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# REPORT ON THE SECOND INTERNATIONAL LAW ENFORCEMENT FORUM

## MINIMAL FORCE OPTIONS

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JANUARY 2003

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# REPORT ON THE SECOND INTERNATIONAL LAW ENFORCEMENT FORUM

# MINIMAL FORCE OPTIONS

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JANUARY 2003

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THE PENNSYLVANIA STATE UNIVERSITY



**2002 International Law Enforcement Forum  
MINIMAL FORCE OPTIONS**



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The Second International Law Enforcement Forum on Minimal Force Options was sponsored by the Pennsylvania State University and held at its University Park Campus on October 29 & 30, 2002.

Given the recent increase in global terrorism, the need exists for effective and safe techniques that can deal with belligerent crowds and individuals who exploit innocent bystanders for concealment or hold them hostage. Our aim is to provide a scientific basis for understanding the options, technologies, and tactics being contemplated. It is our view that the pursuit of minimal force options, the policy and legal aspects of developing and employing such technology, and the surrounding debates, should be conducted on the basis of existing facts from scientific literature.

The content of this report is not intended to represent any policy and/or official position of The Pennsylvania State University or of the governments of the United States, the United Kingdom, Canada, or any of their affiliated agencies.

Although the conclusions and recommendations are based upon a general consensus of the participants, they do not necessarily reflect the views of all of the participants and/or the agencies they represent.

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Comments pertaining to this report are invited and should be forwarded to the Institute for Non-Lethal Defense Technologies, Applied Research Laboratory, the Pennsylvania State University, P.O. Box 30, State College, PA 16804-0030.

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January 2003

## **2002 International Law Enforcement Forum MINIMAL FORCE OPTIONS**

### **PREFACE**

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The success of the First International Forum on Law Enforcement held at Penn State in April 2001 prompted our United Kingdom colleagues to request that Penn State host the Second International Forum in 2002 to focus on less-lethal and minimal force concepts, technologies, and deployment at the practitioner expert level.

Participation in the forums has been by invitation only to assemble a select group of internationally recognized law enforcement representatives from the United Kingdom, Canada, and the United States. Participants also included blunt trauma medical experts and representatives from government agencies involved in related scientific development and testing, including the human effects associated with the use of less-lethal technologies.

The 2002 International Law Enforcement Forum was sponsored by Penn State's Applied Research Laboratory (ARL), Dr. Edward G. Liszka, Director, and its Institute for Non-Lethal Defense Technologies (INLDT), Colonel Andrew F. Mazzara, USMC-Retired, Director. The Forum was co-chaired by Mr. Colin Burrows, former Chief Superintendent Police Service of Northern Ireland, and Dr. John Leathers of Penn State's Applied Research Laboratory.

This report is a summary of the Forum discussions and the associated conclusions derived by the sessions. The meeting more clearly framed some of the generally accepted concepts in this field, yielded some new insights, and furthered the broader understanding of the intent of less-lethal weapons. The forum makes recommendations for further work, specifically in relation to data collection and the establishment of working groups in respect of operational needs and monitoring of human effects.



Participants in the 2002 International Law Enforcement Forum pause for a group photograph at the Nittany Lion Inn. A list of participants is at Appendix C.

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## **2002 International Law Enforcement Forum MINIMAL FORCE OPTIONS**

### **EXECUTIVE SUMMARY**

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Increased interaction between the police and friendly, neutral, or hostile individuals or crowds has become a feature of the contemporary urban landscape. This is likely to remain the case for the foreseeable future. Minimal force options expand the number of choices available to law enforcement confronting situations in which the use of deadly force is considered inappropriate.

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The 2002 Forum addressed, as a matter of urgency, many issues related to less-lethal and minimal force option concepts, technologies, and deployment. The delegates explored capabilities and medical assessments, information sharing, and the development of common standards for less-lethal weapons development, testing, training, and use. The presentations and the Group Sessions are detailed in the following text. The major recommendations are:

- *Develop a Less-Lethal Database.* Create a task force or working group to reach consensus on approaches to creating a coordinated retrospective and prospective database on operational uses.
- *Develop an Injury Database.* Create a working group to develop an international approach to the recording of injury effects of less-lethal weapon usage. This would include the adoption of an agreed upon scoring system, such as that exemplified by the Abbreviated Injury Scale (AIS), to facilitate the collection of data on injuries.
- *Define Operational Needs.* Establish a small core group that puts numbers to measurable (time, distance, and space) parameters that define operational needs. These operational “parameters” should be broadly defined in order to provide flexibility to support different applications and different scenarios. This needs to be a small group, with funding, and a charter to describe a certain number of quantifiable requirements.
- *Develop Standards for Testing and Training.* There is a need to develop and routinely review international standards for both testing and training of less-lethal weapons. This will require resource investment from federal, state, and local law enforcement activities; law enforcement associations and organizations; less-lethal technology manufacturers and distributors, and researchers.
- *Conduct Independent Assessments.* There is a continuing need for independent assessment of the tools and tactics associated with the issues of less-lethal and minimal force option concepts, technologies, and deployment. Periodic assessments conducted by non-biased experts will assist the law enforcement community in developing meaningful concepts of operations with less-lethal applications. Assessments can also create meaningful specifications at the beginning of the

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research and development process and help define the potential for that particular technique. Assessments can provide developers with succinct sets of specifications that are based on testable user needs early in the development process. With a good set of specifications, the developer could focus on a development process that is supported by a meaningful test program. With a solid set of specifications and description of associated technical risk, testing and development cost projections could be much more accurate.

- *Designate a National/International Less-Lethal Weapons Center for Testing and Training.* Establish a Center for research, development, independent testing, and training for Less-Lethal technologies. The Center would serve as a focal point for examining technologies, tactics, and public policy issues related to the deployment of less-lethal weapons.

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### **INTRODUCTION**

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#### **Background**

Increased interaction between the police and friendly, neutral, or hostile individuals or crowds has become a feature of the contemporary urban landscape. This is likely to remain the case for the foreseeable future. Two factors account for this development. First, worldwide patterns of population growth and migration have resulted in increased urbanization, not only within the established industrialized states, but also in many undeveloped and developing societies. The urbanization of many crisis-prone regions of the world creates the potential for varying degrees of social unrest and consequently large, vulnerable groups of civilians caught up in confrontations involving lawful authority and lawbreakers. Additionally, “one-on-one” encounters between police and unduly aggressive individuals raise concerns for both public and police safety. In such situations, the use of deadly force is considered the last resort. To ensure the well-being of all parties, particularly innocent bystanders, the availability and application of less-lethal technologies provides the police a range of minimal force options that permit appropriate means by which they might achieve a positive outcome for all involved.

Minimal force options expand the number of choices available to law enforcement confronting situations in which the use of deadly force is considered inappropriate. They provide flexibility by allowing police to apply appropriate force with reduced risk of serious injury or fatalities, but in such a manner as to provide protection of the public and effect compliance. Because they can employ these minimal force options at a lower threshold of danger, police can respond to an evolving public security or safety threat more rapidly. This allows both local and national police organizations to retain the initiative and reduce their own and the public’s vulnerability. Thus, a robust capability in this area will assist in bringing into balance the conflicting requirements of public order, public protection, and the safety of the police. And it will enhance the utility and relevance of appropriate force as a legitimate policy option in a potentially complex and chaotic social environment.

The principles of proportionality and necessity underpin and reflect the desire to minimize unnecessary injuries and/or fatalities and unwanted property damage and to preserve the integrity of police operations. Despite best efforts, however, we are not always able to eliminate the possibility of unintended consequences without placing the public, the police or the operation at risk. When such consequences occur, even as the unavoidable result of actions taken under clear public order necessity, they are usually widely reported by networked media organizations. Such reporting often creates considerable local, international, or domestic



The Media has significant influence on public perceptions of less-lethal weapons and minimal force options.

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responses. This can result in the loss of perceived legitimacy and severely limit the utility of minimal force as a policy option in the furtherance of public order interests.

Penn State's Applied Research Laboratory (ARL) has been helping U.S. law enforcement and military agencies develop an information base on which to make decisions about minimal force options for conflict resolution since 1997. In October 2000, ARL's Institute for Non-Lethal Defense Technologies (INLDT) published a report on a literature search entitled *The Advantages and Limitations of Calmatives for Use as a Non-Lethal Technique*. This report highlighted the pharmacological effects of calmatives, including a discussion of pharmacokinetic and pharmacodynamic principles of drug action in the central nervous system. Notwithstanding the indiscriminate nature of calmatives, the challenges of dose response, and necessity for responsive medical attention, researchers identified several drug classes that showed promise as a less-lethal technique.



Applied Research Laboratory at Penn State

In January 2001, INLDT published its Human Effects Advisory Panel (HEAP) report on Crowd Behavior, Crowd Control, and the Use of Non-Lethal Weapons. This report summarized the myths and facts of crowd behavior and outlined a decision-making guideline for crowd control that emphasizes prevention rather than confrontation. The report also reviewed education and training guidelines for crowd control.

The Institute (INLDT) published its widely distributed report *The Attribute-Based Evaluation (ABE) of Less-Than-Lethal, Extended-Range, Impact Munitions* in February 2001. This report was a collaborative effort with the Los Angeles Sheriff's Department to characterize blunt impact munitions with regard to accuracy and imparted momentum. The report has since served as an independent preliminary evaluation allowing law enforcement officials to make more informed decisions about appropriate less-lethal munitions.

Numerous nations around the world are beginning to explore and expand the range of minimal force options for improved public safety and public order. The US and UK law enforcement communities have cooperated for several years in developing a common understanding of operational needs in this area. The first International Forum on Minimal Force Options conducted at the Pennsylvania State University in April of 2001 served to define principles for use of minimal force options and to capture operational needs.



The INLDT evaluation of less-lethal impact munitions was published in February 2001.

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In 1999, Penn State and the Los Angeles County Sheriff's Department (LASD) hosted the United Kingdom's International Commissions on Policing in Northern Ireland in Los Angeles. The Commission was chaired by Mr Chris Patten (now Sir Chris Patten). The Commission reviewed the less-lethal programs and activities of LASD and Penn State, including the opportunity to fire a variety of less-lethal weapons. The implementation of the Patten recommendation in Northern Ireland, together with the desire by Government and the police services across the United Kingdom to research less lethal weapons as part of a co-ordinated and structured approach to the management of conflict has been central to the development of this international forum.

The growing level of violence associated with the anti-globalization protests and the War on Terrorism provide a more immediate sense of urgency for identifying broadly accepted (international) approaches for minimal force options.

### **Procedures**

The forum brought together senior and internationally recognized law enforcement representatives from the United Kingdom (UK), Canada, and the United States (US). The participants also included policy-makers, and medical experts versed in various aspects of less-lethal technologies and their applications. The Forum gathered to address less-lethal and minimal force option concepts, technologies, and deployment. The delegates examined gaps in capabilities and medical assessments, information sharing, and the development of common standards for less-lethal weapons development, testing, training, and use. The specific objectives of the 2002 Forum were to:

- Establish common orientation on public order and public safety
- Validate previous work by the Forum on operational needs
- Examine new concepts for minimal force options
- Assess new technologies for less-lethal and minimal force options

The workshop was conducted at the Pennsylvania State University on 29 and 30 October, 2002. The workshop began with introductory remarks and a keynote address. The group was updated on LLW initiatives in both the US and UK. These presentations appear in Section 2 of this report. Part of this update included the research being undertaken in the UK in respect of less-lethal weapons and alternative approaches to the management of conflict (a copy of the Phase 3 report on this research can be found at the Northern Ireland Office web site at: [www.nio.gov.uk/pdf/p3rep1202.pdf](http://www.nio.gov.uk/pdf/p3rep1202.pdf)).



“Old Main” at Penn State

After completing a less-lethal weapon (LLW) overview and briefings, the group participated in four breakout sessions (two on the first day and two on the second day). These sessions addressed current operational and technological limitations; effectiveness and medical issues; acceptability criteria, public policy, and legal issues; and less lethal tactics and procedures.

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### **Major Issues, Discussions, and Recommendations**

The discussions highlighted many more commonalities than differences in approaches to less-lethal weapons. The participants agreed that the law enforcement community has been excessively dependent upon manufacturers when identifying and selecting appropriate less-lethal systems. Although there was broad consensus on the main uses of less-lethal weapon systems, there was some disagreement with regard to the number of systems that should be made available to officers, largely based on culture differences. This debate centered on striking a balance between providing an officer with sufficient less-lethal options and overwhelming him with options to the extent that it detracts from his decision-making capability.

Commensurate with the growth in the use of less-lethal systems is a developing legal framework both in the UK and in North America. In the US, civil rights legislation is broadly equivalent to the Human Rights Act in the UK. The differences in how the legal frameworks are developing derive largely from the history of the use of lethal force in both regions (police officers in the US and Canada are routinely armed but in Britain, the police have traditionally been unarmed). In the UK, the development of less-lethal approaches and minimal force options ensures compliance with Human Rights legislation and is being actively pursued under the collective auspices of guidance prepared by The Association of Chief Police Officers. However, in the US guidance is a local issue and the boundaries of acceptability of use seem to be largely defined by how the courts deal with inappropriate or improper deployment of less-lethal weapons.

#### *Current Operational and Technological Limitations.*

This session was asked to address questions regarding existing operational and technological limitations of Less-Lethal Weapons (LLWs). There was consensus that a “one solution fits all” approach would unnecessarily limit technological development and operational capability. Accuracy was deemed an essential issue in all situations. Regarding blunt impact munitions in particular, accuracy included the ability strike an identified aggressor while minimizing the probability of upper body strikes or impacts on unintended persons. The delegates agreed that both intrinsic ammunition consistency and practical accuracy were important.



There is a need to develop operational parameters for a broad range technologies and scenarios.

The group recommended that an agreed set of operational parameters or guidelines should be developed by a joint working group. These would provide flexibility to support different applications in different scenarios. It was also felt that there should be emphasis placed on better understanding crowd behavior.

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*Less-Lethal Weapons Effectiveness and Medical Issues.* This session focused on the effects of less lethal weapons and medical issues related to their use. The group agreed early on that it was not practical to define the less-lethal quantitatively, but that serious injury potential might be better characterized by drawing on the abbreviated injury scale (AIS) developed for Association for the Advancement of Automotive Medicine. It was also agreed that with many existing less-lethal weapon systems, there was insufficient independent data about both effectiveness and medical outcomes. For impact weapons, a single figure of kinetic energy was determined not to be an appropriate measure of injury potential since there are several other factors that must be taken into account.

There are a variety of desired LLW effects. The group thought pain, incapacitation, and distraction to be most significant, though psychological issues were also deemed important. The group recognized that each of these effects had limitations based on the situation and the state of the subject, but that ultimately, achieving compliance was the goal. In this regard, identifying vulnerable groups and understanding potential effects was judged important.

The group recommended that a working group be established to reach consensus on common approaches and to explore the prospects for better data gathering, archiving, and information sharing.

*Acceptability Criteria, Public Policy and Legal Issues.* As noted previously, there are different approaches to accountability internationally. In the US, accountability tended to be of a post facto nature, such as challenges in the courts. And although the International Association of Chiefs of Police (IACP) has circulated a model policy on the use of force, the policies adopted by the over 19,000 law enforcement agencies in the US can differ significantly. Some of these differences can be attributed to regional experiences with LLWs and cultural differences. In Canada, a more legislative approach is taken, directing individual police departments to ensure an appropriate capability. It was agreed that it is important to make information proactively available to the public, including guidance, although there were likely to be aspects such as tactics and procedures that would not be released unless it became essential. This group again endorsed the need for a small task force to look at common standards for operational requirements.



Differences in regional experiences account for some differences in public perceptions of less-lethal weapons.

*Less Lethal Tactics and Procedures.* This group looked at issues such as training and guidance for operational deployment. It noted that in the US a much higher proportion of all police officers were trained in the use of less lethal weapons, although generally, this was limited to only basic-level training. Also, a wider range of weapons could be used by more junior officers without recourse to senior commanders. On the other hand, the UK's formalized process of Gold, Silver and Bronze command structures (role rather than rank based) is believed to be a major



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contributing factor in improving less-lethal weapons usage in pre-planned or protracted situations. It was important that officers at all levels did not have unrealistic expectations of their effectiveness. Again, it was agreed there is a need for better and timelier information about the effect of using less-lethal weapons. Finally, the group felt that there was real value in an international forum to exchange and explore law enforcement agencies' tactics, techniques and procedures. The formation of such an international organization was strongly recommended.

### **Summary and Conclusions**

The 2002 Forum addressed, as a matter of urgency, many issues related to less-lethal and minimal force option concepts, technologies, and deployment. The delegates explored capabilities and medical assessments, information sharing, and the development of common standards for less-lethal weapons development, testing, training, and use. Each of the following sections of the report details more specific results of each session, including a more comprehensive list of recommendations. There are a number of salient issues that require some action, however, the more urgent of these include:

- *Develop a Less-Lethal Database.* Create a task force or working group to reach consensus on approaches to creating a coordinated retrospective and prospective database on operational uses.
- *Develop an Injury Database.* Create a working group to develop an international approach to the recording of injury effects of less-lethal weapon usage. This would include the adoption of an agreed upon scoring system, such as that exemplified by the Abbreviated Injury Scale (AIS), to facilitate the collection of data on injuries.
- *Define Operational Needs.* Establish a small core group that puts numbers to measurable (time, distance, and space) parameters that define operational needs. These operational "parameters" should be broadly defined in order to provide flexibility to support different applications and different scenarios. This needs to be a small group, with funding, and a charter to describe a certain number of quantifiable requirements.
- *Develop Standards for Testing and Training.* There is a need to develop and routinely review international standards for both testing and training of less-lethal weapons. This will require resource investment from federal, state, and local law enforcement activities; law enforcement associations and organizations; less-lethal technology manufacturers and distributors, and researchers.
- *Conduct Independent Assessments.* There is a continuing need for independent assessment of the tools and tactics associated with the issues of less-lethal and minimal force option concepts, technologies, and deployment. Periodic assessments conducted by non-biased experts will assist the law enforcement community in developing meaningful concepts of operations with less-lethal applications.

