaps the most striking is the case of a 9 year-old girl, who had run away from a special needs Children’s home in Arizona. The girl was in the back of a police car and had already been handcuffed. She was reportedly trying to kick out the window of the police car and so the officer used the Taser in touch-stun mode.¹³⁴ As one local mother commented to *The Arizona Daily Star*:

It doesn’t take two officers to restrain a 9-year-old girl. It’s a horrible thing.¹³⁵

Other examples seen in media reports of seemingly disproportionate, inappropriate, or dangerous use include: A man in Detroit refused to co-operate with police and walk out of the courtroom after his trial hearing for an armed ‘carjacking’ incident and was shocked twice with the Taser to get him moving¹³⁶; a burglary suspect was ‘Tasered’ by police in the US whilst in a tree and subsequently fell and was paralysed from the chest down¹³⁷; a 66-year-old woman was shot with a Taser in the US whilst resisting arrest for beeping her car horn at a police car¹³⁸; a guard in a West Virginia young offenders institution shocked a 17-year-old resident and then let several of them use it on each other¹³⁹; a 65 year-old man with Alzheimer’s disease was shocked by police in the US after wandering into a busy street¹⁴⁰; and a man with three children in his car who was ‘Tasered’ for trying to get past a police barrier to his home during a hurricane in Florida.¹⁴¹

The *LA Times* recently reported that hospital inspectors threatened to cut funding to the Marin Luther King Jr./Drew Medical Center in Los Angeles for relying too heavily on the police use of Tasers to subdue psychiatric patients without trying other methods. A spokesperson from Amnesty International commented in the *LA Times* article:

It’s disturbing and alarming to hear that hospitals – places that are supposed to be safe for people with illnesses and people with mental health problems – are using electric-shock weapons on their patients.¹⁴²

In the United States there is no universal set of guidelines for the use of the Taser by police. Each police force can draft its’ own policy. There are differing opinions on whether, for example, the stun gun should be used on restrained suspects. The death of a 26-year-old man in Las Vegas having been ‘Tasered’ seven times, some of which whilst he was handcuffed, has led police there to reconsider their policy. The chief of

Las Vegas police was quoted as saying, “I don’t like the thought of Tasing someone who has restraints on them already.”¹⁴³ Other police forces in the US have also been reviewing their policies for use of the Taser. In Orange County a police review showed that some officers have used them too readily. Now officers will only be permitted to use the Taser if the subject is showing ‘active resistance’.¹⁴⁴

Police in Oregon have reviewed their Taser policy, which previously did not place any restrictions its use. However the new restrictions are very limited, and officers in the area will still be allowed to stun handcuffed subjects, but will have to consider other solutions before shocking children, pregnant women or the elderly.¹⁴⁵ A police officer interviewed by the *Oregonian* commenting on the restrictions that some other forces have introduced to forbid stunning someone in handcuffs or targeting the groin area said:

We feel that there could be circumstances where the Taser could be used in a groin. It’s a viable, effective target. When you’re in a fight, that might be the only place that you have to hit.¹⁴⁶

The Denver Post conducted a study of Taser usage by police departments in Colorado by obtaining official police records.¹⁴⁷ What they found was differing policies between County police departments in the State. They also discovered that officers in small and medium-sized departments were more likely to use the Taser than those in large cities. The article also gives further examples of apparently inappropriate use. The authors found that out of 112 people shot with a Taser in Pueblo County since January 2003, a third were handcuffed at the time. However, only two of the 506 Taser uses reviewed were deemed inappropriate in the official police records. 10 out of 12 police forces reviewed in their study considered it acceptable to Taser a handcuffed suspect and 4 out of 12 policies allowed the shocking of someone who is showing passive resistance (e.g. a protester sitting on the ground who is not following a police order but is also not physically resisting arrest).

There are strong arguments to be made, in countries such as the US where Taser use by the police is widespread and increasing, for a universal policy and guidelines for use of the weapon. An editorial in a Canadian newspaper, the *Globe and Mail*, suggested a possible way forward:

One option may be not to take the Taser away but to impose strict regulations on its use. If, for instance, officers are found to be using it less discriminately than they should because of its non-lethal reputation, authorities might choose to limit the Taser’s use to situations in which there would otherwise be absolutely no alternative but a firearm.¹⁴⁸

This is akin to the current UK police policy on the use of the Taser, which restricts the weapon to use by trained firearms units in situations where a firearm may also be deployed.

(v) *Lawsuits*

Given widespread increases in the use of Taser weapons in the US together with seemingly inappropriate or disproportionate use of the weapon in some instances, larger numbers of related lawsuits can be expected. Recent examples include: a man seeking \$750,000 in damages alleging that police used excessive force shocking him

several times with a Taser¹⁴⁹; and the family of a mentally ill man who died in custody that have filed a \$570 million suit against Taser alleging the police use the weapon to torture him.¹⁵⁰ A 17-year old boy was recently awarded \$25,000 in damages from Seattle police having been shocked with the Taser four times on the back of the neck while handcuffed during a search carried out after police stopped the car he was in. Although he received the compensation the police admitted no wrongdoing, according to the media report, although the officer involved was ordered to have additional training with the weapon.¹⁵¹

(vi) *US Domestic Marketing Expansion*

Taser have been in talks with retailer Sharper Image, which can be found in most large US shopping malls, to stock their civilian model, the X26C.¹⁵² Following the critical article in the *New York Times*, however, Sharper Image seem to have put plans on hold for the moment.¹⁵³ Many police officers are not too happy at the prospect of the weapons being more easily available.¹⁵⁴ For example, a Deputy with Multnomah County Sheriff's Office in Oregon recently cautioned, "...we don't know what is going to happen when a citizen deploys it." He also raised another issue: "If you point a Taser at an officer, a law enforcement officer, we may have to use deadly force upon you."¹⁵⁵ Taser are selling the new X26C through their web site as of 15 September 2004, priced \$999.00.¹⁵⁶ It has a range of 15ft whereas the model available to the police or the military has a maximum reach of 21ft.

