

**APPENDIX 4**

<b>APPENDIX 4. 2<sup>ND</sup> GENERATION 'LESS LETHAL WEAPONS'</b>				
<b>Weapon</b>	<b>Mechanism</b>	<b>Function</b>	<b>Hazards</b>	<b>Notes</b>
<b>STICK'UMS &amp; SLICK'UMS</b>				
<b>Anti-Traction</b>	Super slippery substances are deployed to prevent movement of people across a designated control zone	Instant banana peel effect is used to create an area denial system where any movement is made either impossible or severely slowed.	Possible injury because of falls or hits from vehicles out of control in the skid pan conditions created by this technology. Likely to effect security forces as well so that dealing with any one injured may be a long delayed process.	
<b>Slippery Barriers</b>	Using instant banana peel technologies on barriers which can't be climbed over.	Creates an effective no-go barrier which can either protect a particular zone or coral people into places where other measures can be deployed against the crowd	Injury to anyone who falls from the barrier.	
<b>CAPTURE SYSTEMS</b>				
<b>Sticky Foam</b>	Gun which shoots out polymer foam which rapidly expands between 35-50 times its original volume. Foam is very sticky and when it hardens, it glues together targets feet and hands to the pavement	Immobilizing equipment for individuals and groups. Foam prevents any movement until a recovery team arrive with the necessary antidote to free trapped subject.	Can cause asphyxiation if the mouth and nose are affected. Might lead to panic in small children and some element of post traumatic stress syndrome in anyone left entombed for any length of time.	

<b>APPENDIX 4. 2<sup>ND</sup> GENERATION 'LESS LETHAL WEAPONS'</b>				
<b>Weapon</b>	<b>Mechanism</b>	<b>Function</b>	<b>Hazards</b>	<b>Notes</b>
<b>Anaesthetic Dart/Pellets</b>	Gas powered gun firing flight stabilized syringe darts containing a range of sleep inducing or paralysis creating effects.	Allows a specific individual to be arrested or immobilised in a crowd. Telescopic sights can make this process surgical and can have a powerful dispersal effect on a crowd who see their ring leaders taken out.	Can't safely be used wherever there is a need for absolutely non-lethal effects. One persons tranquillization shot is another's lethal dose because no control is possible for variations in size, weight, age or medical health.	
<b>Flight Stabilized Capture Nets</b>	Special gun fires a pre-packaged flight stabilized net with expands up to x metres	Net envelopes an individual or small group in a web which stops them fleeing. Variants emerging include lacing the net with either chemicals or electroshock electrodes to enhance incapacitation.	Hazards associated with falling. Associated risks with any particular enhancement including those listed under chemical irritants and electroshock devices if they are deployed as part of the net system	
<b>Bounding NL Munition</b>	Based on existing Volcano mine technology - victim activated - small explosive charge launches a net to from the ground to envelope and capture target.	Can be used to prevent a crowd entering a particular control zone - for example refugees attempting to cross a border. Refinements including the addition of razor blades or chemical irritant to the net.	Any additions of would inflicting mechanisms may lead to inevitable injury if surprise induces flee or panic response.	
<b>CHEMICAL WEAPONS</b>				
<b>Chemical Irritants</b>	Use of replacements for traditional riot agents which are more powerful. Includes vomiting agents such as DM.	Agents which cause eye and respiratory discomfort in addition to CN, CS, CR, OC and PAVA and sprayed on to target by hand held devices or crew served systems or explosive grenades with anti-throw back protection	Hazards associated with toxicity. Each agent needs to be properly assessed on a case by case basis.	

<b>APPENDIX 4. 2<sup>ND</sup> GENERATION 'LESS LETHAL WEAPONS'</b>				
<b>Weapon</b>	<b>Mechanism</b>	<b>Function</b>	<b>Hazards</b>	<b>Notes</b>
<b>Malodorous substances</b>	Powerful stench creating chemicals	Create nausea and revulsion, Can be 'culturally tailored.	Unknown.	
<b>Calmatives</b>	Tranquillising drugs sprayed on to a target via hand held launcher or water cannon. Many of the chemicals being investigated are either anaesthetics (eg.sufentanil and nalefene), reconfigured opiate molecules or members of the fentanyl family and derviatives	DMSO used as a carrier agent to ensure drug is quickly absorbed into the blood stream through skin. A variety of agents are available to put a crowd quickly to sleep and facilitate control, restraint, extraction and removal. Agents currently under consideration include chemicals which attach themselves to particular receptor sites on the brain(eg alpha2-adrenoceptor) including chemicals known only by code, eg EA5302, Etoxadrol, EA5995,EA5955, EA5978).	There is no such thing as a safe chemical calmative particularly in a public order situation where there is little control of amounts of drug disseminated to a varied target group and effects may vary according to age, health and whether or not the individual is on medication or has taken recreational drugs. One persons tranquillization can be another's lethal dose.	
<b>AQUEOUS FOAM</b>				
<b>Crew Served Air/Water Jet</b>	Vehicle platform with jet gun and large storage of pre-mixed foam solution	Prodigious quantities of foam can be distributed which prevents a crowd from being able to organise itself. Chemical irritants such as CR can be added to either punish the crowd or to make a pain barrier to ensure area denial	Damage or injury associated with any disorientation where vehicles and people are moving in conditions of being completely obscured from each other. Excess dosage of chemicals is possible if someone is paralysed in a CR foam where no-one can see the victims to remove and decontaminate them	
<b>DIRECTED ENERGY WEAPONS</b>				
<b>ACOUSTIC</b>	Combustion, explosive or	Resonates human organs causing	Permanent injury to internal organs and	