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Assessments can also create meaningful specifications at the beginning of the research and development process and help define the potential for that particular technique. Assessments can provide developers with succinct sets of specifications that are based on testable user needs early in the development process. With a good set of specifications, the developer could focus on a development process that is supported by a meaningful test program. With a solid set of specifications and description of associated technical risk, testing and development cost projections could be much more accurate.

- *Designate a National/International Less-Lethal Weapons Center for Testing and Training.* Establish a Center for research, development, independent testing, and training for Less-Lethal technologies. The Center would serve as a focal point for examining technologies, tactics, and public policy issues related to the deployment of less-lethal weapons.

*“[Less-lethal force] is the application of tactics and technologies which are less likely to result in death or serious injury than conventional firearms.”*

*Dr. John Leathers  
Applied Research Laboratory  
Penn State*

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## **2002 International Law Enforcement Forum MINIMAL FORCE OPTIONS**

### **SESSION 1 - Current Operational & Technological Limitations**

#### **CHAIR: Major Steve Ijames**

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The purpose of this Session, led by Major Steve Ijames of the Springfield Missouri Police Department, was to address questions regarding existing operational and technological limitations of Less Lethal Weapons (LLWs). Focus questions for all sessions are at Appendix B.

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#### **Operational Priorities**

First, the group sought to identify the most common operational applications of LLWs and needs and to prioritize them. Generally, these included scenarios where law enforcement officers are required to deal with (1) individuals and (2) groups.

Within each of these two categories, officers may have to employ technologies to handle the relatively benign or the extremely volatile. For example, a peaceful crowd may require minimal amounts of control in order to sustain public safety, whereas an aggressive mob might require a more intrusive, and on occasion more forcible, intervention.

Likewise, a somewhat rational but determined individual might be dissuaded merely with the threat of intervention, while an irrational (emotionally disturbed or drug induced) individual might require more assertive action which may include appropriate use of a less-lethal technology.

Effectiveness of a specific technology must also be defined with regard to the context in which the technology will be applied. Less-lethal weapons are



Major Steve Ijames of the Springfield, Missouri Police Department.

mainly, though not exclusively, used in situations where the subject does not have a firearm.

There are a number of likely scenarios for employing less-lethal weapons and other less-lethal technologies. Despite efforts at categorizing scenarios, the situations listed are unlikely to be all-inclusive. There will always be nuances that will distinguish a scenario distinctly and alter the conditions upon which the application of force decision is appropriately made.

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1. *Single Aggressor.* Often armed with blunt, edged, and/or improvised weapons, these individuals include those who threaten themselves and those who threaten others.

- Mentally deranged or disordered individuals (suicidal/self-mutilating) with a potentially lethal weapon (often referred to as a special population group or emotionally disturbed person);
- Under the influence of alcohol/drugs;
- An otherwise stable person with a weapon who won't put it down.

2. *Barricaded suspect.* This routinely involves an individual suspected of a serious crime;

3. *Non-compliant groups.* These groups can range from strictly passive noncompliant groups to overly aggressive and even combative groups or gangs requiring some form of control or intervention.

4. *Hostage taking.* This scenario involves armed groups or individuals. Whether the intent is criminal or terrorist (political), there is the potential for multiple hostage takers and any number of hostages. These situations may require less-lethal distraction and/or disorienting devices;

5. *Serious Public Disorder.* This scenario involves modifying the behavior of groups to prevent aggressive, violent action that may cause serious injury or property damage. On the one end, managing a crowd requires lesser forms of control to ensure the crowd does not escalate into a mob. When a mob evolves and develops, a more intrusive and serious intervention may be required. Controls

and interventions might include less discriminatory low injury potential systems to aid area denial, and dispersal of the violent crowd.

*Electrical Incapacitation Devices (EIDs).* The group considered that the effect provided by EIDs in terms of immediate incapacitation of the individual, opportunity for controlled restraint (handcuffing) of the subject, and near-immediate recovery was ideal.

The TASER was considered by most to be effective across a broad spectrum of "individual subject" groups. Used mainly in close-quarter containments against stationary subjects, some in the group expressed concern about TASER operational accuracy beyond 14 feet. Additionally, the need to ensure that both barbs of the TASER became attached was considered an operational limitation (especially for heavily clothed individuals commonly encountered in many jurisdictions during colder months of the year).

It was noted that the "pistol-like" design of the M26 TASER enhanced its ergonomic design. That same design, in certain circumstances however, could cause the TASER to be confused by both officers and suspects as a conventional firearm, particularly in poor light.

The overt carriage of both a holstered M26 TASER and a conventional self-loading pistol provided the potential for officers to mistakenly draw and use the wrong weapon in the stress of an operational encounter. It was understood that there may have already been several cases where officers have discharged their pistol mistakenly, when their intent was to fire the TASER.

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However, it was also acknowledged that standardized operational procedures, training, and color differentiation could reduce the potential for such incidents. Regardless of these limitations, the group generally considered the TASER a useful less-lethal weapon due to the short term, predictable nature of subject incapacitation and the reversibility of its effects.

*Blunt Impact Munitions.* The group largely agreed that baton round systems offered the ability to deliver a blunt impact out to extended ranges (50 meters) and bean bags/sock rounds had utility at medium ranges (10-30 meters).

Most baton round systems could not be used at close range owing to the increased velocities at close range and there were concerns about accuracy at longer range. However, it was noted that the L21 baton round system recently issued in the UK could be used from one meter out to 50 meters and had a high degree of accuracy and consistency not previously encountered

Some North American law enforcement departments insist that less lethal shotgun munitions should only be fired from dedicated, specially-colored shotguns. This allows the officer to quickly distinguish a less-lethal device from lethal. It also demonstrates to the subject(s) that they are facing a less-lethal force option. On the other hand, some departments allow mixing and matching of conventional and less-lethal munitions from the same weapon. This decision is made at the department level based on local needs and capabilities. On a broader scale, less-lethal weapons must strike a balance between having too few options to having too many. The determination of which system to

employ must consider expected operational challenges, police officer technology preferences, officer training programs, officer tactical load-carrying capacity, and local acceptability issues. The key issues with impact rounds are the accuracy and predictability of impact to the lower part of the body. It is essential to have systems and firing procedures which significantly reduce the potential for impacts to the cardiac area or to the head. Aiming for the belt buckle region is becoming a more widespread operational practice.

*Crowds.* In a crowd or mob situation, any device having a practical effect on an aggressor will also potentially have a psychological effect on the crowd. However, the legal and tactical justification for use of discriminatory and indiscriminate weapons may be very different. Where it is necessary to target an individual either in a one-to-one situation or in a crowd situation, accurate targeting of the individual aggressors is a priority.

*Effects.* Impact rounds are unlikely, and not designed, to immediately incapacitate although they commonly inflict pain sufficient to make a rational person desist in their aggressive intent. Pain compliance as a concept has both strengths and weaknesses. Although generally considered an effective method to elicit compliance, there is a reduced effect on highly motivated or emotionally disturbed individuals, or on those under the influence of alcohol or drugs. Additionally, with regard to public acceptance and maintaining the moral high ground, the application must not simply be as an 'attention gainer' or appear to be in any way punitive in nature. There are a number of North American agencies that still use wood

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skip fire (Ricochet rounds). By and large, the group considered these problematic with regard to unintended effects. A broad understanding is needed of what effects/results will be achieved for a particular weapon system. It was agreed the effect / injury potential of Impact rounds can not be determined solely by reference to kinetic energy figures - other factors must be taken into account. References to notional maximum kinetic energy figures are misleading.

*Reasonable Force Guidance.* “Rules” or overly restrictive guidelines can actually hinder the effectiveness of police on the street where officers are trained and expected to use high levels of discretion and creativity of approach. The group did not favor military terms such as “Rules of Engagement (ROE),” preferring terms that reflect informed empowerment such as “guidance on use.” Although interpretations vary among departments and there are cultural differences both regionally and internationally, it was agreed that generally a higher degree of officer empowerment based on training level and individual skill should be considered. Commensurate with this empowerment, therefore, is public expectation that police officers are properly trained to act reasonably. It is important in any community that there is public confidence that any application of force by law enforcement officers will be proportionate to the harm to be prevented. Questions officers might ask include:

- “Am I facing imminent danger of death or injury?”
- “Is lethal force necessary?”
- “Would less-lethal be appropriate?”

### **Less-Lethal Scenarios**

There is actually a spectrum of LLW scenarios – a portion of which falls into a gray area, where the appropriate measure of force may not be entirely clear. Some of this ambiguity lies in the context of the situation and some lies in cultural and political traditions.

Regardless of this ambiguity, there was consensus that shooting to wound with conventional weapons was not a professional or responsible response in a less-lethal weapon situation.

In the US, it is possible for the senior officer on the scene to declare an unlawful assembly and order a crowd to disperse. After declaring “unlawful assembly,” the use of tear gas or OC (oleoresin capsicum) would then be considered. It is also an offense in certain circumstances to cross a taped police line. In the UK, there are similar powers under Section 12 of the Public Order Act. However, this applies only in Great Britain, not in Northern Ireland. If a crowd has demonstrated threat and capability, then some action must be taken. If space and location required for reasonable standoff and control are breached, then action needs to be taken to neutralize the threat and maintain distance.

### **Performance Parameters**

Although the required performance parameters of a particular less-lethal weapon are arguably different given the operational situation, the expected performance should fall within a narrow, but measurable, band of excellence.

The *accuracy* requirements in a crowd scenario should be the same as that for a single subject scenario. These

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requirements will certainly vary based on the particular system, but should essentially allow an officer the ability to place the impact in the appropriate part of the body.

Both intrinsic ammunition consistency (laboratory bench testing) and practical accuracy (laboratory and operational field testing) are important – accuracy needs to be tested both in the laboratory setting and in the hands of real police officers. The performance of ammunition fired from bench-mounted weapons should be within specified parameters. Operational testing in the field should be at 85-90% with trained officers. The UK's L21 baton round provided the standard to be matched internationally in terms of accuracy and consistency (i.e., where firers are required to demonstrate an ability to achieve an eight inch group at 20 meters with the L21 baton round before qualifying with the weapon system).

In addition to ballistic consistency, there should be demonstrable consistency and quality of performance for the system with regard to muzzle velocity, projectile mass, and munition stiffness (these factors also affect flight and terminal ballistics as well as inherent accuracy). It also will require human effects assessments to determine the appropriate "target area" for the munition/device. For example, delegates from the both the US and UK indicated that they were using the belt buckle region as an aim point for impact rounds, whereas those from Canada were aiming for center body mass.

### **Operational Voids**

There are a number of operational scenarios that exist for which there is currently only a limited array of effective, reliable, commercially available, and acceptable LLWs.

*Hostage Situations.* There are existing less-lethal technologies that provide some options, but these options are mainly distraction/disruptive-oriented. A barrier (possibly chemical) that can be deployed and removed quickly for keeping people in buildings would be useful in some situations. Additionally, a safe and effective method to remotely incapacitate hostage takers could negate the necessity of lethal force in some situations. The 2002 Moscow Theater scenario was discussed at some length. The concept of rendering everyone (hostages and terrorists) unconscious is an ideal situation from the perspective of rescue operations. However, there are inherent challenges with regard to using incapacitating/calmative agents in gaseous/aerosol form. The problems associated with applying a proper dosage across a broad demographic spectrum in these situations are complicated by dispersion challenges (concentration "pockets") associated with a particular facility and its ventilation system, temperature, humidity and myriad other variables. Despite these challenges, this is an area that deserves further focused research.

*Public Order.* Portable barriers are needed for restricting and/or preventing access in public order situations. Incapacitant spray is the only LL option encouraged to be used without deadly force cover. When other forms are used, most US police departments require lethal over-watch. Water



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cannons may be effective for intermediate levels of public disorder, but not suitable if firearms or explosive devices are present. Maneuverability and water container refill are constraints. Water cannons have recently proved effective in Northern Ireland and have also been used in Canada.

*Emotionally Disturbed Individuals in Buildings.* Even as police have tactics and equipment for making forcible entries into buildings, there is also a requirement for a technology to keep someone who is armed from coming out of a building prematurely. In certain scenarios, this may require police to act prior to executing other crisis resolution options.

*Vehicle Stoppage.* A number of contractors have worked different technologies for stopping vehicles (e.g., stop sticks/stinger/dragon teeth). The subjects in these cases may be a determined armed criminal or youths in stolen cars (joy riders). The tactic of boxing a car while moving with close proximity police vehicles has proven to be effective in the UK, but requires skilled, trained drivers. Additionally, this method works relatively well in a rural setting, but not in an urban environment. There remains a significant and unmet requirement for law enforcement.

### **Crowd Standoff**

There are some systems available to keep violent crowds outside of missile throwing distance (e.g., petrol bombs, bricks, rocks, etc.), which is generally accepted to be up to 50 meters. Static police lines are difficult to defend. Most departments generally prefer to keep a

crowd on the move, when feasible, and work to disperse the crowd.

Baton rounds and water cannons seem to be the most effective options to control/modify crowd behavior and maintain standoff, when necessary. Both of these options carry significant political baggage with them (baton rounds in the UK and water cannons in the US), which may place operational constraints on their use. Tear gas has been used successfully however, its indiscriminate qualities can be problematic in certain situations.

Internationally, both CS (ortho-chlorobenzylidene-malononitrile) and CN (chloroacetophenone) are used as the irritant however CN is not approved for use in the UK. Though their effects are largely considered transient, work needs to be done on delivery systems and in quality control of the manufacturers' products. Flash/bang grenades, normally used in hostage situations, have also been used in a number of crowd situations (e.g., Tucson) to prevent police lines from being overrun. Physical barriers are also important, but can be turned to a disadvantage in a riot/mob dispersal scenario. Barriers must be monitored to be effective. Barrier plans and the method by which they should be monitored/covered must be judicious and consider good intelligence.

In these situations, pre-event intelligence gathering is very useful. Intelligence and photographic evidence needs to be integrated into the entire process.

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### **RECOMMENDATIONS**

- Develop a broad set of operational “parameters” that are broadly defined. This will provide flexibility to support different applications and different scenarios.
- Develop comprehensive measures of effectiveness for LLW performance, gain consensus, and conveyed to manufacturers.
- Define Operational Parameters. Weapon selection required to be mission appropriate. There will be different missions, different processes, different parameters - these need to be defined.
- Develop impact rounds with improved accuracy and discrimination. The US and Canada would like to see a more accurate and consistent kinetic energy round than is currently available to them. The rounds should be sufficiently accurate to avoid vulnerable area of the body (head and upper chest/cardiac area) out to 50 meters.
- Work required on more discriminate and appropriate delivery systems for OC/CS in public disorder scenarios
- Identify/develop LLWs that allow officers to discriminate the application of LL force accurately against targeted individuals.
- There is a need to agree internationally on the ideal criteria for less-lethal weapons in terms of operational distance, nature of effect, and required duration.



Major Mark Lyons of the Joint Non-Lethal Weapons Directorate and Mr. Colin Burrows, former Chief Superintendent, Police Services Northern Ireland.

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### **SESSION 2 – Effectiveness and Medical Issues**

#### **CHAIR: Dr. Graham Cooper**

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The purpose of this Session, led by Dr. Graham Cooper of the UK's Defense Science and Technology Laboratory, was to address questions regarding LLW effectiveness and any related medical issue.

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#### **Defining “Less Lethal” and “Serious Injury”**

The group quickly reached consensus that a narrow, quantitative definition of “Less Lethal” is not practical or necessary. There is a general lack of good data available, particularly with regard to new technologies.

Additionally, the group generally felt that any restrictive definition might constrain the use of LLWs and may lead to unwanted hierarchical approaches to their use based on unreliable quantification. Anything that could take the decision-making away from the officers on the street was viewed by the group to be counterproductive. Finally, a narrow definition did not appear to the group to further the understanding or development of less-lethal technology or procedures, yet could contribute to, and in some instances be the catalyst for, after action second-guessing. The conclusion was that there was no merit in attempting to quantify “less-lethal.” Officers must use what is reasonable in a given situation.

One challenge in defining “serious injury” is that the definition of this term really depends on the frame of reference (spanning from that of the victim to the trauma surgeon). The group determined that it would be most

appropriate (and consistent) to use the initial medical responder's assessment of an injury. For serious injury, the type of approach exemplified by the Abbreviated Injury Scale<sup>1</sup> (AIS) could be adapted for diverse technologies – and the group agreed that it could be accomplished. Yet there is still need to use a less quantitative, consensus clinical view: scoring is not a panacea, but it is useful in comparing systems.

#### **Measuring Injury Potential**

The discussion on the most appropriate parameters for determining injury potential focused on kinetic energy (impact) weapons and munitions. The delegates from both the UK and the US agreed that a single figure of kinetic energy (KE) is not an appropriate measure for injury potential. There are several things critical to measuring injury risk that are not addressed by a single KE figure:

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<sup>1</sup> The Abbreviated Injury Scale (AIS) is an anatomical scoring system that provides a method of ranking the severity of injury. The AIS is monitored by a scaling committee of the Association for the Advancement of Automotive Medicine. Injuries are ranked on a scale of 1 to 6, with 1 being minor, 5 severe and 6 a non-survivable injury. This represents the ‘threat to life’ associated with an injury and is not meant to represent a comprehensive measure of severity.

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- Nature of the projectile (stiffness; area of contact; etc.)
- Anatomical location of impact – some areas are more vulnerable than others.
- Weapon system functionality, accuracy, and reliability (these determine the probability of hitting vulnerable areas)

The group recommended that the forum find a better term than “incapacitation” for rendering an individual incapable of continuing a malevolent act. The group discussed a number of terms including “debilitation,” however, it is important to ensure that the term reflects the underlying goal of compliance.

