

TEAR GASSING BY REMOTE CONTROL

The development and promotion of remotely operated means of delivering or dispersing riot control agents

December 2015



REMOTE CONTROL

Examining changes in military engagement



Omega Research Foundation



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BRADFORD

The Remote Control project is a project of the **Network for Social Change** hosted by **Oxford Research Group**. The project examines and challenges changes in military engagement, in particular the use of drones, special operations forces (SOF), private military and security companies (PMSCs) and cyber and intelligence activities.

The Omega Research Foundation (ORF) is an independent UK-based research, investigation and policy organisation. It is dedicated to providing rigorous, objective, evidence-based research on the manufacture, trade in, and use of, military, security and police technologies.

Bradford Non-Lethal Weapons Research Project (BNLWRP) is part of the Bradford Disarmament Research Centre (BDRC) of Bradford University. Its primary objectives are to explore and compile open source information on so called “non-lethal” or “less lethal” weapons, to objectively analyse the implications of their development, proliferation, use and potential misuse for international peace, human security and human rights; and to develop strategies for regulating or prohibiting the introduction and potential use of the most dangerous of these weapons.

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Cover image: Cyclone riot control drone system, displayed on the ISPRA (ISPRA Israel Product Research Co., Israel) stand at MILIPOL 2015, Paris, France, November 2015. ©Robin Ballantyne, Omega Research Foundation

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About

This report has been produced jointly by Bradford Non-Lethal Weapons Research Project (BNLWRP) and the Omega Research Foundation (ORF) for the Remote Control Project. It was written by Dr Michael Crowley (BNLWRP project coordinator and ORF Research Associate), following research undertaken in co-operation with colleagues from ORF. It is part of an ongoing series of briefings and reports analysing CWC State Party implementation of the Convention with regard to the regulation of riot control agents. Aspects of research for this report have been funded in part by the Joseph Rowntree Charitable Trust and the European Instrument for Democracy and Human Rights (EIDHR). EIDHR donor contribution does not indicate endorsement by the EU or any EU Member State of the paper's findings or recommendations, which are solely those of BNLWRP and ORF.

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Executive Summary

The use of riot control agents (RCAs) as a method of warfare is prohibited under the Chemical Weapons Convention (CWC). The Convention, however, permits the employment of such chemicals for law enforcement including domestic riot control purposes, provided they are used in “types and quantities” consistent with such purposes.

Whilst CWC States Parties are prohibited from developing RCA munitions for use in armed conflict, they may manufacture, acquire and utilise delivery systems to disseminate appropriate “types and quantities” of RCAs for law enforcement. However, there is continuing ambiguity as to the nature and specifications of those means of delivery that are prohibited under the Convention. This ambiguity has potentially dangerous consequences, allowing divergent interpretations, policy and practice amongst States Parties to emerge.

Of particular concern – given the current research and development of unmanned systems - are the implications for the regulation of “remote control” RCA means of delivery. These are dissemination mechanisms incorporating automatic or semi-automatic systems where the operator is directing operation of the platform and/or RCA delivery device at a distance from the target. Certain “remote control” devices incorporate target activated mechanisms triggering automatic RCA dispersal, without real-time operational control, whilst others employ a “man in the loop” system, requiring human authorisation before the RCA is released.

This report highlights the ongoing development, testing, production and promotion by a range of State and commercial entities of a wide variety of “remote control” RCA means of delivery including: indoor fixed installation RCA dispersion devices; external area clearing or area denial devices; automatic grenade launchers; multiple munition launchers; delivery mechanisms on unmanned ground vehicles and unmanned aerial vehicles.

Inadequate regulation of such “remote control” RCA means of delivery has potentially serious consequences, including:

Proliferation to and misuse by non-State actors: Current commercial availability of “remote control” RCA means of delivery including for example via unmanned aerial vehicles (UAVs) raises the danger of their acquisition and employment by a range of non-State actors including armed opposition forces, unregulated private military and security companies, and terrorist organisations.

Employment in armed conflict: In previous conflicts RCA means of delivery were employed to drive enemy combatants from entrenched, underground, enclosed or fortified positions; for subsequent area denial; to disable and incapacitate large numbers of combatants; or in conjunction with conventional arms as a “force multiplier”. More recently, a range of contemporary RCA means of delivery, including “remote control” devices have been promoted for use in counterinsurgency operations or urban warfare.

Employment of inappropriate RCA means of delivery in law enforcement: potentially resulting in the serious injury or death of bystanders as well as targeted individuals or groups.

Misuse to facilitate large scale human rights abuses: This could include the blanket application of significant quantities of RCAs against large peaceful

gatherings or demonstrations resulting in en masse infliction of cruel, inhuman or degrading treatment or punishment. Alternatively RCA means of delivery could be employed as a “force multiplier” in conjunction with firearms or other lethal force, making such force more deadly.

Facilitate development and proliferation of autonomous weapons systems: Continuing research and development of “remote control” RCA delivery mechanisms and unmanned systems more broadly may potentially contribute to the development, proliferation and use of fully autonomous weapons systems (AWS), i.e. unmanned systems with on-board computers, that once activated, can select and engage targets without further human intervention.