(For further discussion of public availability of NLWs see Section 2 of this report – *Focus: Criminal Use of NLWs*)

(vii) *Military*

A dual use lethal/non-lethal capability for the M4 rifle has been developed which has an X26E Taser stun gun attached to the front end. *The New York Times* reported that Col. Peter Janker (Armaments Engineering and Technology Center, Picatinny Arsenal) took this variation to Iraq for field trials.¹⁵⁷

(viii) *Manufacturing*

SBE Inc. has signed a \$1.5 million, two-year extension of its contract to supply the capacitors used in Taser stun guns. According to SBE their technology for reducing the size of the capacitor enabled the production of the new smaller Taser gun (X26 model).¹⁵⁸

(ix) *Competition*

In September 2004 a company called Law Enforcement Associates Corporation¹⁵⁹ announced that it had acquired patents for electrical stun weapons from one of the founders of Tasertron, James McNulty.¹⁶⁰ Mr. McNulty has also agreed to consult for the company in the development of such weapons.¹⁶¹ Tasertron was acquired by Taser International over a year ago.¹⁶²

Wireless - Plasma

Xtreme Alternative Defense Systems (XADS) have developed the 'Close Quarters Shock Rifle'(CQSR), a wireless electrical weapon, which may be operationally ready in 2005. According to a report in the *New Scientist*:

....the \$9000 Close Quarters Shock Rifle projects an ionised gas, or plasma, towards the target, producing a conducting channel. It will also interfere with electronic ignition systems and stop vehicles. "We will be able to fire a stream of electricity like water out of a hose at one or many targets in a single sweep," claims XADS President Peter Bitar.¹⁶³

At present it only has a range of three metres, but:

.....an operator can debilitate multiple targets by sweeping it across them for "as long as there is an input power source," says Bitar. XADS is also planning a more advanced weapon which it hopes will have a range of 100 metres or more. Instead of firing ionised gas, it will probably use a powerful laser to ionise the air itself. The idea has been around for decades, says LaVerne Schlie, a laser expert at the US Air Force Research Lab in Kirtland, New Mexico. It has only become practical with advances in high-power solid-state lasers. "Before, it took a laser about the size of two trucks," says Schlie. "Now we can do it with something that fits on a tabletop." The laser pulse must be very intense, but can be brief. So the makers of the weapons plan to use a UV laser to fire a 5-joule pulse lasting just 0.4 picoseconds - equating to a momentary power of more than 10 million megawatts. This intense pulse - which is said not to harm the eyes - ionises the air, producing long, thread-like filaments of glowing plasma that can be sustained by repeating the pulse every few milliseconds. This plasma channel is then used to deliver a shock to the victims similar to a Taser's 50,000-volt, 26-watt shock.¹⁶⁴

The CQSR bought a swift response from human rights organisations, such as the ICRC and Amnesty International, who again highlighted the fact that, in their view, inadequate research has been carried out on the potential biomedical and psychological effects of such a weapon. There is also a danger of innocent bystanders being affected when such an 'indiscriminate' weapon is used.

More information has emerged about Ionatron's Laser Induced Plasma Channel Technology (LIPC) since our BNLWRP Report No. 5. Ionatron describes its systems as "Laser-Guided - Directed Energy Weapons, Delivering High or Low Voltage Electrical Discharges for Various Effects on Target."¹⁶⁵ Essentially they are combination electrical / directed energy weapons systems that use the laser beam to direct and deliver an electrical discharge either to a person or to a vehicle. Since the charge is variable the weapon could be non-lethal or lethal. A prototype vehicle-mounted weapon (others are planned for sea vessels and UAVs, and also a person portable version is in the design stage) should be delivered to the US Department of Defense by the end of 2004. Ionatron is working with the Air Force Research Laboratory (with whom it has a \$9 million contract) and it recently announced that \$12.6 million is in the U.S. Department of Defence 2005 budget bill to develop a Transportable Laser Induced Plasma Channel (LIPC) Demonstration System for the US Navy.¹⁶⁶

HSV Technologies is also working on stun and vehicle-stopping shock weapons with ranges of over 100 metres that employ a laser-induced plasma to deliver and direct the electric discharge.¹⁶⁷

Wireless - Projectile

Another method under investigation for delivering incapacitating electric shocks without the need for wires is the design of projectiles or bullets that can carry an electric charge. As we discussed in our last report Taser Inc. are developing such a wireless projectile (the Extended Range Electronic Projectile (XREP)), as are the MDM Group ('ShockRounds').¹⁶⁸ According to a recent report a prototype of the ShockRound will be ready by early 2005 and a fully tested product by the end of that year.¹⁶⁹

These projectiles are being designed to get round the range limitations of the Taser (21 feet) and offer the increased 'stand-off capability' that military and police users desire. However projectiles that directly impact the body may not be a suitable non-lethal solution. The inherent problem with any projectile is that the effects of gravity will decrease accuracy at longer ranges. With non-lethal projectiles the dangers of reduced accuracy are that people are more likely to be struck in unintended and vulnerable places such as the head and neck. Although these proposed new projectiles, such as ShockRounds, might be fired with less kinetic energy they will still need considerable momentum to reach targets at up to 100 metres (as envisioned by the ShockRounds' developers), especially if they are to remain accurate. And so the potential for serious injury remains.

It is also unclear how the projectiles will cause electrical incapacitation. The Taser, for example, can only remain effective whilst the trigger is held down and the electrical current flowing into the body is maintained. Some questions remain: what will be the duration of electrical incapacitation? If it is only momentary does it confer any advantage? If it lasts longer, will the need for increased electrical energy discharge incur increased health risks? The latter is particularly important given the recent spate of Taser associated deaths.