Pain may lead to debilitation, which may, in turn, lead to incapacitation and compliance. There is an enormous psychological component that must be considered when implementing any option that includes pain to force compliance. Pain is not necessarily the principal or sole driver for effectiveness. There are often better options, but the choice from among these options largely depends on the circumstances. An officer may not be able to rely on pain, or fear of pain, to change an individual’s behavior (e.g., an emotionally disturbed person or someone under the influence of alcohol and/or drugs). In certain situations, then, physiological incapacitation in which there is a direct and unequivocal effect on normal physiological function is necessary (e.g., stimulation of muscle by a TASER).

"In the US we don't test enough; in the UK you test too much."  
– US Delegate

### **Medical Issues for Human Safety Testing**

It is a fairly simple task to declare that the safety of less-lethal weapons, for both the intended subject and the operator, is an important issue. It is much more difficult to actually identify those potential injuries (hazards) and the probability of the adverse effects occurring (risk), especially given new and emerging technologies. The assessment frequently involves educated speculation.

The demographics of the potential subjects of less-lethal weapons span a wide range of sizes, weights, ages, fitness levels, and behavioral responses among many other variables. The subjects are frequently intoxicated with drugs or alcohol. Additionally, there may be vulnerable people exposed collaterally. This creates some challenges for developing a reliable human effects model – how do we integrate enough of these variables into a model to ensure a high confidence level in the outcome? Extrapolation of effects from animal models is very difficult due to differences in the anatomical and physiological features. It is also important to recognize that animals are models, and not mimics of human responses. Nevertheless, they do have utility for defining underlying biomechanical and physiological principles of trauma. Many models, such as some automotive injury models, are not necessarily appropriate to predict trauma from less-lethal technologies because the biomechanical interactions predicted by the models (influenced by factors such as the rate of energy transfer) are not directly relevant to high speed impacts.

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There is a significant investment required to develop models appropriate for LLW energy transfer rates and forms (electric, kinetic, chemical).

Attributing and defining human injury and operational effectiveness following the application of less-lethal weapons is problematic. Although there is a growing effort across a number of agencies to capture injury and effectiveness data on actual incidents, in most cases data is difficult to access (hidden in multiple agencies) or does not even exist. Patient confidentiality issues are very important in this regard and contribute to the challenges of capturing relevant data. Research recently initiated by the FBI at Quantico includes subject and officer questionnaires including international students, which could be a very important source of information for the less-lethal community.

Many in the group felt that tracking and attempting to identify possible long term effects of injuries from LLW was like chasing ghosts. Was the injury sustained from the less-lethal weapon truly the sole cause of the long term effect? What other variables contributed to the condition? Is the substantial investment required able to address all (or even a fraction) of future claims, both warranted and spurious? The group concluded that the investment in studies of long term effects should not be a priority – there would be far too much investment for very little effective return in second-guessing claims years from now.

It was concluded that investment of capital in laboratory-based model development and validation was required. These models should

encompass vulnerable groups, and be appropriate to the rate and form of energy transfer from LLW.

### **Psychological versus Physiological Aspects of Less-Lethal Weapon Design**

Psychological issues play key roles in the effectiveness of LLWs, and the tactics with which they are deployed. There are individual psychological issues that relate to the officers deploying the system and the subjects that are the targets of the system. There are also psychological aspects of the crowd dynamics associated with the deployment, or presentation, of less-lethal weapons. It is important to underscore that the intent, with both individuals and crowds, is to reduce the motivation and/or modify behavior.

It is important to keep the weapon design simple. On a strategic scale, it is good to have a suite of options when preparing and planning, for example, to control a crowd expected after a major sporting event. It is also important tactically to limit the options to a manageable number for the officer on the ground. This enhances the officer's decision process in difficult circumstances and enhances confidence in those weapons that are deployed. Departments need to strike a proper balance for their particular local needs. Having too few choices limits the available less-lethal options and can, therefore, place an officer and/or a subject at risk. Conversely, too many choices become tactically inefficient (load carrying capacity, decision process, etc) and can require an inordinate amount of training.

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*Special Groups.* Although there are subjects that fall into special groups (for example, emotionally disturbed and alcohol or drug-induced), the Forum concluded that the primary issues were force option selection and training, as opposed to weapons design. In this regard, there is a need to differentiate between physiology and psychology. Technologies directly employing effects on physiology are less likely to be affected by drugs, alcohol, or a subject's mental state (e.g., TASER). It is very difficult to predict or quantify impact of these "special groups" on technologies that rely heavily on human behavioral responses (psychology) as opposed to physiology, though the common expectation is that the LLW would have some reduced level of impact. If the LLW relies on pain, then one would expect a reduced effect on special groups, unless a deep visceral pain is initiated. There is a normal variation in pain response. Special groups will have a wider variation, and invariably higher pain thresholds, and thus will be less susceptible to these systems. It is therefore important to design weapons that do not rely on compliance *exclusively* through cutaneous pain. Technologies need to focus on direct physiological effects with minimal subjective modification. For those LLWs that rely on pain or the fear of pain, officers must be aware of the limitations when used on special groups.

Tactically, early intervention with less-lethal weapons is crucial and may avert the requirement for higher levels of force at a later stage. The later the intervention, the more force is required. Less-lethal weapons must, therefore, be readily available. It may also be appropriate to display or present LLWs as an initial control tactic. There is a

need to demonstrate that law enforcement has the capability and the means, but there is also a need to be cautious of sending the wrong message to both the subjects (crowd) and the media.

Ultimately, departments must use a holistic and layered approach to minimal force. Officers cannot rely entirely on pain and psychology. There must be a conventional firearms capability to reinforce the less-lethal approach. There is also a need to understand crowd dynamics and behavior to enable proactive and preventive measures to be employed rather than responsive action. Collectively, we need to understand the psychological dimensions of the use of LLWs and incorporate that understanding into the design stage. The post-deployment database discussed later in this section could be used, in part, for that purpose.

### **Predictability of Outcome**

The law enforcement community has high expectations for LLWs, both in terms of effectiveness and consequences. Education is key to controlling unwarranted expectations.

It is important to differentiate the "repeatability" of the physical functionality of a weapon and the "repeatability" of its operational effectiveness. The former might be expressed in terms of numbers of firings (e.g., in 999 out of 1000 firings during bench testing, the weapon functioned as expected). The probability of effectiveness and the associated confidence interval are much more complex. Effectiveness may need to incorporate variables that are not only difficult to measure, but inconsistent

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from situation to situation. These include distance from the subject, demographics of a subject group, subject psychological/physiological state, number of applications, training level of the officer, agent dispersion characteristics, meteorological conditions, and tactical situation intensity. Regardless, knowledge of the effectiveness and the associated confidence interval is extremely important to the officer deploying the weapon.

The level of difficulty in deriving a proper measurement of effectiveness and confidence interval will differ between categories of LLWs. While reasonably predictable effects are expected for most kinetic energy (KE) projectiles and for the TASER, for other LLWs (e.g., OC Spray - Oleoresin Capsicum, CS – Ortho-chlorobenzylidene-malononitrile and CN-chloroacetophenone) determining repeatability of effects is much more problematic. There are more complex variables to consider such as subject group demographics, associated dosage rates, and environmental conditions (wind, humidity, and temperature). Within confined spaces, the airflow through a ventilation system and within the structure will affect vapor, aerosol and gas dispersion; this may lead to non-uniform concentrations with consequences for the effectiveness and medical risks attributable to the introduced material.

The bottom line in terms of average predictability is that officers need to know the “repeatability”, but also that the required “repeatability” is situation dependent. Providing officers information on expected effects and confidence intervals must also include

the operational conditions that can impact on these expected effects (increase or reduction). They should also include the conditions which should generate a “no use” warning. The inherent lack of predictability of some LLWs and devices is yet another rationale for ensuring that officers use a layered tactical approach.

### **Impact Munitions and Multiple Applications**

There is a need to understand the effects of multiple impacts. Some LLWs are designed for multiple impacts. Additionally, LLW tactics may involve multiple impacts. It is difficult, however, to model multiple impacts even for penetrating missiles (bullets, fragments).

Currently, there is no satisfactory method to model multiple impacts or doses, either in terms of effectiveness or injury. One delegate stated that nearly 70 percent of subjects require more than one bean bag hit. How does effectiveness increase quantitatively with multiple shots? The law enforcement community needs a retrospective review of operational uses and an analysis of the data. There is no satisfactory method to assess the effectiveness escalation for multiple applications for new technologies such as the Area Denial System (ADS) because it defies quantification without operational experience. This problem is a subset of the human safety and effectiveness challenge and should be included as part of the modeling and data gathering process. It again reinforces the requirement for a coordinated retrospective and prospective database on operational uses of LLW.



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### **Medical Information and Tactical Risk Assessment**

The amount of medical information that an operational officer requires to support safe and effective use of LLWs on the streets should be limited to that required to properly (and quickly) conduct a risk assessment and act accordingly. Medical information should also be incorporated (implicitly or explicitly) in the written guidance to users. The user needs some medical information to support the use of LLWs, but not to the level of, for example, understanding how the TASER works physiologically.

At the tactical level, an officer needs to understand the expected, normal reactions to a particular technology as well as those reactions that would be considered abnormal. He should know what a specific technology does and does not do. Understanding generally what groups are medically vulnerable would assist in developing a rapid assessment of the situational risk. At the strategic level, there is a need for much more information on expected reactions, potential for adverse effects, and public perception, in order to determine appropriate technologies for patrol officer, special packages for SWAT teams, and unique operational deployments. Selected medical information should be properly woven into existing tactics and weapons training and be included as part of the training process for strategic planning.

### **Less-Lethal Weapon Post Deployment Database**

The final segment of this session addressed the need for developing and maintaining a LLW Post Deployment Database. The discussion included

information requirements and data gathering as well as design features. There are a number of purposes for the database, a number of which have been addressed previously.

The database should focus on capturing data on injuries and operational effectiveness. It should be used as only one source of information for validating injury models, because it is never likely to capture all of the necessary data, nor is the data likely to be of sufficient detail in post-deployment review to validate detailed injury models – validation must be laboratory-based where the scientific basis is auditable. However, the database would certainly offer guidance on effectiveness and could identify unexpected trauma.

There are some significant medical privacy issues that will (rightly) constrain the collection of detailed clinical data. This does not negate the usefulness of the exercise. Most people subjected to LLW will have trivial or minor injuries; there is no merit in devising a system to capture superfluous detail in these scenarios – this will undermine the support of the officers participating in the data collection. The initial data collection should be gross (such as, “no injuries”, “admitted to hospital”) and act as an “adverse event trigger” to enable the focusing of more detailed data collection on key incidents. The collection of data on “effectiveness” may need to be more universal with regard to deployment and use (plainly, collection of effectiveness data will be necessary for nearly all incidents; few incidents will lead to serious injury thereby invoking detailed data collection).

The effort could begin with a voluntary data collection program on a national

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and international level. It will also be important to agree on some definitions (the FBI National Academy, which includes US and international students, is one starting point). Data will not be perfect but it will certainly be better than ignoring the need. It was recommended that a Working Group be convened to address the design and implementation of the database.

### **RECOMMENDATIONS**

- That scoring systems, exemplified by the Abbreviated Injury Scale (AIS), be developed for less-lethal weapon technologies to facilitate the collection of data on injuries.
- Develop a better term than “incapacitation” for rendering an individual incapable of functioning normally. It is important to ensure that the term reflects the underlying goal of compliance.
- That substantial investment in speculative research addressing any long-term medical consequences of LLW is currently unwarranted, until evidence accrues that such effects have occurred and the nature of the effects
- can focus investigations and research programs.
- Refine terminology regarding repeatability. It is important to differentiate the “repeatability” of the physical functionality of a weapon and the “repeatability” of its operational effectiveness. Effectiveness may need to incorporate variables that are not only difficult to measure, but inconsistent from situation to situation.
- Providing officers information on expected effects and confidence intervals must also include the operational conditions that can impact on these expected effects (increase or reduction). They should also include the conditions which should generate a “no use” warning.
- Selected medical information should be properly woven into existing tactics and weapons training and be included as part of the training process for strategic planning.
- Finally, a task force or working group should be created to reach consensus on approaches to creating a coordinated retrospective and prospective database on operational uses.



Delegates confer on a technical point during deliberations.

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### **SESSION 3 – Acceptability Criteria, Public Policy, and Legal Issues**

#### **CHAIR: Captain Sid Heal**

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The purpose of this Session, led by Captain Sid Heal, Chief of the Special Enforcement Bureau of the Los Angeles County Sheriff's Department, was to address questions regarding Less-Lethal Weapon acceptability criteria, public policy, and legal issues.

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Potentially the most contentious issues relative to public acceptance of LLWs are those relating to the use of chemicals (particularly issues associated with "gassing"). The potential of LLWs for use as instruments of torture and potential human rights violations are also concerns of which policy makers and law enforcement officials must be cognizant. Much public resistance to these technologies is due to an enormous amount of misinformation about LLWs in the public sector. However, there are regional and national cultural mindsets that have an historical foundation which cannot be ignored.

The use of chemical (with the exception of CS and OC products) or caltative agents as a less-lethal option carries with it much controversy. Beyond the misinformation regarding the legalities of using such agents, the public is generally uncomfortable with anything labeled "chemical." Much of this anxiety derives from the terminology and its association with historically more sinister technologies such as mustard gas, nerve agents, biological toxins, and radiological devices all falling under the heading of weapons of mass destruction (WMD). This public uneasiness was most recently evidenced by the flurry of



Captain Sid Heal, Chief of the Special Enforcement Bureau of the Los Angeles County Sheriff's Department

news media coverage of the events surrounding the 2002 Moscow Theater hostage rescue operation. While the initial media blitz lambasted the Russians for the use of such chemicals, many law enforcement professionals readily admitted that since a caltative option is currently not available to agencies in the US or UK, the resulting rescue effort would likely have ended in many more casualties. Fortunately, the more legitimate media ultimately

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recognized that the concept of using such a technology is desirable, but there is a need for much more extensive research to address the issues of demographics, dosage rates, particle distribution and the challenges involved in applying agents in a closed or open environment.

Perceptions of LLWs as “indiscriminate, inappropriate, repressive” or as “instruments of torture” will surface if used *or perceived to be used* in a partisan manner or against a particular group. In Russia, South Africa, and the US, the use of dogs in race riots and the associated public media attention, has caused these intended less-lethal capabilities to carry a cultural stigma that now often precludes their use in many jurisdictions. A similar situation exists with water cannons in the US, although they have been reintroduced in Northern Ireland where such cultural stigmas do not exist. Conversely, wooden, rubber, and plastic baton rounds (including “skip fire”) are used in the US, whereas in Northern Ireland, where a number of deaths occurred as a result of the use of older designs of baton rounds (the last fatality occurred in 1989) resulted in a major research program to determine an effective and acceptable alternative to the baton round. All of these examples underscore the need for law enforcement agencies to train officers in the proper use of LLW technologies while also closely managing the public perceptions of such technologies before and after being deployed. Where inappropriate or improper use of LLWs (and by extension any use of force) occurs, the law enforcement community should accept the mistake. Additionally, agencies need to recognize, acknowledge, and inform officers and

the public on the limitations of some technologies.

Intelligent informed debate is essential to enable the public to gain a balanced appreciation of the issues. International law enforcement needs to proactively address the public acceptability issue. Focus on the appropriateness of use, professional guidelines, and training.

### **Accountability**

Although public accountability mechanisms exist in the UK, Canada, and the US, there are significant differences in approaches.

*The United Kingdom.* England and Wales have an independent Police Complaints Authority (PCA) which supervises complaint and public interest investigations. The PCA is required to issue statements of satisfaction. In Northern Ireland, there is a recently formed Police Ombudsman's Office endowed with powers of arrest and search. All use of firearms and baton rounds are automatically referred for investigation.

Throughout the UK, each Chief Constable has accountability responsibilities to the Secretary of State and/or Government Minister and a Police Authority (in NI a Policing Board). Her Majesty's Inspectorate of Constabulary will comment on force policies and procedures and carry out thematic inspections. The Police Scientific Development Branch (PSDB) of the Home Office has seconded police advisers who assist ACPO develop concepts and guidelines linked to emerging technology. There are legislative provisions now on equipment in England and Wales and on guidance

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in Northern Ireland. Public enquiries and Royal Commissions are rare, but possible.

*Canada.* Although it was understood that no national mechanisms exist, there are provincial controls (e.g., a Policing Standards Manual has been provided by the Provincial Government of Ontario which is directive in terms of capability, equipment and training for those in the Province of Ontario).

*The United States.* In the US, there is no equivalent to Independent Police Complaints Authority, Ombudsman, or Police Authorities in the UK. There are over 19,000 independent law enforcement agencies across the US. Even at the state level, it is very rare to have any proscriptive state laws governing less lethal technologies. The accountability mechanism is largely local law/statutes and criminal cases. Civil actions shape future policy. Any evidence of a civil rights violation draws in the federal (US) government, where the FBI may carry out an investigation.

Commissions in the US established by the State Governor can be very influential, such as the Webster Commission after the Los Angeles riots. Los Angeles County now has the Office of Independent Review. The US Department of Justice (DoJ) imposed what some viewed as an unprecedented requirement on the Washington, D.C. Metropolitan Police to develop and implement use of force policies and training regimes. In this instance, however, federal involvement was due to the unique nature of the District of Columbia.