<b>APPENDIX 4. 2<sup>ND</sup> GENERATION 'LESS LETHAL WEAPONS'</b>				
<b>Weapon</b>	<b>Mechanism</b>	<b>Function</b>	<b>Hazards</b>	<b>Notes</b>
	electrically driven creation of infra-sound frequencies below 20 Hz	disorientation, nausea and involuntary defecation. Can be tuned from less-lethal to lethal creating body cavitation.	death.	
<b>Pyrotechnic Stun</b>	Explosive devices which create a high powered blast wave of sound,	Variation of stun grenades to create maximum disorientation.	Deafness.	
<b>Vortex Ring Gun</b>	Combustion driven ring vortices for impulse or chemical delivery.	Applies vortex ring gas impulses with flash, concussion and less-lethal agents and/or markers to approximate human body resonances. Device can be retrofitted to the MK19-3 automatic grenade launcher	Unknown.	
<b>RADIO FREQUENCY</b>				
<b>(I) Thermal Wall</b>	Can project energy through a wall to raise target human body temperature to 107 degrees F.	Incapacitates human internal bio-regulation by mimicking fever conditions.	Unknown.	
<b>(ii) Microwave</b>	Directed energy weapon system designed to match radio frequency source to interfere with human brain activity at synapse level	Invisible weapons which can immobilise at a distance to create a ghostly hitting effects. Weapon is 'tunable' and can be applied in the so called 'layered defence' approach which grows more lethal at the core.	All the hazards associated with microwave radiation. Highly classified programme and hard data is difficult to access.	

<b>APPENDIX 4. 2<sup>ND</sup> GENERATION 'LESS LETHAL WEAPONS'</b>				
<b>Weapon</b>	<b>Mechanism</b>	<b>Function</b>	<b>Hazards</b>	<b>Notes</b>
<b>OPTICAL</b>				
<b>(i) Isotropic Radiators</b>	Explosive round which yields superheated gaseous plasma to produce a dazzling burst of laser light	Omni-directional laser bright dazzling rounds.	Eye damage	
<b>(ii) UV Laser</b>	Ionizes Air to allow electric shock to be projected over a distance.	Anti-Personnel Beam Weapon which tentanizes human muscle-skeletal tissue to create paralysis via induced electro-shock	Unprotected eye extremely vulnerable to narrow laser beams. Threat of eye damage or blindness. Heart attack problems associated with other forms of induced electro-shock	
<b>KINETIC ENERGY</b>				
<b>NL Crowd Dispersal(M203)</b>	Grenade containing rubber balls fired from M203 Grenade Launcher	Blunt trauma weapon operating like a shotgun but using rubber rather than lead.	Relative hazards depend on muzzle velocity, kinetic energy at target and distance of victim from gun. Exact figures unavailable.	
<b>Foam Batons</b>	37/40mm foam baton fired from a hand held launcher	Transfers energy to a specific target	Meant to be less hazardous than existing kinetic energy weapons but hard date awaits independent scrutiny.	
<b>Sponge Grenades</b>	40 mm M203 munition which has ben designed to have a configuration with more 'give' and lower velocity.	Design of munition is meant to lower both the kinetic energy and the sharp edges which have lead to blinding and scaping wounds from baton rounds in the past.	Evaluation of hazards awaiting technical data.	
<b>Claymore Mine</b>	Less-lethal version of	Can be pre-placed and remotely	Independent confirmation of non-lethal	

<b>APPENDIX 4. 2<sup>ND</sup> GENERATION 'LESS LETHAL WEAPONS'</b>				
<b>Weapon</b>	<b>Mechanism</b>	<b>Function</b>	<b>Hazards</b>	<b>Notes</b>
	military mine which dispenses blunt impact munitions.	activated to protect specific areas.	status is absent. Clearly, if the munition has sufficient kinetic energy to incapacitate there is a maiming potential whose outcomes are uncertain.	
<b>Variable Velocity Guns</b>	Rapid fire rifle/ammunition system that can easily change from lethal and non-lethal modes on a shot to shot basis.	Uses a valve system which can reduce velocity of bullets fired up to 66% on demand to create required less-lethal effect.	No way of ensuring that such devices will not be permanently left on kill option or for the lethal option to be selected by mistake.	
<b>Variable Velocity Ammunition</b>	Dual purpose round which is lethal at high velocity and less-lethal at lower velocity.	Designed to work with a particular rifle, eg a selectable multi-barrel system on an M16 upper receiver.	As above.	