The US Army is certainly interested in pursuing this type of weapon. They are currently seeking proposals:

To design, build and launch a projectile that would deliver electrical energy to the target in order to (near instantaneously) incapacitate the target in a non-lethal manner.¹⁷⁰

According to the announcement, the desired effective range is 6-80 metres and the preferred launch platform would be the 40mm M203 grenade launcher or 12-gauge shotgun.

3.4 ACOUSTIC

As mentioned in *BNLWRP Report No.5*, the American Technology Corporation's 'Long Range Acoustic Device' (LRAD) was taken to Iraq by the US Marines. There was also some speculation that the LRAD could be deployed for the first time in the US during potential demonstrations over the Presidential election period.¹⁷¹ The New York Police Department bought two LRAD's for \$35,000 each in preparation for the recent Republican convention in the city.¹⁷² Although deployed, there were no reports of its use during the convention where the expected violent protests did not occur.

One news report described the use of the LRAD during a mock prison riot training exercise at a West Virginia prison.¹⁷³ And an ATC press release from 4 August highlighted several recent contracts with the US military:

- Awarded contract to deliver LRAD devices to a U.S. Army Stryker unit for use in missions in and around Mosul, Iraq.
- Awarded contract to deliver LRAD devices to the U.S. Navy 5th Fleet for use in and around the Basra, Iraq fueling terminal.
- Completed and delivered LRAD remotely operated pan/tilt units with integrated camera to Naval Surface Warfare Center Crane for the warship integrated force protection system.¹⁷⁴

A subsequent release (26 August 2004) gives further information, noting that the Port Authority of New York/New Jersey had made an order for LRADs to use in bridge protection, and that the LRAD is being tested by the Border Transportation Security (BTS) Directorate of the Department of Homeland Security for use on the Arizona border with Mexico.¹⁷⁵ Charles McQueary, the US Under Secretary, Directorate of Science and Technology, U.S. Department of Homeland Security testified to a Senate committee on "Enhancing Border Security" in June stating that: "The LRAD is one of the most promising existing technologies that S&T has introduced that could transition to BTS on a larger scale."¹⁷⁶ (Also see p.11 of this report)

3.5 DIRECTED ENERGY

The majority of the US military's efforts in DE technology development are carried out by the Air Force. However the US Navy does have a programme for integrating directed energy technologies into ship-board systems. The 'Directed Energy User Scrutiny Equipment (DEUSE) Program' at Crane Naval Surface Warfare Center seeks to "...accelerate the fielding of a non-lethal force protection capability for future use by the Navy operational forces."¹⁷⁷ The Navy are also reportedly interested in adapting the Active Denial System (ADS) for Naval applications.¹⁷⁸

The Heritage Foundation, a conservative think tank, with links to the current US administration, published a report in August 2004 advocating the development of directed energy weapons, both lethal and non-lethal, and recommending that such weapons programmes be given additional resources.¹⁷⁹

Active Denial System (ADS)

The Active Denial System (ADS) has been in the news again, featuring in a long article in *The New York Times* magazine¹⁸⁰ and another article by the *Associated Press*.¹⁸¹ However it appears that there is not much new information to report. According to *The New York Times* piece there will be a media demonstration of the Humvee-mounted ADS later this year, whilst the *Associated Press* report states:

A Humvee-mounted Active Denial weapon is expected to be given to all services by the end of this year for evaluation, with a decision about deployment expected by the end of 2005.

According to another report the US Air Force is also seeking to investigate the potential public reaction to the ADS both in the US and in other cultures.¹⁸²

The ADS is seen as a key technology for the US DOD Office of Force Transformation's 'Project Sheriff', as described in the Introduction and Commentary section of this report.

High Power Microwave (HPM)

HPM weapons are seen as being potentially useful as force-multipliers rather than discrete non-lethal weapons. For example, a recent US Army announcement called for proposals to enhance the lethality of conventional munitions with an HPM directed energy component to increase the 'destructive range' by destroying electronics at ranges beyond the effects of the conventional explosion.¹⁸³ The Directed Energy Directorate of the US Air Force Research Laboratory have a budget of \$50 million over the next five years for their 'Directed Energy Technology Applications and Research' programme according to a recent 'Broad Agency Announcement' calling for proposals that "...will provide technology and applications research and development (R&D) for pulse power (PP) and HPMs."¹⁸⁴

Envisioneering, Inc.¹⁸⁵ has recently been awarded a \$5 million contract with the US Naval Research Laboratory to work on Naval systems including HPM and other directed energy weapons.¹⁸⁶

One potential non-lethal application of HPM is for stopping vehicles. The UK Home Office Police Scientific Development Branch (PSDB) is currently testing a new device that employs an antenna to direct a beam of radiofrequency (RF) energy at cars to disable their onboard computers.¹⁸⁷

Lasers

Researchers at the US Department of Energy's Thomas Jefferson National Accelerator Facility, carrying out work in co-operation with the Naval Sea Systems Command (NAVSEA) Directed Energy and Electric Weapons Office, announced that they have now produced 10 kilowatts of infrared light from their Free-Electron Laser (FEL) system.¹⁸⁸ This laser is the most powerful *tuneable* laser in the world, reportedly 400 times more powerful than nearest rivals in Japan and Russia.¹⁸⁹

3.6 RIOT CONTROL AGENTS & MALODORANTS

Riot Control Agents (RCAs)

RCA's and the military

The German government recently decided to equip their army with riot control agents. A *Sunshine Project* news release on 17 June 2004 explained the reasoning behind the decision:

Last week's decision was triggered by March 2004 riots in Kosovo, when German soldiers were unable to stop a violent mob burning down monasteries. After a criticism in the German weekly the *Spiegel* in early May, the Minister of Defense felt pressure to take political action. The quick decision to equip the Army with chemical agents, however, ignores the actual situation in Kosovo. The German Army itself acknowledges that their soldiers were equipped with non-lethal weapons such as rubber bullets, but decided not to use them in this particular situation in order not to harm women and children. And the Army acknowledges that they do not have any plan or scenario for the use of chemical agents.¹⁹⁰

The 1993 Chemical Weapons Convention (CWC) prohibits the use of riot control agents 'as a method of warfare'. However, such agents are permitted for 'law enforcement including domestic riot control purposes.' Interpretations of this exception differ but generally permitted overseas law enforcement uses by the military are peacekeeping and public order/riot control situations.¹⁹¹ For example, in March 2003, just as the war in Iraq began, UK Defence Secretary Geoff Hoon explained that the UK military would not use RCAs in Iraq for any purpose other than riot control:

Question:

...there are reports this morning that the Americans may plan to use in urban warfare non-lethal chemical weapons, what would you say about that?

Mr. Hoon:

On your second question, as you are aware non-lethal chemical weapons are permitted for dealing with riot control, the United Kingdom is fully signed up to the Chemical Weapons Convention and they would not be used by the United Kingdom in any military operations or on any battlefield.¹⁹²

The US Army Field Support Command put out an announcement in July 2004 seeking a company to manufacture 58,200 M7A3 riot control grenades for them. According to the announcement "the M7A3 is a CS filled burning type grenade used to control counterinsurgencies and other tactical missions."¹⁹³ These stated uses would seem to fall outside the 'law enforcement' exception permitted by the CWC.

The US air force apologised to residents of a Tucson, Arizona neighbourhood after tear gas used in a training exercise was blown over a local shopping plaza triggering numerous calls to the emergency services.¹⁹⁴

Recent use of RCAs against crowds

Tear gas (CS) and other irritants are used widely across the world to break up protests, demonstrations, and riots. Some examples from media reports of use in recent months against crowds (as opposed to use of small spray devices against individuals) are illustrative (see *Table 2* below): Incidentally the US Olympic team were supplied with over a thousand gas-masks in case of use of tear gas or pepper spray by police in or around the Olympic arenas.¹⁹⁵

*Table 2: Examples of large-scale use of chemical irritants for crowd control.**

** Compiled from media reports May – September 2004.*

Date	Location	Incident
26 June	Ankara, Turkey	Police fired tear gas at a group of over 100 people protesting a visit by US President, George Bush.
3 July	Nairobi, Kenya	Tear gas used against protesters demanding constitutional reform. ¹⁹⁶
August	Imphal, India	Tear gas used by police throughout August in this region during large-scale protests against a new anti-terror law. ¹⁹⁷
8 August	Swaziland	Tear gas used against protesters demanding political reform. ¹⁹⁸
13 August	Male, Maldives	Police fired tear gas to disperse thousands of pro-democracy protesters. ¹⁹⁹
18 August	Bujumbura, Burundi	Police fired a tear gas and water cannon at 1,000 people protesting the massacre of 160 Congolese Tutsis at a UN refugee camp. ²⁰⁰
24 August	Nairobi, Kenya	Tear gas used against over 100 Maasai protesters demanding return of ancestral land. ²⁰¹
24 August	Dhaka, Bangladesh	Tear gas used by police against protesters during a general strike. ²⁰²
27 August	Kashmir	Indian police fired hundreds of tear gas shells at over 5,000 people protesting against US operations in Najaf. ²⁰³
27 August	Athens, Greece	Police used tear gas against some of the 2,000 protesters demonstrating against a visit by US Secretary of State, Colin Powell. ²⁰⁴
30 August	Tarlac, Phillipines	Tear gas used to disperse around 300 farm workers protesting losing their jobs. ²⁰⁵
31 August	Buenos Aires, Argentina	Police fired tear gas at hundreds of demonstrators protesting a visit by the Managing Director of the International Monetary Fund (IMF). ²⁰⁶
1 September	Kathmandu, Nepal	Tear gas used in an attempt to disperse several thousand people protesting over the killing of 12 Nepalese hostages by militants in Iraq. ²⁰⁷
5 September	Oakland, USA	Police used one tear gas grenade to disperse a crowd of 500 people during an annual motorcyclists meeting. ²⁰⁸
7 September	Jakarta, Indonesia	Police used tear gas and water cannon to break up protests during the trial of a terrorism suspect.
10 September	Grenada	Police used tear-gas to stop looting following the hurricane that devastated the island. ²⁰⁹
11 September	Santiago, Chile	Police fired tear gas and water cannon at some protesters during the anniversary of the 1973 military coup. ²¹⁰
12 September	Imphal, India	Police fired tear gas to disperse an angry crowd. ²¹¹
18 September	Conakry, Guinea	Police used tear gas to break-up a protest march against the country's president. ²¹²

CS Spray in the United Kingdom

The results of a study by the Medical Toxicology Unit of Guy's and St. Thomas' Hospital in London of the health effects of the CS sprays used by UK police were published in paper in the September edition of the *Emergency Medicine Journal*.²¹³ The study was based on all incidents during 1998 of use of police incapacitant spray (PIS), (which is CS based), where patients were reported to the National Poisons Information Service – London (NPIS-L). The study concluded that adverse symptoms such as dermatitis and blisters were reported more for cases exposed to police sprays than for non-police sprays and that:

Adverse effects more than six hours after exposure have also been observed, which is in conflict with the reported immediate, short lived, and self limiting symptoms that PIS are reported to cause.²¹⁴

The authors state that the CS sprays used by UK police may cause more adverse effects than other sprays and they recommend that a detailed study be carried out to establish the potential adverse effects of UK police CS sprays.