Most of these advisory boards and commissions are post operational deployment activities that respond and react to perceived problems. Budgets in the US still remain fairly isolated from policy decisions relative to LLWs. In the US, there are generally fewer regulatory/accountability bodies involved with oversight of law enforcement policies at the local level. Control is predominantly exercised through the electorate (i.e., election of sheriffs and other officials). Deadly force policy in the US at the national level is a constitutional issue and has remained fairly stable. The majority of police chiefs develop "use of force" policies that are often "invisible" to the rest of government (until a problem surfaces).

The International Association of Chiefs of Police (IACP) provides model policies and updates on technology and training. The National Institute of Justice (NIJ) conducts research on new technologies, as does the US Department of Defense. Independent bodies such as The Pennsylvania State University (Penn State) contribute to, and work with, individual law enforcement departments. There is a need for national and international coordination and funding in developing integrated concepts with regard to less lethal concepts, technologies, procedures, and public policy.

"It's interesting that we're going over the ocean to get information we should have here."

-US Delegate

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### **Legal and Human Rights Challenges**

Constitutional and international human rights issues continually surface. These include, but are not limited to, torture, inhumane degrading treatment, right to life (UK term), right to family life (human rights/pursuit of happiness), right to privacy and race issues.

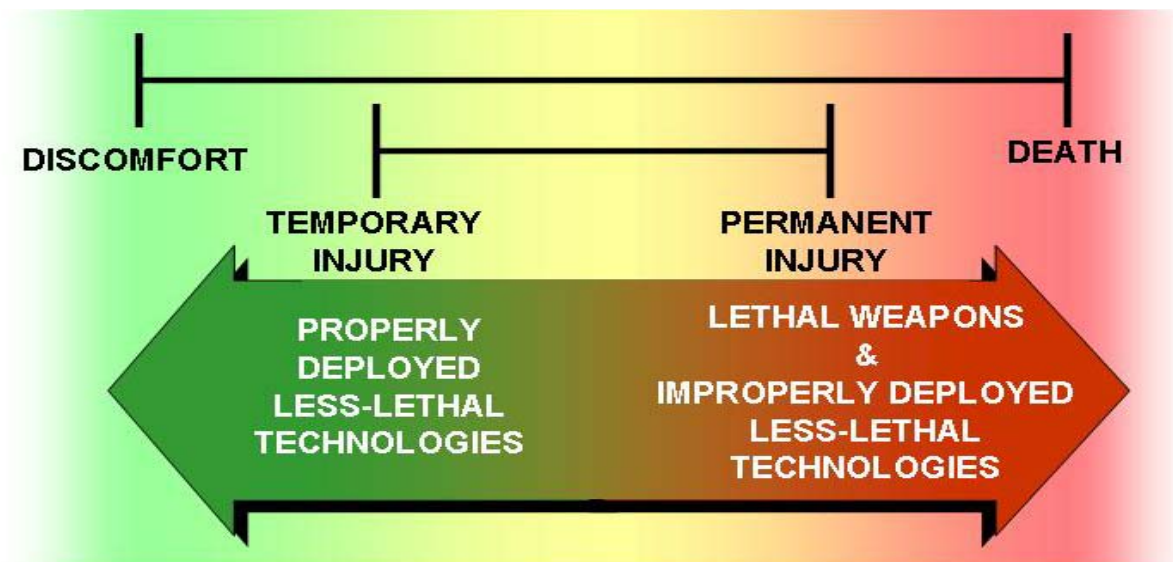
In the US, both the use of OC (oleoresin capsicum) spray and beanbag rounds has been consistently challenged in the judicial system. Nearly all of the evidence that is provided in court is anecdotal and not supported by scientific data. Often the issue becomes the tactics, the decision, and/or the results rather than the technology. Medical confidentiality (privacy) often prohibits organizations from accessing useful data and information relative to policing in general, and LLWs in particular. This is where the US might really benefit from the involvement of the NIJ in funding real research, testing, and evaluation.

### **Defining Public Acceptability**

Who is it that determines acceptability? (courts, elected officials, human rights groups, Media, or all)? Who should determine acceptability? What issues should be considered?

The group considered that our respective citizenry is the true source of “public acceptability.” However, there are many other actors in this arena. Ultimately, the citizens (the electorate) will determine what is acceptable and shape public policy through its elected officials. But there are a number of actors at work that shape public opinion and further influence policy-makers, most notably perhaps, is the Media.

The Media can color a certain issue that might then devolve into a public issue based on inaccuracies and mis-information. The public is influenced by the Media, which obviously must be educated and informed. Less-lethal weapons is but one of a series of emotional issues (abortion, war, etc.)



Spectrum of effects for less-lethal weapons

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and an 'informed' public is not overly influenced by pressure groups. The Media is interested in ratings and news is merely the means. Some technologies and their effects are highly visual, which heavily attracts the Media (e.g., the TASER vice malodorants). There is a need for law enforcement to understand the Media influence on the public, who ultimately determines acceptability. Developing a relationship of trust with the Media often is key to ensuring that misinformation is limited. The LASD has an annual media day when the media and others can come and fire weapons and observe technology under consideration. The UK has developed a less-lethal audit framework which is part of the enclosed presentation "Managing Conflict and Responding to Violence." Each technology must be audited on strategic, operational, ethical and societal issues. This seems to be a positive and well-received initiative which may have international application.

### **Subject Discrimination**

The concept of second order effects is used in the US (similar to collateral damage in the military). Second order effects include the logical and reasonable consequences of an effect, such as an injury from falling down. In the UK, officials refer to primary, secondary and tertiary effects. Additionally, there is a significant difference between causing discomfort and causing unintended injury to members of a crowd. The degree of acceptability and risk to unintended subjects is both contextual and situational.

Use of distraction devices (flash/bang) and chemical mechanisms (CS/CN/OC smoke), with their relatively higher levels of risk, may be necessary and appropriate in hostage rescue situations, for example. There is certainly a need to be cautious about absolute prohibitions that rule out an unforeseen, yet appropriate, LLW usage.

The immediacy and seriousness of a threat may alter what is acceptable with regard to risk. Clearly, there are times and circumstances which will, tactically or operationally, elicit an increase in the level of response. In the UK, commanders utilize a time-dated decision making log to record key actions and decisions. In the US, the Supreme Court has ruled that a police officer does not necessarily always need to be right, but they do need to be reasonable in the application of force. Additionally, in the US public oral warnings of intended action (with origins in the now repealed UK Riot Act) provide the basis for enabling onlookers to leave before action is taken.

### **Adequacy of Testing**

Testing cannot continue indefinitely. It requires prioritization, since time for testing is ultimately limited by funding and operational necessities. Vendor testing is not independent, adequate, and often suspect. Anecdotal evidence is not adequate and is not a substitute for independent and rigorous testing.

Development of appropriate models for testing should be a priority. Without proper, independent testing or adequate models, decisions are made to limit tests to issues that can be addressed with available time and resources. As a



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community, we need to address the effects most likely to result in lethal or serious injury. A degree of pragmatism must be applied. If criteria are simple and straightforward, the testing can be done more quickly. It may also be useful to use existing systems as benchmarks and thereby quantify improvements in safety and effectiveness (e.g., comparison tests between UK’s L21 baton round and its predecessor). Historical operational data is an important aspect in determining the overall safety of, and risk associated with, a particular LLW. Evaluation and testing in operational settings is absolutely necessary to build confidence in the weapon, munitions, technology, or tactics. Bench testing in the lab does not equate to operational testing in the field. Additionally, post-deployment review is one of the most important parts of the continuous testing process.

**Reversibility of Effects**

As one might suspect, the acceptable range and measure of “reversibility” and duration of effects will vary from system to system. A particular system generates an effect that requires sufficient duration to enable an officer time to:

- Move forward and make physical contact;
- Restrain and arrest; and/or
- Make safe or exit the immediate danger area.

Times will vary depending on the exact situation. A single violent subject (armed with a blunt, edged, or improvised weapon) may require more or less time for engagement than an individual in a crowd, depending on the system. Further, a barricaded suspect (with or without hostages) presents

**EXAMPLE OPERATIONAL NEEDS**

<b>Accuracy</b>	<b>100% bench test</b>
<b>Consistency of effect</b>	<b>1 shot / 1 dose</b>
<b>Minimum Safe Distance</b>	<b>0 meters</b>
<b>Duration of Effects</b>	<b>60 sec – 180 sec</b>
<b>Maximum Effective Range</b>	<b>0 – 60 meters</b>
<b>Immediacy of Use</b>	<b>Instantaneous</b>
<b>Lethality</b>	<b>0.1%</b>
<b>Reversibility without intervention</b>	<b>10 minutes</b>

This table represents the level of specificity to which operational needs should be developed. One of the group’s recommendations is to form a small group to identify quantifiable requirements that define operational needs. The numbers above should not be construed as parameters recommended by the Forum.

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other conditions that will influence the time required for engagement. For both the US and UK, the timeframes of 60 seconds to 3 minutes were discussed (see table below). The edged weapon distance (21 feet - human reflex response distance) is well acknowledged. The standard of 0-50 meters used by LASD and the UK is based on the average human's ability to throw a missile or object. Ideally LLWs, when properly used, should have no greater lethality at point blank range. In certain situations, preventing or denying the subject the ability to carry out a threat will suffice (disrupting or frustrating intent).

### **Effectiveness, Disclosure, and Countermeasures**

How can effectiveness be maintained in an atmosphere of disclosure (i.e., development of countermeasures by targets/groups)?

The UK has posted their use of force and firearms policy, as well as their conflict management model, on the internet. Additionally, they post ongoing less-lethal research information. The exception is tactics and procedures, which are protected as much as possible. In the US, Freedom of Information Act (FOIA) requirements would enable an individual to apply for most documentation. These are usually not offered routinely to the public, but on request.

It is difficult, if not impossible, to prevent adversarial groups from developing countermeasures to less-lethal systems. A menu of options, however, allows the police to keep the crowd/protest group off balance, since most groups would find it logistically infeasible to carry

countermeasures for every conceivable less-lethal system that may be deployed. The "suite" needs to contain a wide range of LL options.

The psychological aspect of LLWs also deserves more attention and research. This will allow officers to leverage the psychological component of less-lethal and influence LLWs at design stage. The US military term "force multiplier" suggests that when a technology is employed in conjunction with other technologies, tactics, or techniques, a greater value can be attributed to the result from the synergy. The New York City Police Department (NYPD) strategy for crowd disorder includes distracting and diminishing the morale of the crowd. This has implications when dealing with local communities.

### **Medical Safety Standards**

It is important that LLWs be evaluated both in the laboratory and in an operational setting. The level of medical testing and injury evaluation will vary depending upon the nature of the system being considered for operational use. At the upper end, particularly with chemicals, the level of testing should be the same as that for new drugs. However, to apply this concept to the whole spectrum of less-lethal weapons would unnecessarily exhaust resources and needlessly extend the time "from concept development to operational fielding." The context of use is significantly different. Although some medical certainty needs to be applied, the application requires a different approach, typically within a more compressed period. The general stages of research should, however be followed:

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- Literature review;
- Laboratory testing;
- Modeling of effects;
- Control studies; and
- Post implementation review.

There is also a matter of expediency. If authoritative research is not done centrally, individual medical practitioners and hospitals will provide opinions (not necessarily expert). In the US, there is some medical review that will/can play out in the courts (criminal and civil). The group recognized that some systems, particularly chemical incapacitants, tranquilizers, and calmatives should ideally be employed in consultation with medical experts. Before such systems are approved for use, they should be extensively tested. The group took note that the approach recommended in the independent UK Himsworth report, published in 1971, was to test these systems in the same manner as any new drug.

### **RECOMMENDATIONS**

- Employ a proactive media plan to promote the beneficial aspects of LLW technologies. Meet with pressure and interest groups. Discuss with them how they might address the issues at hand. Challenge pressure groups' stances by soliciting alternatives for public order and other situations. Papers on police accountability need to be identified and provided to both sides (links from website).
- Use technology so as to be least intrusive to the public. Guidance and policy for use should be easily read and understood, and available to the public.

- Political issues need to be addressed on a political level, Media issues need to be addressed in the Media. Proactive rather than reactive response to Media should be stressed. Provide information and have it readily available.
- That the US National Institute of Justice expand its funding of constructive research, testing, and evaluation of less-lethal weapons. This should include human effects/risk assessments, laboratory bench testing, operational field testing, post deployment review and analysis, and the psychological aspects of these systems.
- Establish a small core group that puts numbers to measurable (time, distance, and space) parameters that define our operational needs. This needs to be a small group, with funding, and a charter to describe a certain number of quantifiable requirements.
- The law enforcement community needs to have an accepted standard adopted by more than one nation. A standard that is based on international or bilateral consensus and is considered "generally accepted." One approach may be to post a proposed set of standards/statement of operational requirements on a police community-based web site. The core group would work to develop this set of standards, based on the personnel and discussions at this forum.

"That's your problem, we are just monitoring what you do!"

-An unnamed media representative's response when asked for alternative solutions.

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### SESSION 4 – Less Lethal Tactics and Procedures

#### CHAIR: Inspector Robin Hamilton

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The purpose of this Session, led by Inspector Robin Hamilton of the Hertfordshire Constabulary, was to address less lethal weapons tactics and procedures.

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#### Standards for Training

Certainly one challenge in establishing common training standards for less-lethal weapons is that there is not much commonality with regard to which systems are used from country to country – nor for that matter from department to department in the US.

This holds true even though these systems carry the same mission for all of these law enforcement agencies: *stop without killing*.

There are also varying standards based on local funding availability. Use of LLWs is governed by law. There is a legal requirement in both the US and the UK for officers to use reasonable force. This reasonable force may not be minimal, but is generally understood to mean minimum necessary force – the assessment of which is left to the officer faced with a particular situation. It is therefore vital that we ensure an officer has adequate training and the proper system enable them to apply the appropriate minimal force option.

In the US, the national standard for the use of lethal force was determined by the Supreme Court. Indirectly, the standard for less than deadly force derives from “Graham vs. Connor,” where “objectively reasonable” was



Robin Hamilton of the Hertfordshire Constabulary, United Kingdom

determined to be the standard. Additionally, standards and guidance are published by both the Commission on Accreditation for Law Enforcement Agencies, Inc. (CALEA®) and the International Association of Chiefs of Police (IACP).

In the UK, if death occurs (whether intentional or not) the test of *absolute necessity* applies (Article 2 European Convention of Human Rights). Otherwise, the test is one of *reasonable in the circumstance* (Sec 3 Criminal Law Act 1967). The European Court ruled against the UK in the case of McCann v. UK. The court ruled that upholding the right to life extended to *planning* as well as *actual* use of force. The Association of Chief Police Officers (ACPO) have included the legal standards for the use of force in part one of the ACPO manual of Guidance on police use of firearms in

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the UK, which is accessible on the internet at: <http://www.westmercia.police.uk/mogpufdefault.htm>.

### **Tactics**

Tactics and techniques for less-lethal weapons differ internationally. There are a number of reasons for these differences:

- Legal acceptability - interpretation of reasonable use of force
- Public acceptability
- Cultural/historical differences

The perspective on using less-lethal force is different between the UK and the US. In the US, police officers are generally armed with lethal weapons and have the capability and discretion to use lethal force. The perspective then is that less-lethal options are a new capability, though a “ratchet down” from existing lethal force. The UK views less-lethal munitions from the opposite side. Since officers in the UK (with the exception of Northern Ireland) do not routinely carry conventional firearms, less-lethal weapons are a “ratchet up.”

In the UK, there are relatively fewer numbers of officers trained in firearms than in the US. However, it was felt by the group that these specially selected officers are general trained to a higher level than their US counterparts (basic trained US officers) and are empowered to take necessary action in spontaneous situations. Commensurate with this empowerment is a need to equip these specially trained officers with less-lethal options.

As discussed earlier in this report, from country to country (and region to region) there are cultural imperatives that limit which minimal force option might be

deployed. These cultural limits derive largely from historical abuses (perceived and actual). The use of dogs and water cannons in parts of the US and the use of the baton round in Northern Ireland are but two examples. Political powers are being introduced in England and Wales which will enable Home Secretary to issue codes of practice with respect to the use of both conventional firearms and less lethal weapons by police. In the US, police chiefs have autonomy in the selection of weapons. Provincial Government in Ontario Canada has specified under health and safety legislation the type of weapons and equipment a police department should have.

### **Command, Control, & Decision-Making**

There are some command and decision-making issues which require consideration when deploying LLWs. These issues differ in some respects between public order and discrete violent situations.

In a public order scenario, there is generally some anticipation of the event and therefore, more time to prepare. In this instance, pre-planned tactics, procedures, and less-lethal deployment guidance (“rules of engagement”) can be considered in advance and reviewed in the light of any perceived change in the “threat assessment.” Training opportunities may also be possible prior to engagement to enhance the operational planning and situational briefings prior to actual engagement.

In the UK, there is a standard command and control structure utilized for managing and commanding all operational incidents. The command

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structure echeloned at three levels (Gold – strategic, Silver – tactical, and Bronze – operational). The system is specifically role-, as opposed to rank-related and enables individual officers to be appointed as the Gold, Silver or Bronze commander for the event. While typically there will be one Gold and one Silver commander there will be a number of territorial or role specific Bronze commanders managing inner and outer cordons and specialist teams and resources. Gold and Silver commanders will also be assisted by tactical advisors as appropriate to the situation.

In the US, on-scene advisors may also include general (legal) counsel. Most often departments use specifically trained individuals for LLW operations (since there are differences in frequency of training). It was agreed that multiple LLW use (chemical, impact and electrical) requires careful consideration of public acceptability issues.

Situations involving discrete acts of violence (usually involving one or two violent subjects) are difficult to anticipate and there is normally very little (if any) time to prepare. Previous training and the use of pre-existing general and incident specific tactics, procedures, and deployment guidance are critical. In these situations, there are few opportunities for specific training or briefings prior to initial engagement. The generic approach to command, adopted by the UK and offering a standard approach to a wide variety of incidents, has recently attracted a degree of criticism in respect of perceived “spontaneous” firearms incidents. In particular there was concern that the Gold/Silver/Bronze template did not function properly and

that these roles, in reality, resided in one individual.

In these situations, where the commander may not have the option to intervene or give direction, the officer on the scene should be trained and empowered to act appropriately.

There is a higher level of authority required for LLW use in UK (specifically in public order situations) than in both the US and Canada. Additionally, senior officers in US and Canada generally lack any real training in the use of LLWs. Though there are some differences in the frequency of required training, most agencies demand some form of training annually. The UK’s formalized process of a Gold, Silver, Bronze command structure (role based and not rank based) facilitates, and in the opinion of some, enhances intelligent LLW use in preplanned or protracted situations. In the US and Canada, the trend is to place the responsibility *and authority* to use LLWs at the lowest possible level. The UK, however, has national standards and consistencies between constabularies (ACPO committee structure and guidelines) that do not exist in the US and Canada.

### **Lessons from Recent Deployments**

*England and Wales.* At the time of the forum there had been only two uses of the L21 baton round in England and Wales in the last two years. There were two further uses in before the end of 2002. There is a need to ensure that weapons can be made available when required. There is a recognized need for a quick feedback loop – factual summary circulated within a day (similar to the standardized “hotwash” after-

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action reviews conducted by the US & UK military organizations). The use of appropriate records and data will enable relevant factual data to be placed before the media and the public and enable informed decision making to take place.

As a means of capturing lessons, a database is being designed by UK Police Services for the detailed and required post-investigation of every firing event.

*Northern Ireland.* In Northern Ireland there were 255 baton rounds fired by PSNI in 2002 during serious public disorder events. There were Independent Police Ombudsman investigations of all uses. In addition to the individually detailed reports, the Ombudsman also provided a comprehensive collective report on 7 incidents which occurred in 2002 which has been published (see <http://www.policeombudsman.org/Images/pdfs/10993%20for%20pdf.pdf>).

The rounds used had the effect of deterring the immediate attack and were believed to have deterred further attacks. In one case, police officers were commended for their restraint. Lessons from incidents are fed back into training (command and tactical) and incorporated into vehicle and weapon design programs. The new baton round does not have the flash/bang that was inherent in the previous version of the round. Officers believe, therefore, that this may have reduced the psychological effect on the crowd who are no longer necessarily aware that a baton round has actually been fired. Throughout the UK all uses of less-lethal weapons are being closely monitored by the Police Service, Home Office and the Northern Ireland Office.

The joint Northern Ireland Office/ACPO steering group responsible for developing less-lethal weapons is also ensuring coordinated development of all relevant issues.

*Canada.* In Canada, there have been deployments of ARWEN, sock rounds, and water cannons. There seems to be unreasonable expectations of ARWEN and sock rounds at all levels, though admittedly there is a training curve involved. Water cannons were effective with minimal training and dual use assets (fire trucks). The public perception was favorable. A reporting system for less-lethal weapons deployments is also being instituted.

*US.* In the US, agencies learn primarily from situations where the results are less than optimal. Inquiries occur when the result is serious injury or death. There is currently no national method for collecting or sharing data. Since 1995, there has been an increase in the use of LLWs. Corresponding with this has been a decrease in the use of lethal force. There have been critical investigations of the 13 deaths that have occurred as a result of impact rounds (baton rounds and bean bags) since 1971. Most of these occurred in the last five years. The investigations led to these five lessons learned:

- Aiming point – Point of aim has evolved from the “center of mass” to the intended point of impact (belt buckle area).
- Ready access – Officers need LLWs on the scene in a timely fashion (within three minutes).
- Multiple shots – This focused on the “bean bag” system where it was felt that one shot stops do not routinely

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occur. We need to teach that one shot cannot be relied upon to work. With bean bag technologies three shots is becoming the norm. Combination of pain, recognition and verbal dialogue are integral aspects of successful employment.

- Volley shots – volley shots are simply not appropriate for impact shooting. The method is extremely dangerous and outside of any mission objective.
- There is recognition that, with respect to the “bean bag,” the combination of impact, pain, and dialogue may prove insufficient to dissuade a very determined individual. There is a need for officers to recognize at an early stage that the tactical option chosen, in this instance, needs to be re-assessed to lessen the cumulative effect that has, in one instance, lead to a fatality.

### **RECOMMENDATIONS**

- That rigorous and standardized after-action reports and methodologies be developed to rapidly share information on less-lethal weapons operational deployments.
- That data mining tools be developed that will search these reports to uncover larger issues, trends, and potential design modifications.
- That the Forum strive to develop a standardized LLW guidance to be made available to the international law enforcement community. There is currently a commonality of purpose, but that is because the goal/mission is similar and not because of any organized cooperation or intended standardization.
- Although commonality may not be appropriate or necessary due to legal limitations and public perceptions, there is an impelling need for cooperation and an international forum to exchange, share and explore law enforcement tactics, techniques, procedures, and lessons learned from deployments.
- That an international law enforcement organization be formed (with rotating leadership) to facilitate the development of universal understanding of systems and limitations. It was felt this would assist the effectiveness of training and procedures.



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### **KEYNOTE ADDRESS**

#### **Assistant Chief Constable Ian Arundale, West Mercia Constabulary<sup>1</sup>**

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Ladies and gentlemen, I am very pleased to be here with police colleagues from the United Kingdom, Canada, and the United States, as well as some notable individuals from the academic, scientific and medical, world who have contributed so much to this important area.

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#### **Context**

The debate in the United Kingdom, being led by the Association of Chief Police Officers (ACPO) and the Northern Ireland Office is about how we can respond to threats posed by armed and dangerous persons in a way that minimises risk, and enhances community confidence in law enforcement. Our officers, like yours, daily face a variety of immensely demanding, dangerous and very different scenarios. The UK context is, however a little different.

Our key objective is to provide officers with an appropriate range of options to allow them to resolve those scenarios as safely as possible. Wherever possible, we will continue to seek to resolve situations without using force at all, by negotiation, for example. But such approaches always rest upon our ability to contain and neutralise threats by the deployment of effective options and tactics.

The “less lethal” programme in the United Kingdom seeks to provide a narrow, but effective range of tactical options that will enable officers, who have made an appropriate threat assessment and considered their powers to deploy such tactics to optimum effect. We are now extending these choices to improve our operational effectiveness. There is, as you all know, no panacea that can be used successfully across the full range of potential scenarios officers may encounter. Recent events in Russia have highlighted this. A threat at close or long range – precise or imprecise, the presence of drugs, alcohol, mental illness – the permutations are endless, and this makes it extremely important, indeed vital, that we get our research and testing of operational effectiveness and medical impacts and subsequent treatment correct.

Particularly important in the context of the Great Britain, where the majority of officers patrol and carry out their duties unarmed but with the consent of the populous, is that they must have the confidence of the public. The UK approach is, we believe, measured, thorough and driven by the urgency of our operational requirement.

#### **Drivers for UK Development**

The concept of “less lethal” is not a new one in the UK context. There has been throughout the history of policing in the United Kingdom a legal and moral duty to use “minimum force” and this programme builds on it. The tactics we have developed to

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<sup>1</sup> Ian Arundale serves as Chair of the Association of Chief Police Officers (England Wales and Northern Ireland) Sub Committee on Police use of Firearms

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achieve this are based on principles of containment, contact, and negotiation, with the ability to use proportionate force when necessary.

As the availability of weapons to those disposed to violence has increased, and, as the sophistication and firepower of those weapons has increased the challenge to the UK police service has also increased. I believe we have responded positively and, without being at all complacent, additionally our ability to quickly deploy highly skilled firearms officers to incidents has never been greater. This has proved very effective at dealing with armed and dangerous persons. However, often those posing a violent threat are not the determined criminals – rather, they are the desperate, the disturbed, and those whose judgement is temporarily affected by trauma, drugs or alcohol.

The discharge of our moral and legal duty to use minimal force against such persons has caused us to search for options that enable intervention – wherever possible – with less lethal force. It is important to note that the drive for such approaches came primarily from the police service, which was concerned about both legal moral and operational considerations. I think that says a great deal about the culture of the UK Police Service. Although I emphasise that, in the context of the UK, there is a need for further less lethal options, this should not be taken as being critical of existing tactics. Rather it represents the adoption, of an increasingly considered and professional, approach by Police forces in a number of countries.

The European Convention on Human Rights, sets out the legal and political imperatives that underpin the UK approach, as well as United Nations and UK directives and legislation. Interestingly our government can now specify what equipment we can use. Our leadership command and training (and research) must be effective and in keeping with our legal obligation.

We do have concerns about the availability and acceptability of what some commercially class as less lethal options. However, we realise that we are vulnerable from legal challenge if we do not exhaust every avenue in developing the ability to use only such force as is absolutely necessary, lawful and proportionate.

### **ACPO & NIO Research Programme**

ACPO, on behalf of the UK Police Service, set up a joint working group with the Northern Ireland Office to see how our capability gap could be filled. Representatives were drawn from several areas of specialism: Firearms, Self Defence and Restraint, and Public Order. In particular there was a desire to explore and utilise the rapid advancements in technology that had allowed a number of devices to become commercially available.

Around the same time, a working group set up to deal with the report of the Independent Commission on Policing for Northern Ireland (the Patten Report) instigated a separate search for new “less lethal “ options in the public order arena. There were clearly areas of joint interest and so a joint approach between ACPO and the Patten Action Team was developed.

The process began with the preparation of an Operational Requirement to reflect the needs of both ACPO and the Patten Action Team. In preparing that requirement,

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consideration was given to the wide range of operational situations we are called to deal with. ACPO then tasked the Police Scientific Development Branch to conduct an extensive programme of research to ascertain which, if any, commercially available options met that requirement. Within the context of policing in the United Kingdom, however, we felt there had to be a broader assessment of each option than just their operational effectiveness.

Unlike many other countries, we have sought to stringently judge the acceptability and the medical impact of all technologies being considered. To this end, emergent technologies, irrespective of their operational pedigree in other countries, are being assessed against strategic, ethical, and social criteria of acceptability. Whichever technologies are ultimately selected by the UK service, they must command the confidence of both police and public alike. Our process will provide an audit trail that will justify any subsequent legal / ethical scrutiny as to why a particular technology was chosen and issued.

The search has led us down many and varied paths, some of which have involved concepts that, have been intriguing – and more. My colleagues have looked at amongst others:

- Glue guns
- Nets
- Bean Bags
- Water canons – commercial fire extinguishers
- Chemical incapacitants
- Stun guns / belts and probes
- Lasers
- Electrical water canons
- Lights and noises
- Tranquillisers and the rather ominous “Malodarants”.

Clearly, we require to know the limitations of such devices and crucially, our officers will want to know whether such devices will function correctly and consistently. These concerns and questions are at the heart of the UK programme. Too much choice in this area, however, has legal and operational implications for 43 police forces in England and Wales the 8 in Scotland and for the Police Service of Northern Ireland. A postcode / zip code lottery cannot exist in UK context. At the very outset, the steering group set evaluation criteria that were influenced and informed by these key themes.

- *Is the device effective?*
- *Is it accurate?*
- *Will it be safe for the officer using it?*
- *Will it increase or reduce risks to officers and to the public we seek to protect?*

It soon became apparent that a number of systems, most notably the more exotic, were not able to meet the initial criteria. What we needed to do was to focus research on those technologies that were deemed most likely to satisfy the operational requirement I have described. We split the known technologies into three categories:

- A – those devices meriting immediate further **in depth** research
- B – those devices warranting further research over a more extended timeframe.
- C – devices which did presently not require further research

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We do, however, see this as a rolling and dynamic programme which will not preclude any emerging technology from assuming priority.

Following a review of all commercially available and near-market less lethal technologies, we have prioritised a number based on their evaluation against the operational requirement. Additional testing has since been carried out to assess the performance of the prioritised technologies against further aspects of the operational requirement. Questions now being addressed are how options will perform in an operational environment – for example, how effective will they be when an operator is having to move swiftly – or deal with a moving target?

These tests will be followed by a medical review of the devices that appear most suitable. I suspect that there is a commonly held misapprehension that there is a whole body of evidence and research from other countries that would inform our evaluation process.

One of the technologies that have been fast tracked within the UK research programme is the electrical device typified by TASER. Whilst acknowledging, a number of law enforcement agencies in Canada and the United States have already introduced this technology into their operational environment, you could be forgiven for believing that there is a whole body of independently assessed, evidence and research from other countries that would inform our evaluation process.

This is actually not the case and the UK is compiling new research that will be needed to withstand rigorous and lengthy scrutiny, whether it be in a court of law or elsewhere. Data and evidence is still being gathered by PSDB, which will allow an independent medical advisory body to provide an assessment on the likely medical impact of its use. This structured approach will facilitate informed decisions regarding the possibility of use of this type of equipment in the UK. Amongst many other things, the medical evaluation will be linked to and inform the development of operational guidelines.

### **You may have heard of L21A1 – Baton Round**

The UK has so far introduced one very effective less lethal option, which is already being operationally deployed. The current L121A “Baton Round” was one system that was identified at an early stage as meeting the operational requirement. There was also a foundation of research that allowed an assessment of medical effects and injury probability to be considered.

This new design of Baton Round with its enhanced accuracy was also felt to be a much safer and consistent system than its predecessor, and was approved for use by the respective Secretaries of State for the Home Departments, Northern Ireland and the Ministry of Defence and entered operational service in June 2001.

The recent operational firings of the baton round in North Wales and Surrey, provided the authorised firearms officers at the scene with a less lethal option and negated the discharge of conventional firearms. These two incidents will allow useful consideration of its effectiveness, and a full and thorough evaluation of the incidents is currently being

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undertaken by forces in conjunction with the UK Police Complaints Authority and our Police Use of Firearms Working Group.

### **Looking Ahead to the Future**

The deployment of less lethal options in the UK is primarily to a small number of firearms officers, but the US and Canadian experience shows a potential for a wider routine deployment in due course. This is a debate the UK has yet to have and this conference will help inform and shape this critical discussion. Indeed our research programme has now reached the stage where the focus will begin to move from the technologies themselves to establishing how they should be used.

As I have said, a key factor that will influence this debate is medical evaluation and only by knowing a system's capability and its medical impact will it be possible to provide appropriate and effective guidelines. I believe this conference will help the UK engage in the next crucial phase of development and provide answers to our colleagues who rightly ask:

- What are the tactical and training issues?
- What are the strategic issues?
- What will the deployment issues be?
- What operational guidelines on use should apply?
- What complexity will it add to the decision-making processes for authorising officers?
- How will it impact upon accountability?
- Not forgetting we need to obtain Government approval – so we need to anticipate views of critical observers.

We are very interested in a number of the technologies that are being progressed but I do believe that the UK approach has to be a measured and professional one. Others may view this as overly cautious but hopefully our approach will ensure that all equipment has undergone an assessment rigorous enough to command support from both the service and the public and then courts, Coroner inquests, and public inquiries that may follow.

This approach has the benefit of ensuring that a corporate, co-ordinated, strategic and responsible approach by all UK forces is achieved. We have found there are inherent risks in forces seeking to advance particular systems that they feel may suit their particular needs, without allowing proper evaluation through our national programme.

I share the anxiety to better equip our officers with less lethal options but we are determined that such options will be effective, reliable and safe for our officers to use. However an uncoordinated approach, in the context of the UK, would risk losing the confidence of the public and may leave officers struggling to make choices from a plethora of devices, which may not all be reliable.

I do hope you find this conference valuable and invite you to fully participate in the planned workshops to allow enable the cross pollination of ideas and practices which will, I am sure, improve the service we all give. Thank you for your kind attention.