John Wadham, Deputy Chair, Independent Police Complaints Commission (IPCC) commented on the study:

Officers should be told about this valuable research and may need to be more careful in how CS spray is used.

It is also time to re-evaluate other options such as synthetic pepper spray or examine whether the composition of CS spray can be changed to reduce damage.²¹⁵

In Northern Ireland, where CS sprays were only introduced this year (2004), the Police Service of Northern Ireland has asked the Ombudsman's Office to investigate all incidents in which they are used.²¹⁶

In August 2004 two police officers were attacked by a man they had stopped for driving without a seatbelt. He managed to get hold of one of their CS sprays during the confrontation and used it against them.²¹⁷

Pepper spray/OC and CS in Prisons

Ifeanyi Iko, an inmate at Western Correctional Institution near Cumberland in Maryland, USA, died of asphyxiation in April this year after a confrontation with prison officers. His death was ruled a homicide by the medical examiner. Later, in July, a *Baltimore Sun* investigation obtained accounts from witnesses that prison officers had used three cans of pepper spray to subdue the man and subsequently put a mesh mask over his face to stop him spitting at them.²¹⁸ In mid-July it emerged that state prison officials in Maryland changed their policy on authorisation for use of pepper spray so that only a warden or assistant warden could authorise its use. A prison spokesperson said that the changes were not in response to the death of the man but because of an ongoing review.²¹⁹ Subsequently in late July the prison officers involved in the incident were cleared of any 'criminal responsibility' for the man's death.²²⁰ During August 2004 *The Baltimore Sun* obtained a copy of the autopsy report:

The autopsy report says that Iko, 51, died of asphyxia "caused by chemical irritation of the airways by pepper spray, facial mask placement" and the manner in which he was restrained.²²¹

The FBI has now launched a further investigation into his death.²²²

A *Minnesota Public Radio* report published in June 2004 in response to two unrelated deaths in custody where pepper spray was used asked for the opinion of Dr. Cyril Wecht, an expert in this area (also mentioned in this report in relation to Taser autopsies), on the dangers associated with pepper spray. According to the article he emphasised that past medical history can be an important factor:

He says officers should take into account that the combination of drugs, pepper spray and the method of restraint can lead to a fatality. Wecht says pepper spray makes it hard for anyone to breathe, much less someone with asthma.²²³

In July 2004, four prison officers in East Jefferson County, USA were injured whilst being re-certified to use pepper spray, which involved them being sprayed in the face with the product. The prison department was testing a new hand-held spray canister from PepperBall Technologies, who also make the PepperBall launcher systems. According to the news report “Two of the corrections officers experienced lung problems, one had problems in his esophagus and one got blisters over one of his eyes.”²²⁴ The authorities decided not to introduce the new product. PepperBall Technologies’s web site advertises the spray, which contains PAVA (a synthetic version of OC) as being “...five (5) times hotter than the current leading brand.” The company claims that “...its super hot qualities are the hottest available, spray after spray, can after can.”²²⁵

A British man released from the US military prison at Guantanamo Bay, Cuba alleged mistreatment and torture upon his return to the UK. He told the London *Evening Standard* that he was sprayed with pepper spray and beaten for not co-operating with prison authorities.²²⁶ Pepper spray or OC is amongst the standard equipment held by the Security Department at Guantanamo Bay Naval Base. For example, in a June 2004 solicitation the Navy sought 50 three ounce and 5 twelve ounce ‘First Defense’ OC spray canisters as well as batons and other riot control equipment.²²⁷

Another solicitation in May 2004, for a US prison in California, The Federal Correctional Complex Victorville, shows that a variety of CS and OC riot control grenades are deployed there (the contract was awarded to Aardvark Tactical, Inc.):

FCC Victorville has a requirement for the following less than lethal munition supplies manufactured [sic] by Defense Technology/ Federal Laboratories. 1. 1026 CS Triple Chaser continuous discharge grenades (3) 250 each, 2. 1092 CS Han-Ball Rubber Ball Grenades (519) 250 each. 3. 2040 T16 OC Flame Less expulsion grenade 150 each....²²⁸

PepperBall and US Border Control

Fourteen PepperBall launcher systems were acquired in August 2004 by US Border Patrol for use along the Mexican border with Texas²²⁹, creating some controversy in Mexico²³⁰ and resulting in high-level meetings between the US and Mexico in Washington.²³¹ The PepperBall systems, which fire frangible OC or PAVA filled projectiles, have been used on trial along the California and Arizona borders with Mexico since 2001 and where they are reported to have been fired a total of 81 times during 2002-2003.²³² US President George Bush’s nephew stirred up the debate by condemning the policy whilst in Mexico

campaigning for votes in the run up to the US Presidential election.²³³ For more information about the PepperBall systems see our previous reports.²³⁴

Accidents or ‘Pranks’

There have been several incidents in recent months where pepper spray has been released in public spaces by accident as ‘pranks’. The most high profile of these occurred in a public food court area of an office building in central Washington DC where some teenagers apparently released pepper spray by accident. The event caused a large reaction, initially being treated as a ‘mass casualty’ incident by the fire department before the cause of occupants’ coughing and stinging eyes was identified.²³⁵

Malodorants

The Israeli army has announced the development of a “skunk bomb” for use against Palestinian protesters. The device, which has not yet been deployed, releases a synthetic chemical version of the skunk’s odour that reportedly ‘permeates clothes for five years’.²³⁶

RCA / Malodorant mixtures

The US Naval Surface Warfare Center Dahlgren Division (NSWCDD) have this year been calling for proposals to develop a dual OC / malodorant projectile to be fired from a 12-gauge shotgun. According to the solicitation design characteristics would include:

Lethality: The round must be non-lethal at ranges greater than 20 yards with a maximum allowed kinetic energy of 58 ft-lbs; Penetration / Payload Dispersal: The round must penetrate a single-pane of glass at 50 yards. It is desired that the round passes through the glass intact and then disperses the payload on contact with a body or drywall. ...The payload will be a liquid organic mixture of Oleoresin Capsicum (commonly referred to as OC or pepper spray), mercaptans, sulfides, and possibly some amines. The payload formula will be a government furnished item.²³⁷

However, an apparently conflicting report in a recent *New York Times* article pointed out that the US military “...is not moving forward with plans to “weaponize” the odors, partly for fear of violating the Chemical Weapons Convention.”²³⁸

3.7 BIOCHEMICAL INCAPACITATING AGENTS

Writing in the July/August issue of *Arms Control Today* Mark Wheelis argues that the ‘new biology’ will lead to new chemical and biological weapons agents:

Soon, scientists around the world will be able to tailor pharmaceutical agents to enhance or block specific physiological pathways. This will be a great boon for medicine but will also allow the development of a wide range of novel biochemical agents for hostile purposes.²³⁹

It is discoveries in neuroscience and drug discovery that some military weapons developers hope will lead to new ‘non-lethal’ incapacitating agents. However, advances in these areas will be equally if not more applicable to the development of new toxic agents that cause neurological damage or death.

In July 2004 the US Marine Corps demanded that The Sunshine Project, a US non-governmental organisation, remove documents from their web site detailing early 1990’s research proposals for military development of incapacitating weapons.²⁴⁰ The Sunshine Project has a large collection of documents relating to the US military’s research and development in this area that are available on their web site.²⁴¹

Some still call for the Chemical Weapons Convention (CWC) to be re-drafted to allow the use of incapacitating agents in warfare, arguing that it would be better than shooting people.²⁴² This argument overlooks the historical record of military use of much less potent chemicals (riot control agents such as CS gas), which, for example, were used in Vietnam to great effect in enhancing the lethality of conventional gunfire, rather than minimizing the ‘shooting people’.²⁴³

For a detailed discussion of these issues see BNLWRP Research Report No. 5.²⁴⁴

3.8 COMBINED TECHNOLOGIES

Several companies are developing weapons that can deliver incapacitating electric shocks without the need for wires. Some of these are essentially combination directed energy/electrical weapons. The underlying principle is to use a laser beam to produce and ionised gas or plasma through which an electrical charge can be conducted to the target person or vehicle. Other weapons under development are electrical projectiles that use a capacitor to store an electrical charge within the bullet that is released when it hits the target person. (See 3.3 Electrical section of this report and previous reports)

Universal Guardian Holdings plan to launch their Cobra StunLight system at a conference at the end of September 2004.²⁴⁵ It is a combination flashlight and laser-aimed pepper spray dispenser.²⁴⁶

The US Marine Corps Clear-A-Space Distract/Disorient Program issued an announcement in June 2004 seeking contributions from industry. The programme has in the past sought to develop a combined light, sound and malodorant grenade-like device.²⁴⁷ This announcement outlines their interest in a slightly different combination device:

Capabilities of interest are: the application of non-coherent and impulse sources of light, aversive sound, and blunt force trauma used individually or in combination to create a distracting or disorientating effect.²⁴⁸

The M84 Non-lethal Stun Grenade is a 'flash/bang' grenade used by the US Army.²⁴⁹ It is described in a 2003 Army announcement seeking a manufacturer as:

...a non-lethal (stun) diversionary hand grenade, which produces an intense flash (approximately 1 to 2.5 million candlepower peak) and bang (approximately 170 to 180 decibels at 1.5 meters (5.0 ft.)). The grenade will be used by tactical and non-tactical forces while performing missions of hostage rescue and capture of criminals, terrorists, and other adversaries.²⁵⁰

According to a contract notice in June 2004 the M84 is manufactured for the US Army by Universal Propulsion Company, Inc.²⁵¹

Flash/bang devices or noise flash diversionary devices (NFDDs) as they are also termed, were the subject of a study carried out by E-Labs, Inc., funded by the US National Institute of Justice (NIJ), in partnership with the Bureau of Alcohol, Tobacco, and Firearms (BATF) and the National Tactical Officers' Association (NTOA), to assess their performance and potential 'collateral effects' on household items. Eight different devices were tested. Two of the devices were found to start fires on pillows, cushions or other objects in close proximity to the detonation. All but two of the devices caused some degree of displacement of pillows, cushions or other objects after detonation. Other tests included measuring the light and sound produced by the devices and degree of fragmentation. The authors of the study did not draw any conclusions or assessment of the test results.²⁵²

A May 2004 contract between the US Department of Justice and ALS Technologies sheds light on the types of non-lethal weapons deployed at US prisons. The Federal Correctional Complex, Victorville, California (also see RCAs section of this report) sought a large number of flash/bang devices and projectiles including:

1. ALSG40, Safety Diversion Device, Single use light-weight tactical polymer device with an ejecting sub-munition, produces a brilliant flash of 1.5 million candela and produces up to 1.5 atmospheres of

pressure, report of approximately 174dB at 5 feet causing disorientation for a period of 1 to 3 seconds. Quantity – 50