**2002 International Law Enforcement Forum  
MINIMAL FORCE OPTIONS**

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**2002 International Law Enforcement Forum  
MINIMAL FORCE OPTIONS**

**PRESENTATION: “Operational Needs and Standards for Less-Lethal Weapons”**

**Colonel Andrew F. Mazzara, USMC-Ret**

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**2002 International Law Enforcement Forum  
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## 2002 International Law Enforcement Forum MINIMAL FORCE OPTIONS


2002  
INTERNATIONAL LAW ENFORCEMENT FORUM

# OPERATIONAL NEEDS AND TESTING / TRAINING STANDARDS FOR LESS-LETHAL WEAPONS



POLICE LINE DO NOT CROSS POLICE LINE DO NOT CROSS POLICE

COLONEL ANDREW F. MAZZARA, USMC (RET)  
Applied RESEARCH LABORATORY  
THE PENNSYLVANIA STATE UNIVERSITY



## 2002 International Law Enforcement Forum

### Background

- US Department of Defense Joint Concept for Non-Lethal Weapons published in 1997
- Less-lethal (LL) manufacturers, trainers, policymakers and operators have no guidelines or standards
- Expanding cooperation and dialogue between US, UK and other international law enforcement agencies
- Penn State's Attribute-Based Evaluation of Less-Than-Lethal Munitions, Jan 2001
- UK Home Office Police Scientific Development Branch (PSDB) Report on Less Lethal Technologies, Dec 2001
- International Law Enforcement Forum on Minimal Force Options conducted in April 2001



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SLIDE 2

## 2002 International Law Enforcement Forum MINIMAL FORCE OPTIONS

### 2002 International Law Enforcement Forum

#### A Network of Law Enforcement Professionals

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SLIDE 3

### 2002 International Law Enforcement Forum

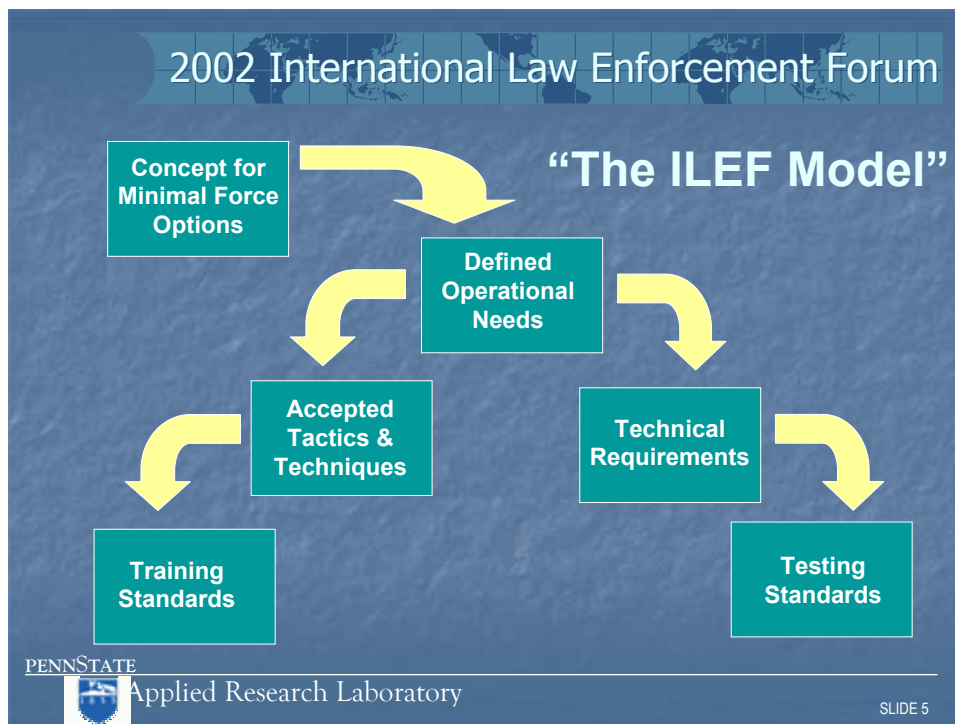
#### A Few Notes to Begin

- This is a work in progress
- Collaboration has been only narrowly established
- Focus evident in the technology orientation
- Additional input is needed/solicited
- US National Institute of Justice (NIJ) support for broadly-based operational needs assessment - to be the subject of a web site sponsored by the US National Institute of Justice and hosted by the Pennsylvania State University

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SLIDE 4

## 2002 International Law Enforcement Forum MINIMAL FORCE OPTIONS



2002 International Law Enforcement Forum

### Purpose

This International Concept for Minimal Force Options should serve as:

- a basis for decisions regarding MFO capability development
- a point of departure for experimentation and testing
- a common frame of reference for developing new techniques, technologies and procedures



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SLIDE 6

## 2002 International Law Enforcement Forum MINIMAL FORCE OPTIONS

### 2002 International Law Enforcement Forum

#### The Environment

- Increased global urbanization
- Social and political unrest
- Wide, networked media attention
- Large, vulnerable groups of civilians
- Authorities interested in "positive outcomes"
- One-on-one encounters with unduly aggressive individuals on the rise
- Government objectives to minimize injuries, fatalities and unwanted property damage and to eliminate unintended consequences
- Growing mandate for public order and public safety



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SLIDE 7

### 2002 International Law Enforcement Forum

#### Defining Minimal Force Options

Those generally accepted standards, practices, and technologies that provide law enforcement professionals a wider range of options allowing them to deal in a humane fashion with individual aggressiveness and/or public disorder.

While retaining control and the initiative in any given public order situation, police organizations are intent on reducing their own and the public's vulnerability.

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SLIDE 8

## 2002 International Law Enforcement Forum MINIMAL FORCE OPTIONS

### 2002 International Law Enforcement Forum

#### Minimal Force Options

- Preemption
- Isolation
- Negotiation
- Individual control techniques
- Crowd/riot control techniques and training
- Less-lethal technologies



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SLIDE 9

### 2002 International Law Enforcement Forum

#### Guiding Principles

- Augment Proportionate and Justifiable Force
- Apply across the Range of Police Operations
- Maintain Public Acceptability
- Focus on Discriminate Applications
- Leverage Simple Technology
- Enhance Supportability of Operations
- Ensure Predictable Results
- Provide for Reversibility of Effects



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SLIDE 10

## 2002 International Law Enforcement Forum MINIMAL FORCE OPTIONS

### 2002 International Law Enforcement Forum

#### Core Capabilities

- Dissuade and Deter Actions
- Deny Areas
- Disrupt Communications
- Incapacitate/Control Individuals
- Crowd Control



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SLIDE 11

### 2002 International Law Enforcement Forum

#### Technology Requirements

- Range variability – provides both close-in and stand-off capabilities
- Accuracy – at least as accurate as traditional weapons
- Collateral damage – supports precision application
- Immediacy of use – effects is instantaneous
- Subject population – applies across demographic groups
- Ease of operation – simple, minimal training
- Judgment – allows for selective, modified use

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SLIDE 12

## 2002 International Law Enforcement Forum MINIMAL FORCE OPTIONS

### 2002 International Law Enforcement Forum

#### Technology Requirements (Continued)

- Lethality – tested, validated, non-lethal
- Effect – Repeatable and measurable
- Environment – Minimal impact by atmospheric conditions
- Deployability – Easy to re-locate, easy to use
- Mobility/flexibility – agile local operations, adaptable



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SLIDE 13

### 2002 International Law Enforcement Forum

#### Technology Requirements (Continued)

- Durability – low maintenance, rugged, dependable
- Cumulative Effects – Repeated applications without increased risk
- Minimized beaten zone – Dispersion of effects is small and controlled
- Safety – for both operator and targeted individuals



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SLIDE 14



## 2002 International Law Enforcement Forum MINIMAL FORCE OPTIONS

### 2002 International Law Enforcement Forum

#### Concept Input

- Information clearinghouse
- Professional forum
- Controlled access
- Sponsored by the U.S. National Institute of Justice
- Hosted and maintained by Penn State University



### 2002 International Law Enforcement Forum

#### Summary/Conclusions

- There is still much work to be done on operational needs and standards
- A generally accepted "concept" will facilitate both professional discourse as well as frame actual operations on the street
- As more detail and substance are attached to the concept, the better manufacturers, police and research centers are able to test and evaluate new technologies

**2002 International Law Enforcement Forum  
MINIMAL FORCE OPTIONS**

**PRESENTATION: “Less Lethal Issues in the United States”**

**Captain Sid Heal**

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**MINIMAL FORCE OPTIONS**

# Nonlethal Issues in the United States



Capt. Sid Heal  
Los Angeles Sheriff's Department  
Special Enforcement Bureau

## Types of Nonlethal

- **Chemical Agents**
  - CN, CS, OC (Pepper Spray)
- **Impact Munitions**
  - Batons, "Bean Bags," Pellets, Fin-Stabilized, etc.
  - Most Diverse
- **Hybrid**
  - Encapsulated, Ring Air-Foil
  - Pepper Dust, Dyes, etc.
- **Electrical**
  - Tasers
  - "Shock Belts"
- **Directed Energy**
  - Laser Dazzler
  - Active Denial System

Dosage Factor

Sweet Spot

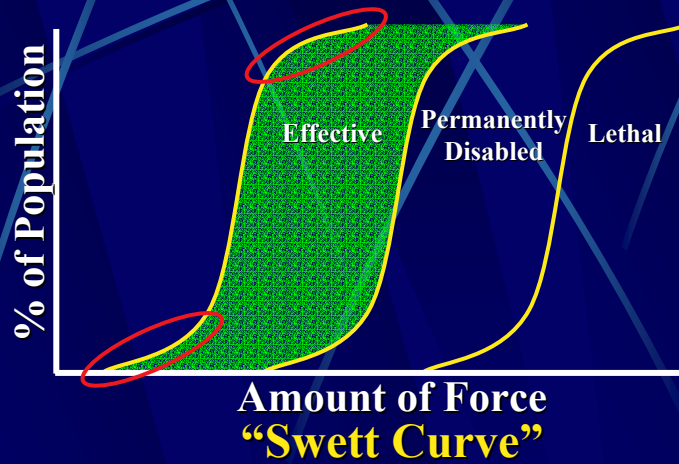
Single Subjects

Limited Range

Emerging

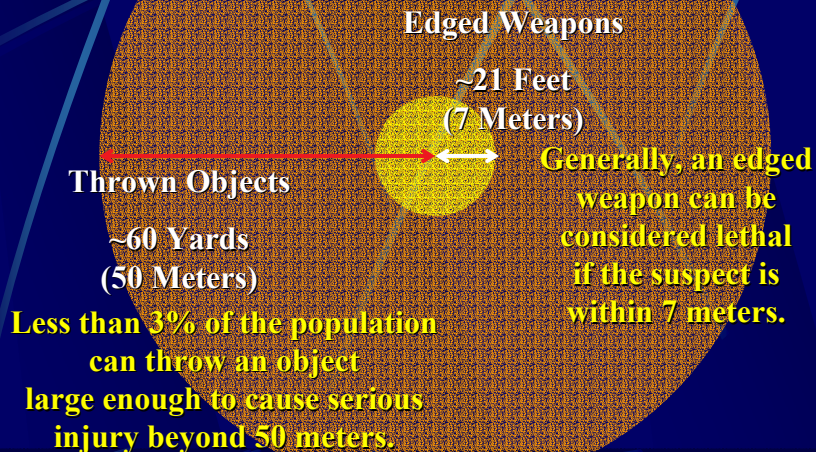
## 2002 International Law Enforcement Forum MINIMAL FORCE OPTIONS

### Measuring Effectiveness



**Currently all less lethal options are debilitating, not incapacitating!**

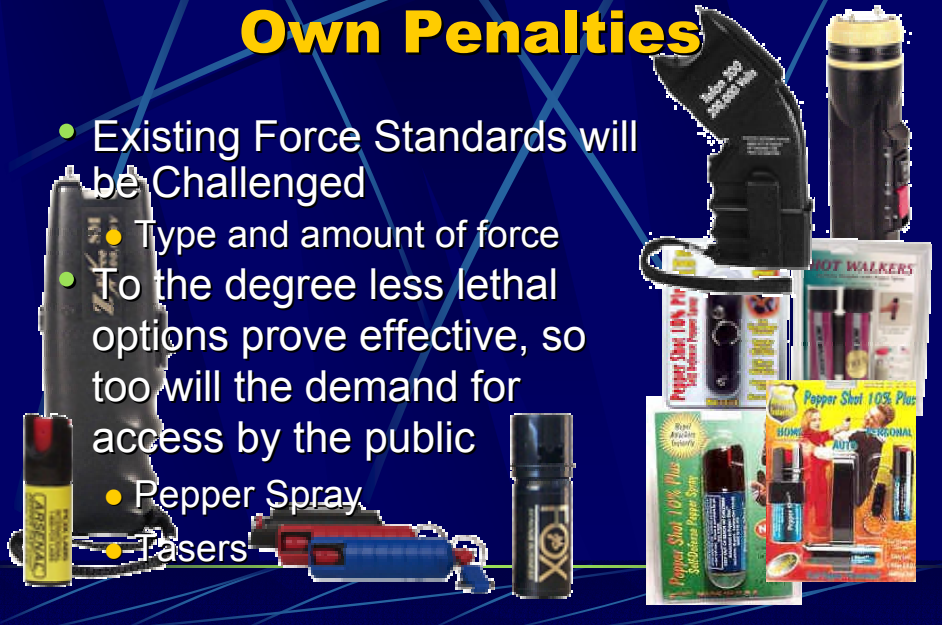
### How Far is Far Enough?



## 2002 International Law Enforcement Forum MINIMAL FORCE OPTIONS

# Success Comes with its Own Penalties

- Existing Force Standards will be Challenged
  - Type and amount of force
  - To the degree less lethal options prove effective, so too will the demand for access by the public
- Pepper Spray
- Tasers



### Interservice Nonlethal Weapons Instructor Course Ft. Leonard Wood, Missouri



**2002 International Law Enforcement Forum  
MINIMAL FORCE OPTIONS**

# Questions?

## **Capt. Sid Heal**

Los Angeles Sheriff's Dept.  
Special Enforcement Bureau  
130 S. Fetterly Ave.  
Los Angeles, CA 90022

**323-264-7084**

**[CSh Heal@lasd.org](mailto:CSh Heal@lasd.org)**

**2002 International Law Enforcement Forum  
MINIMAL FORCE OPTIONS**

**PRESENTATION: “Managing Conflict and Responding to  
Violence”**

**Mr. Colin Burrows**

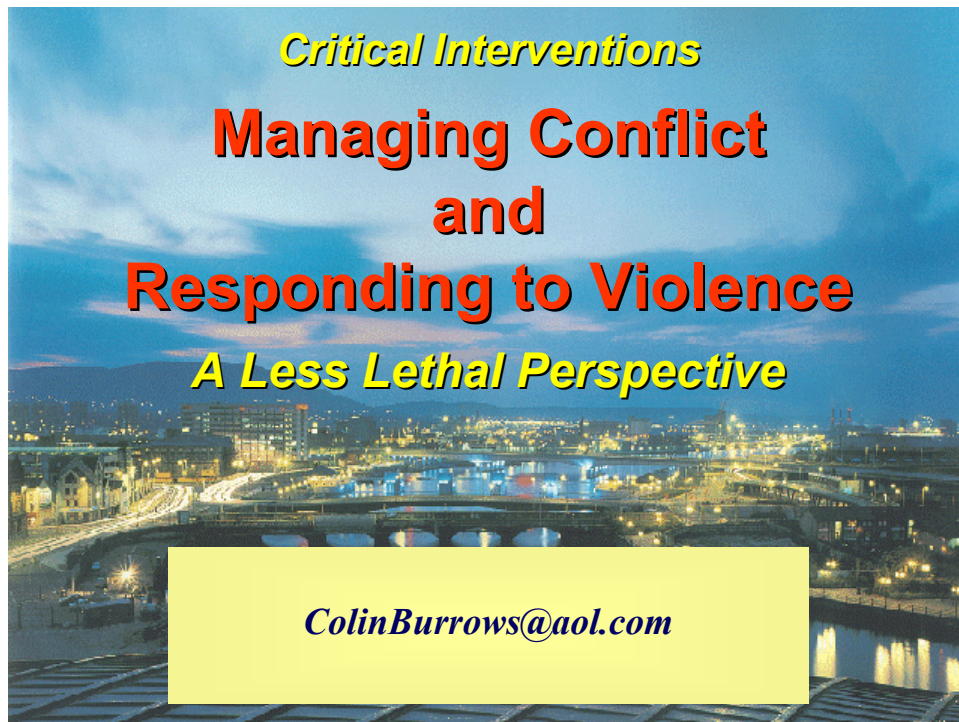
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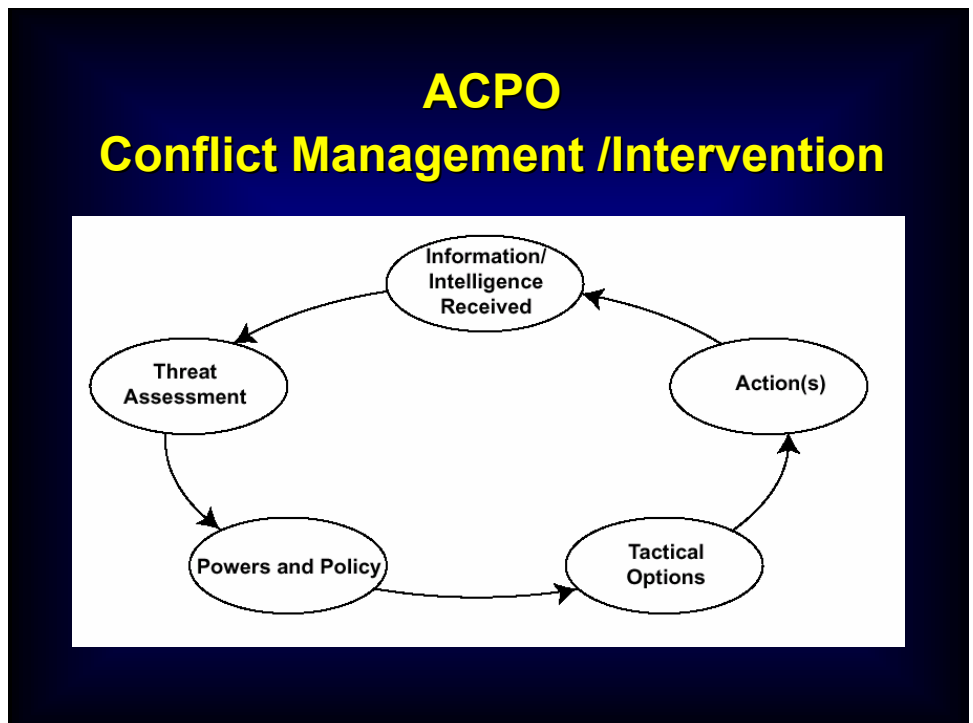
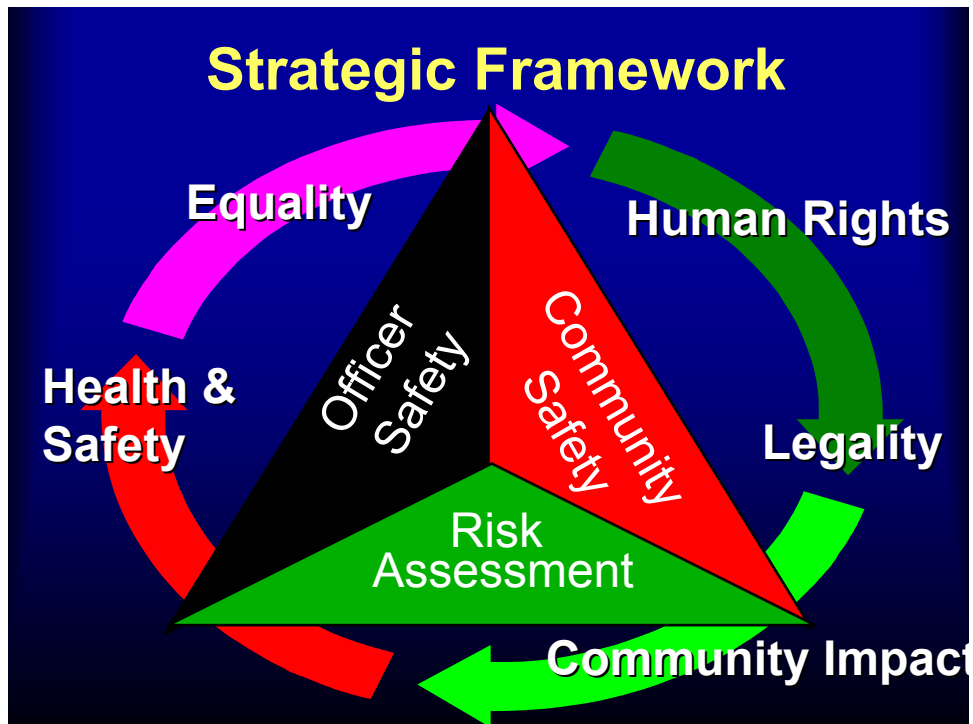
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**2002 International Law Enforcement Forum**  
**MINIMAL FORCE OPTIONS**



## 2002 International Law Enforcement Forum

### MINIMAL FORCE OPTIONS



## **2002 International Law Enforcement Forum MINIMAL FORCE OPTIONS**

A NEW BEGINNING :  
POLICING IN NORTHERN IRELAND

**Public Order & Less Lethal  
Weapons**

*There should be an  
immediate substantial  
investment...  
to find an  
Acceptable, Effective and  
Less Potentially Lethal  
Alternative to Baton  
Rounds  
And a Broader Range of  
Equipment*

THE REPORT OF THE INDEPENDENT COMMISSION  
ON POLICING FOR NORTHERN IRELAND

**Extensive Coordinated  
Research Programme**

**Northern Ireland Office**

**Home Office**

**UK Police Services**

**Police Scientific  
Development Branch**

**Defence Scientific  
Technology  
Laboratories**

**PennState University**

## Acceptability Matrix

- Strategic
- Ethical
- Operational
- Societal

## **2002 International Law Enforcement Forum MINIMAL FORCE OPTIONS**

### **International Law Enforcement Forum**

Issues: How Little We Have Progressed

Lack Of:

- Dedicated Focussed Designed for Purpose Initiatives.
- Common (International?) Design and Safety Specifications.
- Shared Databases of Use
- Understanding of How Devices Work (HE)
- Guidance on Use-
  - Operating Distance, Duration, Point of Aim Repeat Exposure, After Care Cautionary Groups

### **AUDITING FRAMEWORK 1—Strategic Issues**

<b>QUESTION</b>	<b>IDENTIFIED REQUIREMENTS</b>	<b>EVIDENCE / COMMENTS</b>
Does it meet Legal Requirements?	<ul style="list-style-type: none"><li>• Are the UN Basic Principles met?</li><li>• What are the Human/Civil Rights implications?</li><li>• Are there Criminal Law implications?</li><li>• Are there Local Statutory Requirements</li><li>• Is the Firearms Act relevant?</li><li>• Are there Common Law implications?</li></ul>	

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MINIMAL FORCE OPTIONS**

**AUDITING FRAMEWORK 1—Strategic Issues**

QUESTION	IDENTIFIED REQUIREMENTS	EVIDENCE / COMMENTS
Does it meet the ACPO/ICAP Operational Requirement?	<ul style="list-style-type: none"> <li>• Have the views of the ACPO/ICAP portfolio-holders been sought?</li> </ul>	
What are the physical and financial resource implications?	<ul style="list-style-type: none"> <li>• What would be the initial capital investment?</li> <li>• What training and re-qualification would be necessary?</li> <li>• What maintenance is required of the technology?</li> </ul>	

**AUDITING FRAMEWORK 1—Strategic Issues**

QUESTION	IDENTIFIED REQUIREMENTS	EVIDENCE / COMMENTS
Are there any inter-operability issues between Police organisations?	<ul style="list-style-type: none"> <li>• Are there compatibility considerations?</li> <li>• Is recruitment likely to be effected?</li> <li>• Would cross-boundary protocols be required?</li> </ul>	
Is deployment nationally being considered?	<ul style="list-style-type: none"> <li>• Is there any Local or national approvals/ agreement necessary, if so has it been obtained?</li> <li>• Has Chief Officers agreement been obtained?</li> </ul>	

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**MINIMAL FORCE OPTIONS**

**AUDITING FRAMEWORK 1—Strategic Issues**

QUESTION	IDENTIFIED REQUIREMENTS	EVIDENCE / COMMENTS
Is imminent emerging technology likely to have an effect?	<ul style="list-style-type: none"> <li>• What is the identified ongoing research?</li> <li>• Is there potential for obsolescence in the near future?</li> </ul>	

**AUDITING FRAMEWORK 2—Ethical Issues**

QUESTION	IDENTIFIED REQUIREMENTS	EVIDENCE / COMMENTS
Does it meet health and safety requirements?	<ul style="list-style-type: none"> <li>• Does it meet the requirements of the risk assessment?</li> <li>• Does it meet the evaluation criteria?</li> <li>• Is there any environmental impact?</li> </ul>	
Have medical considerations been met?	<ul style="list-style-type: none"> <li>• Has a medical assessment been done and what was the result?</li> </ul>	
Are there any ethical and/or cultural issues?	<ul style="list-style-type: none"> <li>• Does it meet relevant codes of Police Ethics?</li> <li>• Is there a Local /Provincial perspective?</li> <li>• Is there an International perspective?</li> <li>• What is the product history?</li> <li>• What is the product source?</li> </ul>	

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**MINIMAL FORCE OPTIONS**

<b>AUDITING FRAMEWORK</b>		<b>3—Operational Issues</b>
<b>QUESTION</b>	<b>IDENTIFIED REQUIREMENTS</b>	<b>EVIDENCE / COMMENTS</b>
What issues pertain to the tactical use?	<ul style="list-style-type: none"> <li>• Is the technology environmentally specific?</li> <li>• Is the technology incident specific?</li> <li>• Is the technology subject specific?</li> <li>• What is the subject vulnerability?</li> <li>• Against what threat assessment is the technology considered appropriate to use?</li> <li>• Is there a requirement for decontamination?</li> <li>• Is there the potential for misuse of the technology?</li> </ul>	

<b>AUDITING FRAMEWORK</b>		<b>3—Operational Issues</b>
<b>QUESTION</b>	<b>IDENTIFIED REQUIREMENTS</b>	<b>EVIDENCE / COMMENTS</b>
Are there restrictions with regard to deployment capability?	<ul style="list-style-type: none"> <li>• Are there any availability and accessibility issues and if so, what are they?</li> <li>• Who might be considered for training with the technology?</li> </ul>	
What are the requirements for a community impact assessment?	<ul style="list-style-type: none"> <li>• Is there a requirement for a community impact assessment in operational deployments?</li> </ul>	
What would be the training requirement?	<ul style="list-style-type: none"> <li>• What would be the likely duration of training?</li> <li>• Is a suitable venue required for training purposes?</li> </ul>	



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**MINIMAL FORCE OPTIONS**

**AUDITING FRAMEWORK**

**3—Operational Issues**

QUESTION	IDENTIFIED REQUIREMENTS	EVIDENCE / COMMENTS
What monitoring of the technology will take place?	<ul style="list-style-type: none"> <li>• Will operational re-evaluation be required?</li> <li>• Will the gathering of statistics with regard to use be needed and what information would be required?</li> </ul>	
What post incident review would occur?	<ul style="list-style-type: none"> <li>• Would a de-brief of each use be necessary?</li> <li>• Would post use investigation be required?</li> <li>• Would there be a reporting requirement for deployment of the technology?</li> </ul>	

**AUDITING FRAMEWORK**

**4—Societal Issues**

QUESTION	IDENTIFIED REQUIREMENTS	EVIDENCE / COMMENTS
What stakeholder and public consultation is appropriate?	<ul style="list-style-type: none"> <li>• Have the views of stakeholders and representative organisations been considered?</li> <li>• Have the views of NGOs / Interest Groups and other interested parties been considered?</li> </ul>	
What justification is there for adopting the technology?	<ul style="list-style-type: none"> <li>• What current need does the technology address?</li> <li>• Is a future need also to be addressed by the technology?</li> <li>• Is the technology of use on all occasions or at specific incidents or events?</li> </ul>	

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MINIMAL FORCE OPTIONS**

**AUDITING FRAMEWORK 4—Societal Issues**

QUESTION	IDENTIFIED REQUIREMENTS	EVIDENCE / COMMENTS
What is the environmental impact of the technology?	<ul style="list-style-type: none"><li>• Is there an environmental risk as a consequence of deployment of the technology?</li><li>• Is decontamination a requirement and if so what decontamination is necessary?</li></ul>	
What is the public liability of using the technology?	<ul style="list-style-type: none"><li>• Have liability issues in respect to exposure of the subject been considered?</li><li>• Have liability issues in respect to exposure of the public been considered?</li><li>• Have the staff associations raised any issues with respect to exposure of their members to the technology?</li></ul>	

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MINIMAL FORCE OPTIONS**

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**2002 International Law Enforcement Forum  
MINIMAL FORCE OPTIONS**

**PRESENTATION: “Less Lethal Technologies – United Kingdom”**

**Chief Inspector Neil Haynes and Mr. Graham Smith**

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MINIMAL FORCE OPTIONS**

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## **2002 International Law Enforcement Forum**

### **MINIMAL FORCE OPTIONS**



# **Minimum Force Options PennState ARL 29th October 2002**

## **Less Lethal Technologies**

**Chief Inspector Neil Haynes**

**Graham Smith**

Police Scientific Development Branch,  
Home Office Policing & Crime Reduction Group

## **DEFINITION OF LESS LETHAL**

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

**ACPO 2000**



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## 2002 International Law Enforcement Forum MINIMAL FORCE OPTIONS

# BACKGROUND

- ◆ **ACPO Sub-Committees**
  - ◆ SDAR
  - ◆ PuoF
  - ◆ Public Order
- ◆ **Northern Ireland Office**
  - ◆ Patten Report Recommendations
- ◆ **Home Office**
  - ◆ Action Against Crime and Disorder Unit
- ◆ **Steering Group**
  - ◆ Representatives from all interested parties



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# Need

- ◆ Still gaps;
- ◆ ECHR;
- ◆ *Proportionality in response;*
- ◆ Availability of a wider range of options.



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## **2002 International Law Enforcement Forum MINIMAL FORCE OPTIONS**

### **OPERATIONAL REQUIREMENTS (1)**

- ◆ **Generic - recognises a range of situations and circumstances (*threats not people*);**
- ◆ **Agreed by all relevant parties;**
  - ◆ **Police Use of Firearms**
  - ◆ **Self-Defence Arrest and Restraint**
  - ◆ **Public Order (Northern Ireland Office)**
- ◆ **Less lethal is not a replacement for conventional firearms**



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### **OPERATIONAL REQUIREMENTS (2)**

- ◆ **Accurate and Discriminating;**
- ◆ **Instantaneous/sufficiently long lasting to achieve control;**
- ◆ **Distance - 1 - 50 metres;**
- ◆ **Ease of deployment/operation;**
- ◆ **Suitable for use with other options;**
- ◆ **Suitable for range of environments/conditions;**
- ◆ **Audit trail of usage.**



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## **2002 International Law Enforcement Forum MINIMAL FORCE OPTIONS**

### **NEED FOR EVALUATION**

- ◆ **Need for independent data and information;**
- ◆ **Need to understand the technologies and know the most likely outcomes**
  - ◆ Effectiveness
  - ◆ Risks
- ◆ **Need information to support decision making by ACPO/Home Office (Policy Division);**
- ◆ **Need to inform guidance for users.**



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### **FUTURE CONSIDERATIONS**

- ◆ **How are the options going to be deployed?**
- ◆ **Marketing publicity**
- ◆ **Guidance/Training**
- ◆ **Future technologies**



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MINIMAL FORCE OPTIONS**



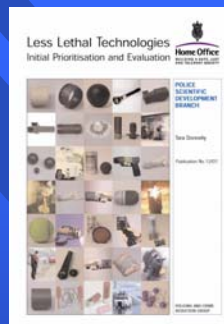
# Minimum Force Options PennState ARL 29th October 2002

## Less Lethal Technologies

Chief Inspector Neil Haynes

Graham Smith

Police Scientific Development Branch,  
Home Office Policing & Crime Reduction Group



Phase 1 report:

[www.nio.gov.uk](http://www.nio.gov.uk) under 'Patten Recommendations on Baton Rounds'

Phase 2 report:

[www.homeoffice.gov.uk/pcrg/psdb/publications/lesslethal.pdf](http://www.homeoffice.gov.uk/pcrg/psdb/publications/lesslethal.pdf)



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## **2002 International Law Enforcement Forum**

### **MINIMAL FORCE OPTIONS**

# **PRIORITISING**

- ◆ **Category A (Devices which may be subject to immediate more in depth research)**

**Kinetic Energy Rounds**

**Chemical Delivery Devices**

**Distraction Devices (Laser, light and noise devices)**

**Water Cannon**

**Electrical Devices**



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# **PRIORITISING**

- ◆ **Category B (Devices warranting further research over a more extended time)**

**Tranquillisers**

**Malodorants**



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# **PRIORITISING**

- ◆ **Category C (Devices which presently do not require further research)**

**Stun Grenades**

**Smoke**

**Acoustic Devices**

**Electromagnetic Waves**

**Nets and Wire Entanglement Systems**

**Glue, Foam and Grease**



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# **IMPACT DEVICES**



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## 2002 International Law Enforcement Forum

### MINIMAL FORCE OPTIONS

**Bean Bags**

**Sock Rounds**

**Multi-Ball Rounds**

**Fin-Stabilised Rubber Rounds**

**Multi-Baton Rounds**

**Encapsulated Rounds**

**Single Baton Rounds**

**Single Ball Rounds**

# IMPACT DEVICES

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## INITIAL EVALUATION CRITERIA

- ◆ **Accurate from 1-20m (and up to 50m if possible)**
  - ◆ 40cm wide x 60cm high
  - ◆ 95% POH bench-fired
  - ◆ 85% POH man-fired
- ◆ **Consistent Orientation on Impact**
- ◆ **Variety of platforms**
- ◆ **Energy not greater than L21A1 at 20m**
- ◆ **Single Point of Aim**
- ◆ **Impact not Penetration**



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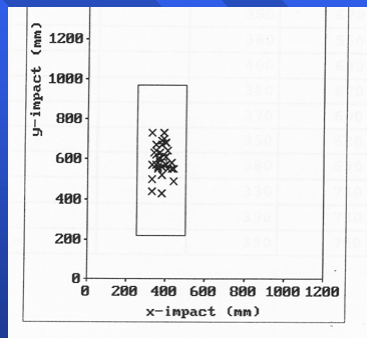
# Performance of Bean Bags



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# L21A1 BATON ROUND 50m



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## **2002 International Law Enforcement Forum MINIMAL FORCE OPTIONS**

### **Round Being Medically Assessed**



- ◆ 12 gauge shotgun
- ◆ Sock Round
- ◆ Armor Holdings



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### **CHEMICAL INCAPACITANT DEVICES**

- ◆ Incapacitant Sprays
  - ◆ 10-14ft
  - ◆ Discriminate
- ◆ Grenades and Projectiles
  - ◆ Crowd, room or vehicle
  - ◆ Indiscriminate
- ◆ Longer-Range Discriminating Devices
  - ◆ 1-20m
  - ◆ Discriminate
  - ◆ Encapsulated Rounds



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## 2002 International Law Enforcement Forum MINIMAL FORCE OPTIONS

# ENCAPSULATED ROUNDS



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# ENCAPSULATED ROUNDS



25 02-15-02 PLAY 001323  
FWD50 0000 .4393sec

1/3000 START 3000FPS



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## **2002 International Law Enforcement Forum MINIMAL FORCE OPTIONS**

# **WATER CANNON**

Public Order Training  
with water cannon



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# **PORTABLE WATER CANNON**



Shot Number : 3  
Range: 10m  
Gun Capacity: 1 Liter  
Orifice Size: 43.3mm  
Wind Speed: 9.9 mph  
Test Date: 08/03/02



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## **2002 International Law Enforcement Forum MINIMAL FORCE OPTIONS**

### **DISTRACTION DEVICES**

- ◆ **Laser/Light Devices**

- ◆ Laser Targeting
- ◆ Laser Dazzling
- ◆ Spotlights



- ◆ **Noise Generation Devices**

- ◆ Non-fragmenting
- ◆ Non-pyrotechnic
- ◆ 'Non-injurious'



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### **ELECTRICAL DEVICES**

- ◆ TASERS
- ◆ Stun Guns
- ◆ Stun Batons
- ◆ Electrified Riot Shields
- ◆ Electrified Nets
- ◆ Sticky Shocker
- ◆ Water Cannon
- ◆ 'Mines'
- ◆ Stun Belts
- ◆ Restraint Staffs



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## 2002 International Law Enforcement Forum

### MINIMAL FORCE OPTIONS

# TASERS



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# LIMITATIONS OF TASERS

- ◆ 21ft (6.4m) maximum range
- ◆ Not 100% effective
  - ◆ Barb(s) missing target
  - ◆ Low batteries
  - ◆ Clothing
  - ◆ Subject unaffected by electricity
  - ◆ Cartridge / taser failure
  - ◆ Operator error
- ◆ Flammability Problems



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# **FLAMMABILITY PROBLEMS**



- ◆ **6 Second Spray**
- ◆ **2 out of 7 Ignited**



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# **POLICE HANDLING TRIALS**