2. ALST429, Tactical Blast Stun Munition, cylinder shaped 2 X 4 9/16 inch body with military style M201-A1 pin and spoon fuse, approximately one second delay, produces a brilliant flash and report of approximately 174 dB and a 5 P.S.I. pressure wave at 7 feet. Quantity – 700
3. ALST460, Tactical Blast Strip, 4 X 13 X 0.1 inch plastic body, attached is a 5 meter electric match, produces a brilliant flash, report of approximately 175 dB and a 5 P.S.I. pressure wave at 7 feet. Quantity – 700
4. ALST471, Magnum Ultra Flash Stun Munition, cylinder shaped 2 X 4 9/16 inch body with military style M201-A1 pin and spoon fuse, approximately one second delay, produces a brilliant flash and a report of approximately 185 dB and a 10 P.S.I. pressure wave at 7 feet. In addition to the blast it produces a shower of white-hot sparks. Quantity – 700
5. ALS1203, Tri-Dent Triple Rubber Projectile, 12 Gauge, direct fire 12 gauge round which fires 3 each, 46 grain, 80 durometer rubber projectiles. Quantity – 500
6. ALSG101, Hornet's Nest Sting Grenade, non-reusable rubber filled grenade filled with approximately 80 .45 caliber rubber balls surrounded by and explosive charge, detonation throws rubber balls in a 360 degree radius covering an area of approximately 7 to 25 feet. Quantity – 450²⁵³

3.9 DELIVERY SYSTEMS

Non-Lethal Munitions

The US military is conducting continued research and development of airburst munitions for non-lethal weapon delivery, some with proximity fuses. A recent article in the *New York Times* described a dual lethal/non-lethal prototype rifle under development, called the XM29, that can fire either conventional bullets or 20mm non-lethal rounds containing rubber balls or pepper spray for example. The user can ‘toggle’ between the two functions. At present the rifle employs a laser range finder that calibrates the fuse on the 20mm non-lethal bullet to detonate just before it reaches the target person. However, because of risks of misfire or someone stepping into the path of the bullet, research is being carried out on a proximity fuse that would cause the round to detonate automatically when it is nearing a target.²⁵⁴ The US Army is seeking to develop such a proximity fuse system for a larger 40mm airburst round.²⁵⁵

The Army are also continuing development of a 40mm ‘telescoping projectile’, described in BNLWRP Research Report 5.²⁵⁶ Other non-lethal munitions under development by the US Army, co-ordinated by the Tank-automotives and Armament Control - Armament Research, Development & Engineering Center (TACOM-ARDEC) at Picatinny Arsenal, include the non-lethal muzzle launched ordnance: “The MLO is designed to be a Non -Lethal munition that is attached to the muzzle of the M4 carbine or M16 rifle. A blank cartridge is used to launch the non-lethal payload.”²⁵⁷ Another munition the US Army wish to develop is described as:

...a small munition that would be able to penetrate through an 8 inch concrete wall and deliver a small explosive or non-lethal stun device into an interior space. Ideally this munition would be a 40mm grenade type munition delivered from an M203 launcher mounted underneath the standard M16 rifle.²⁵⁸

US Marines from the 24th Marine Expeditionary Unit have tested VENOM, which is a vehicle mounted device used to launch non-lethal ammunition such as 40mm stinger balls and smoke grenades. According to Ray Grundy, an official at the Joint Non-Lethal Weapons Directorate (JNLWD), this provides ‘ a range and volume of fire which keeps marines beyond the reach of an angry crowd.....it takes us from a defensive posture to an offensive posture, allowing us to better control and influence the battle space’.²⁵⁹ Some non-lethal ammunition for the VENOM system has been supplied by Combined Tactical Systems, Inc.²⁶⁰

The Israel Defence Forces (IDF) will be equipping their tanks with non-lethal ‘stun shells’ for use against Palestinian demonstrators in the coming months according to a report in the *Jerusalem Post*. They will be manufactured by TASS Israel Military Industries:

The shells are made of fiberglass and disintegrate in the air creating a loud noise aimed at dispersing crowds. TASS IMI has long produced non-lethal stun and flash grenades used by the IDF and other security agencies around the world. The official said the products are unique to Israel.²⁶¹

Non-Lethal Landmines

The US has not signed the 1997 Ottawa Convention banning landmines. One of their arguments for continued resistance to joining the 150 States Parties to the Convention is the

development of so called ‘smart landmines’. A report in the Canadian *Globe and Mail* describes one such system under development:

The program involves a battery-operated system known as Spider, which has six canister-like valves on the outside, and a global-positioning chip and a radio inside. After the Spider is hand-placed by a U.S. soldier, the device’s operator monitors and fires it from a laptop computer up to a mile away...

When an enemy triggers one of a half dozen tripwires, the Spider signals a U.S. soldier, who can fire a grenade from the device. Operators can also shoot Claymore mines or “non-lethal agents,” like a net or a terrible odour.²⁶²

Unmanned Vehicles

Unmanned Ground Vehicles

The US Army’s Gladiator Tactical Unmanned Ground Vehicle (TUGV) prototype, discussed in our previous reports, is designed as a platform for both lethal and non-lethal weapons. An article in *National Defense* described its’ weapons systems as follows:

The system will be able to perform both lethal and non-lethal direct fire missions... For the lethal punch, it will use the M240 G Medium Machine Gun, M249 Squad Automatic weapon and Uzi sub-machine gun, while the non-lethal package includes the FN303, Light Vehicle Obscuration Smoke System and VENOM.²⁶³

It will likely not be deployed until 2008.²⁶⁴ When it is eventually given to US military forces its’ proposed ‘non-lethal’ missions are as follows:

- (a) support ground forces to disperse crowds who have become unruly and dangerous to the mission;
- (b) control groups of personnel by using area effects that force them to either move from one area to another or that corral them into one area;
- (c) control individuals by using point effects that cause individuals to comply with the desires of the force--ringleaders can be singled out of large groups and removed from the area, generally defusing the situation;
- (d) deny an area to personnel and vehicles by strategically positioning the TUGV and NLMPM [non-lethal mission payload modules] such that it prevents passage thereby creating a clear area; and,
- (e) clearing large facilities can be accomplished by either driving the TUGV (or other tactical vehicle) into the facility or by engaging the facility from the outside if the non-lethal weapons (NLW) effects can penetrate the walls.²⁶⁵