- ◆ **64 Participants**
  - ◆ Range of officers with different backgrounds
  - ◆ 20 police forces + prison service
- ◆ **1,253 Cartridges fired**
- ◆ **Range of exercises**
  - ◆ With and without laser sights
  - ◆ Light and dark environment
  - ◆ Range of target and firer orientations
- ◆ **Questionnaires**



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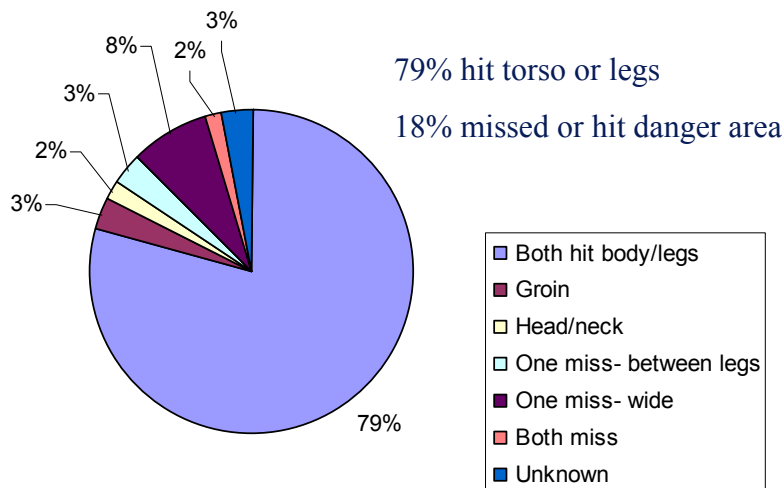
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### Barb Placement of all Shots



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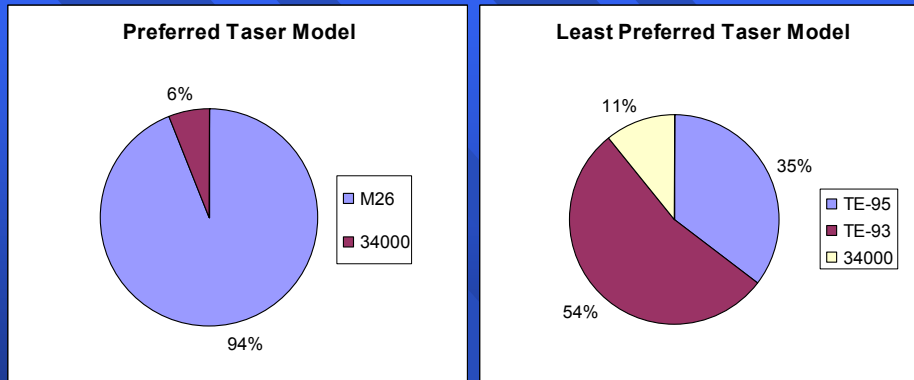


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### MINIMAL FORCE OPTIONS

# BEST AND WORST MODELS

## Opinion of Participants



94% of participants preferred the M26



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# PSDB EVALUATION OF TASERS

- ◆ Addressing the Operational Requirement
- ◆ In-House Evaluation
  - ◆ Comparison of models under ideal and extreme conditions
- ◆ Police Handling Trials
  - ◆ Firing of tasers
  - ◆ Questionnaires
- ◆ International Use
- ◆ Electrical Output
- ◆ DOMILL Statement

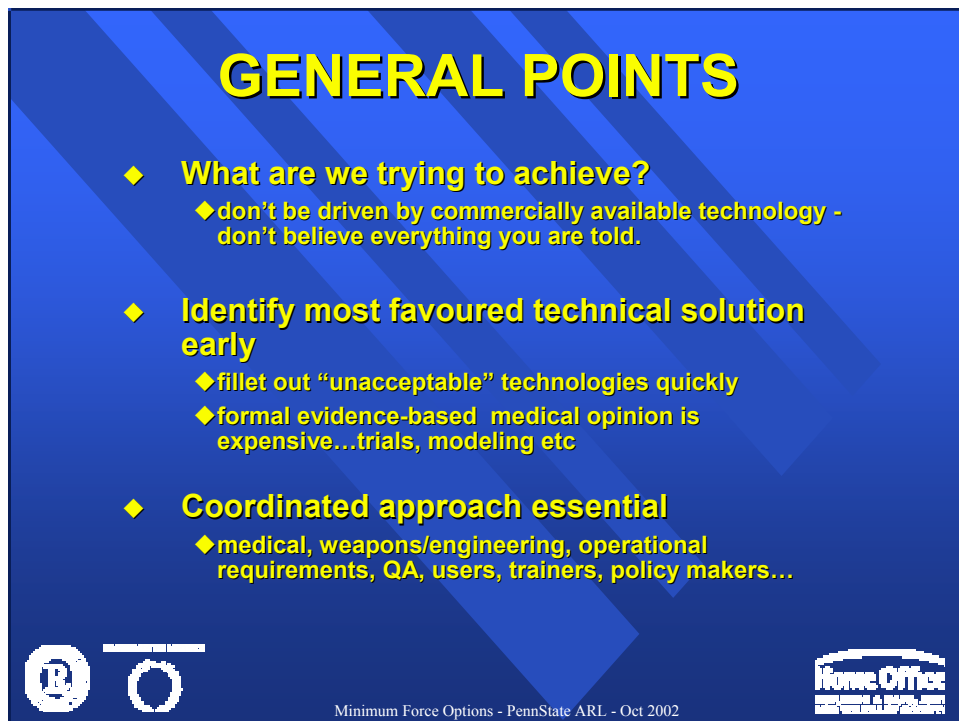
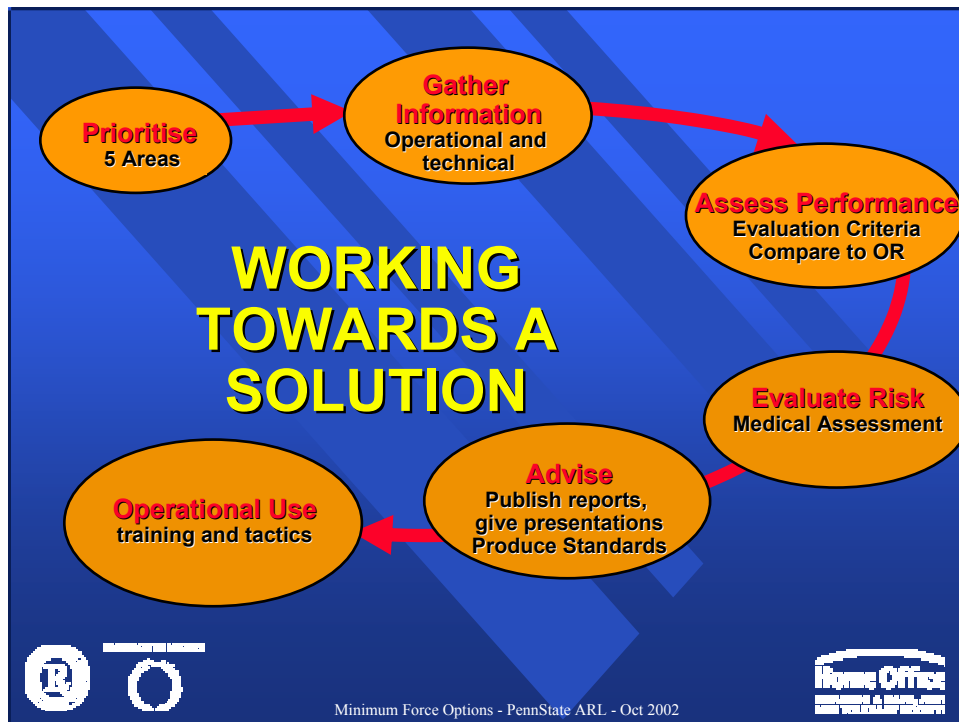


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**MINIMAL FORCE OPTIONS**



**Minimum Force  
Options  
PennState ARL  
29th October 2002**

**PSDB Evaluation of  
Less Lethal Technologies**

Police Scientific Development Branch,  
Home Office Policing & Crime Reduction Group



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## **2002 International Law Enforcement Forum MINIMAL FORCE OPTIONS**

### **APPENDIX A – Agenda**

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#### **Monday, 28 October**

1500-1600	SeaLab & Acoustics Demonstrations	Nittany Lion Inn/ASB
1800-2000	Welcome Reception	Penn State Room

#### **Tuesday, 29 October**

0700-0800	Continental Breakfast (available at 0645)	Inn Dining Room
0800-0815	Walk to Hintz Family Alumni Center	Campus
0815-0820	Host Welcome	Hintz
0820-0830	Introduction, Overview, and Administration	Hintz
0830-0900	Keynote Remarks	Hintz
0900-1000	<i>Less Lethal Weapon (LLW) Initiatives UK/US</i>	Hintz
1000-1015	MORNING BREAK	Hintz
1015-1200	Breakout Sessions 1 & 2	Hintz
	<i>1 - Current Operational &amp; Technological Limitations</i>	
	<i>2 - LLW Effectiveness &amp; Medical Issues</i>	
1200-1215	Walk to Nittany Lion Inn	Campus
1215-1315	LUNCH	Alumni Fireside Lobby
1315-1445	Breakout Sessions 1 & 2 (Continued)	Ballroom D & E
1445-1500	AFTERNOON BREAK	Atrium
1500-1700	Breakout Sessions 1 & 2 (Continued)	Ballroom D & E
1700-1800	Personal Time	
1800-2000	Dinner	Faculty Staff Club

#### **Wednesday, 30 October**

0700-0800	Continental Breakfast (available at 0645)	Inn Dining Room
0800-1000	Breakout Sessions 3 & 4	Ballroom A & B
	<i>3 - Acceptability Criteria, Public Policy, and Legal Issues</i>	
	<i>4 - Less Lethal Tactics and Procedures</i>	
1000-1015	MORNING BREAK	Atrium
1015-1130	Breakout Sessions 3 & 4 (Continued)	Ballroom A & B
1130-1230	LUNCH	Alumni Fireside Lobby
1230-1430	Breakout Sessions 3 & 4 (Continued)	Ballroom A & B
1430-1500	AFTERNOON BREAK & Plenary Preparation	Atrium
1500-1700	Plenary Session (Group Reports)	Ballroom A & B
1700-1800	Personal Time	
1800-2000	Dinner & Adjournment	Assembly Room

#### **Thursday, 31 October**

0900-1000	SeaLab & Acoustics Demonstrations	Nittany Lion Inn/ASB
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## **2002 International Law Enforcement Forum MINIMAL FORCE OPTIONS**

### **APPENDIX B – Focus Questions**

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#### Session 1: Current Operational & Technological Limitations

1. What are the top 3 operational priorities for LLW applications? Why?
2. What are the most likely (limit to 5) scenarios for employing LLWs? Why?
3. What are the 5 most useful technical performance parameters for a LLW? Why?
4. What operational scenarios exist for which we do not currently have an effective and reliable commercial available acceptable LLW?
5. What systems currently exist to keep violent crowds outside of missile throwing distance (Petrol bombs etc)?
6. What are the accuracy parameters that we should require and expect from Kinetic Impact Rounds?
7. What are the ideal criteria/technical requirements for LLW and what are their relative (weighted) values?
  - Range variability – provides both close-in and stand-off capabilities (operational distance)
  - Accuracy – at least as accurate as traditional weapons
  - Collateral damage – supports precision application
  - Immediacy of use – effects is instantaneous
  - Subject population – applies across demographic groups
  - Ease of operation – simple, minimal training
  - Judgment – allows for selective, modified use
  - Lethality – tested, validated, less-lethal
  - Effect – Repeatable and measurable (nature & duration of effect)
  - Environment – Minimal impact by atmospheric conditions
  - Deployability – Easy to re-locate, easy to use
  - Mobility/flexibility – agile local operations, adaptable
  - Durability – low maintenance, rugged, dependable
  - Cumulative Effects – Repeated applications without increased risk
  - Minimized beaten zone – Dispersion of effects is small and controlled
  - Safety – for both operator and targeted individuals

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### Session 2: LLW Effectiveness & Medical Issues

1. How should the term “Less Lethal” be quantitatively defined? Should it? How should the associated “serious injury” be defined?
2. What are the most appropriate measures for injury potential (e.g., ‘kinetic energy’)? Regarding “Pain” versus “Incapacitation,” is there a better option than blunt trauma/impact?
3. For LLW human effects testing, what are the top three most critical medical issues? Why?
4. What psychological issues should be considered at the LLW design stage?
5. What level of “repeatability” (predictability of outcome) is expected by police employing LLWs? (9/10, 999/1000)? Why?
6. What are the Physiological/ Psychological issues that minimize the effects of LLW’s on those who are suffering from acute mental disorders, alcohol or drugs? What special risks pertain to this group and what are the implications for LLW design/ Selection?
7. How do we assess the effects of multiple impacts/applications on safety? How do we evaluate changes in overall effectiveness of a particular LLW in this regard?
8. How much medical information does a user need (in say, training, guidance) to support safe and effective use of LLWs on the streets?
9. What information is required for a post-deployment/use review (e.g., detail of medical data; how data should be used; informative value; model validation)?
10. Can an indiscriminate LL projectile be both effective and have low risk?
11. How do we build human population data into our models (i.e., age; height/weight; pre-existing disease; orientation; posture)

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### Session 3: Acceptability Criteria, Public Policy, and Legal Issues

1. State and describe the most contentious issues relative to public acceptance of LLWs and how are these being addressed
2. What is acceptable in terms of discriminatory/ Non-discriminatory effect especially in Public Order situations?
3. How would “adequate testing” be acceptably defined?
4. What legal/Human Rights challenges have repeatedly surfaced for LLW use? Why?
5. What issues should be considered when determining the appropriateness of using a non-discriminatory LLW in a crowd control scenario?
6. Who determines acceptability (courts, elected officials, human rights groups, media, or all)? Who should determine acceptability? What issues should be considered?
7. What are the acceptable range and measure of “reversibility” and/or “duration” of effects?
8. What accountability bodies, audits, and systems exist?
9. What are the future trends in LLWs (police and military)?
10. How can effectiveness be maintained in an atmosphere of disclosure (i.e., development of countermeasures by targets/groups)?
11. Why shouldn't LLW have the same degree of medical safety evaluation as new drugs or should they?

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### Session 4: Less Lethal Tactics and Procedures

1. What research / good practice exist with respect to “managing out” or “diffusing” conflict situations?
  2. What command and decision-making issues require consideration when deploying LLWs and do these differ between Public Order and Discrete Violent situations (i.e, do “Rules of Engagement” change)?
  3. Are there differences between LLW tactics and standard LE tactics? If so, describe.
  4. What training standards are established for LLWs? What standards should be adopted?
  5. How and why do tactics and techniques for LLWs differ internationally (i.e., from country to country)?
  6. What notable examples have there been of LLW usage in the last 2 years and what were the key issues and learning points? Known commissions of inquiry? Major research programs?
  7. What guidance exists with regard to LLW tactics, techniques, and procedures? What degree of commonality exists from country to country? From LE agency to LE agency? How is this guidance published?
- ★ Based on the overall group discussion, what are the top and bottom three less-lethal weapons/technologies of choice?

**2002 International Law Enforcement Forum  
MINIMAL FORCE OPTIONS**

**APPENDIX C – Attendees**

Assistant Chief Constable Ian Arundale	Constabulary Headquarters, West Mercia-UK
Commander Andy Baker	Metropolitan Police-UK
Inspector Robert Blackburn	Metropolitan Police-UK
Constable Casey Brouwer	York Regional Police, Canada
Mr. Colin Burrows	Law Enforcement Consultant-UK
Inspector Jon Carter	Public Order Training, West Yorkshire-UK
Dr. Howard Champion	Dstl-UK
Chief Ed Connor	Ferguson Township-US
Dr. Graham Cooper	Dstl Biomedical Sciences-UK
Colonel Paul Evanko	Pennsylvania State Police-US
Inspector Keith Garlick	Firearms Training, West Yorkshire-UK
Inspector Robin Hamilton	Hertfordshire-UK
Mr. Tom Harmon	Penn State Police-US
Mr. Neil Haynes	Police Scientific Development Branch-UK
Captain Sid Heal	Special Enforcement Bureau, LASD-US
Lt Colonel Ed Hughes (Ret)	Institute for Non-Lethal Defense Technologies, ARL-US
Major Steve Ijames	Springfield PD-US
Dr. John Kenny	Institute for Non-Lethal Defense Technologies, ARL-US
Chief Tom King	State College Police Department-US
Dr. John Leathers	Special Assistant to the Provost, Penn State-US
Superintendent John MacDonald	HMIC-UK
Mr. Robin Masefield	Patten Action Team, Northern Ireland Office
Colonel Andy Mazzara (Ret)	Institute for Non-Lethal Defense Technologies, ARL-US
Mr. Bob McCann	Northern Ireland Policing Board
Lt Colonel Tom Murray	U.S. Army War College
Chief Inspector Jimmy O'Brien	Police Services Northern Ireland-UK
Graham Smith	Police Scientific Development Branch-UK
Special Agent Mark Winscher	Training Division, FBI Academy
Dr. Ed Liszka	Applied Research Laboratory, Penn State-US
Inspector Ken Cameron	Police Services Northern Ireland-UK
Major Mark Lyons	Joint Non-Lethal Weapons Directorate
Lieutenant Wes Mahr	International Association of the Chiefs of Police
Mr. Fred Schwarz	Joint Non-Lethal Weapons Directorate
Ms. Olivia Mcleod	Embassy to US-UK
Sergeant Andy Baird	Critical Incident Program, RCMP, Canada
Dr. Nicholas Nicholas	Institute for Non-Lethal Defense Technologies, ARL-US
Inspector Derek Hollick	Firearms Support, Hertfordshire-UK



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**The Nittany Lion**

*Applied Research Laboratory*