Other US systems under continued development are the Mobile Detection Assessment Response System (MDARS), which can carry a variety of sensing, surveillance and weapons payloads (lethal and non-lethal) dependent on its ‘mission’. MDARS is described as having a “plug-n-fight” capability in a recent paper on the use of UGVs for protecting military bases.²⁶⁶ The paper describes testing of MDARS with the PepperBall System that fires paint-ball type frangible OC/PAVA projectiles. Another prototype UGV is a remotely controlled 4x4 motorbike with mounted lethal (M16 rifle) and non-lethal (CS spray) systems.²⁶⁷

The *New Scientist* reported in early August 2004 that a Japanese security company, Secom, has developed a robot to ward off intruders:

...a six-wheeled surveillance robot which can be either remotely controlled or pre-programmed. It can chase intruders, take high definition video pictures of them, issue loud warnings and release a dense, billowing cloud of smoke to frighten them off.

...

A Secom spokesman says it hopes that if the smokescreen does not frighten off the intruder, it will at least confuse them long enough for a human guard to get to the scene. The non-toxic smoke has been developed specially by Secom, but it is not saying what it contains.

...

But the robot will not be for sale. Secom plans to rent out the robots at 300,000 yen a month (\$2700) which is half the cost of hiring a human security guard to do the same job, says the firm.²⁶⁸

Unmanned Air Vehicles

In addition to the LRAD and PepperBall systems being tested for border security in the US, the Border Transportation Security (BTS) Directorate of the Department of Homeland Security is also investigating the use of UAVs for surveillance purposes along the border.²⁶⁹

There have not been suggestions of using UAVs with weapons payloads in this context. However such technology already exists and armed UAVs (such as the conventional missile-armed Predator) have been used by the military in Iraq and Afghanistan. The feasibility of non-lethal weapons delivery by UAV was tested as early as 1996 by the US Joint Non-Lethal Weapons Directorate, and a video recently obtained by The Sunshine Project shows successful tests in 1997 with a Hunter UAV using smoke canisters. Of course the same technique could be used to deliver similar payloads such as chemical irritants in the form of riot control grenades. The video can be viewed at:

<http://www.sunshine-project.org/incapacitants/jnlwdpdf/hunter.html>

As we mentioned in an earlier report, a short video of a smaller UAV, the Exdrone/Dragon Drone, being tested for NLW delivery can be accessed at:

[http://www.m2technologiesinc.com/compressed/RCSPDS\(Glider\).mov](http://www.m2technologiesinc.com/compressed/RCSPDS(Glider).mov)

The video shows tests with several different payloads including solid objects, a camera for surveillance, and what appears to be an aerosol generator or spray system.

Unmanned Surface Vessels

Another unmanned vehicle prototype developed by the US Navy is called the Sea Fox, which is a small remote controlled boat with a jet-ski engine. It would be capable of carrying weapons such as a machine gun or grenade launcher or indeed non-lethal weapons, but according to an *ABC News* report there are no plans to develop this capability at the moment.²⁷⁰ However \$3.5 million of the US FY2005 defence budget has been earmarked for continued development of this platform beyond testing of the existing two prototypes and including integration of non-lethal weapons, according to a news release from a Washington State senator supporting the project:

Sea Fox has proved to be an immediately available asset to support Anti-Terrorism / Force Protection (AT/FP) efforts in a variety of circumstances. This money would fund 10 vessels and associated mission packages for follow on proof-of-concept operational testing and integration with current AT/FP tests and operations. Sea Fox can be used in a direct support role for port security forces, deployed from U.S. Navy combatants and craft in a variety of operational scenarios, and used as a low cost augmentation to support large scale autonomous vehicle scenarios. This money would also fund engineering and procurement costs for mission packages including radars, sonars, multifunctional camera suites, autonomous equipment packages, *non lethal response systems*, and required communications, testing, and support. Missions can include AT/FP patrols, area patrol, route survey, vessel interrogation and escort, swimmer detection, under water survey of piers and docks, bottom surveys, and operational test range monitoring and clearance.²⁷¹ [emphasis added]

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5. CONFERENCES

Forthcoming BNLWRP Seminar, 9 November 2004

We are holding a closed seminar on 9 November 2004 at the Centre for Conflict Resolution, Department of Peace Studies, University of Bradford entitled:

New Non-Lethal Weapons Technologies: Implications for British Policing

We plan to bring together about 25 invited experts with policy, operational, manufacturing, and academic experience to discuss the implications of new non-lethal technologies for British policing, with a focus on electrical weapons (particularly the Taser weapon).

Forthcoming Conferences

Jane's Less Lethal Weapons 2004 Conference:

Critical Incident Intervention including Less-Lethal Weapons in War and Peace

19-20 October 2004

The Berkeley Court Hotel, Dublin, Ireland

<http://www.janes.com/security/conference/llw2004/programme.shtml>

Non-lethal Technology and Academic Research Symposium (NTAR) VI

15-17 November 2004

Graylyn Conference Center, Winston-Salem, NC, USA

<http://www.unh.edu/ntic/ntar.shtml>

Non-Lethal Defense VI

14-16 February 2005

Hyatt Regency, Reston, VA, USA.

<http://register.ndia.org/interview/register.ndia?PID=MeetingDetail&MID=5420>

3rd European Symposium on Non-Lethal Weapons

10-12 May 2005

Stadthalle Ettlingen, Germany

<http://www.non-lethal-weapons.com/sy03index.html>

Recent Conference Proceedings and Presentations

Report on the third day of the International Law Enforcement Forum

5 February 2004

Hosted by: Northern Ireland Office with the International Law Enforcement Forum

Royal Society of Arts, London, UK

Available at: <http://www.nio.gov.uk/ilef3.pdf>

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