Certain forms of “remote control” RCA means of delivery may have utility in a variety of law enforcement situations provided they meet the CWC “types and quantities” restrictions and are employed in conformity with the CWC and human rights standards; however, there is a risk that some of these could also be readily misused in armed conflict or for human rights violations. Such RCA means of delivery should be stringently regulated to prevent misuse.

Other forms of “remote control” RCA delivery mechanisms may be determined to be intrinsically inappropriate for law enforcement. Such mechanisms would potentially breach the CWC and their development, possession, transfer and use should be prohibited.

Despite the development and promotion of a range of “remote control” RCA means of delivery of potential concern, the Organisation for the Prohibition of Chemical Weapons (OPCW) has failed to effectively address this situation to date. Given the evident dangers arising from the unregulated production, proliferation and misuse of such means of delivery, Bradford Non-Lethal Weapons Research Project (BNLWRP) and the Omega Research Foundation (ORF) believe the OPCW should address this issue as a matter of urgency.

BNLWRP and ORF recommend that the OPCW should:

- Conduct a review of the existing constraints, under relevant international law, upon the use of RCA means of delivery in law enforcement;
- Develop a process for determining which means of RCA delivery are prohibited under the Convention;
- Strengthen existing RCA declaration and reporting measures, and explore the feasibility and utility of introducing appropriate monitoring and verification measures;
- Utilise existing CWC consultation, investigation and fact-finding mechanisms where activities of potential concern come to the attention of Member States, such as the reported development, production, marketing, transfer, stockpiling or use of inappropriate RCA means of delivery.

Although the CWC is clearly applicable to the regulation of “remote control” RCA means of delivery, it is critical that the international governmental community also examine the constraints imposed upon these devices under international and regional human rights law and related standards. Consequently BNLWRP and ORF recommend that all States should:

- Ensure effective national assessment of new weapons (including RCA means of delivery) to be employed in law enforcement; and undertake subsequent monitoring and regulation of their trade and use;
- Establish an international expert group to examine application of international human rights law to “less lethal” weapons (including RCA means of delivery);
- Bring cases of concern regarding misuse of RCA means of delivery to the attention of appropriate human rights bodies and mechanisms.

Introduction

Riot control agents (RCAs) are potent sensory irritants normally with relatively low lethality that produce dose and time-dependent acute site-specific toxicity. The most widely used include 2-chlorobenzalmalononitrile (CS), dibenzoxazepine (CR), 1-chloroacetophenone (CN), Oleoresin capsicum (OC) and N-Vanillylnonamide (pseudocapsaicin) (PAVA). These chemicals interact pharmacologically with sensory nerve receptors associated with mucosal surfaces and the skin at the site of contamination, resulting in localized discomfort or pain with associated reflexes. Although intense lachrymation and sternutation are common reactions to exposure to RCAs, these compounds can elicit a diverse array of physiological effects.¹ Concerns have been raised regarding the employment of RCAs in excessive quantities or in confined spaces where the targeted persons cannot disperse and where the toxic properties of the agents can lead to serious injury or death, particularly to vulnerable individuals.²

The use of RCAs as a “method of warfare” is absolutely prohibited under the Chemical Weapons Convention (CWC).³ RCAs can, however, be utilized for a range of “purposes not prohibited” under the CWC, most notably “law enforcement including domestic riot control purposes”⁴; provided that the RCAs employed are of appropriate “types and quantities” for such purposes.⁵ Consequently, whilst States Parties to the CWC would be prohibited from developing RCA munitions intended for use in armed conflict, they may manufacture, acquire and utilise delivery systems to disseminate appropriate “types and quantities” of RCAs for law enforcement purposes.⁶

In addition to considerations regarding permissibility under the CWC, all States intending to employ RCA means of delivery for law enforcement should ensure

that such means of delivery are fully compatible with relevant international human rights law and standards regulating the use of force by law enforcement officials.⁷

A range of delivery mechanisms have been developed that disperse relatively small amounts of RCAs over short distances and with a very limited coverage area. Such devices, which include hand-held sprays, hand-thrown grenades and individual weapons fired projectiles, are regularly employed for law enforcement purposes. If such devices have been properly tested and trialled, their use should not raise concerns, provided it is in strict accordance with the relevant human rights standards and is strictly monitored. Indeed if employed appropriately such RCA means of delivery can be an important alternative to other applications of force that are more likely to result in serious injury or death, notably firearms. However, if used by law enforcement officials in an inappropriate manner, such RCA means of delivery can result in serious injury or death.⁸

Since the coming into force of the CWC in 1997, a variety of additional RCA dispersal and delivery mechanisms have been developed and marketed which have the capacity to disseminate inappropriate quantities of RCAs to the targets with the potential risks of poisoning or asphyxiating the affected individuals. Two distinct, but overlapping, categories of delivery mechanisms raise particular concerns:

1. “Remote control” means of RCA delivery: dissemination mechanisms incorporating automatic or semi-automatic systems where the operator is directing operation of the platform and/or RCA delivery device at a distance from the target. Certain “remote control” devices incorporate target activated mechanisms triggering automatic RCA dispersal, without real-time operational control, whilst others employ a “man in the loop” system, requiring human authorisation before the RCA is released.
2. “Wide area” means of delivery: a variety of systems that can be utilised for dispersing or delivering significant quantities of RCA over wide areas and/or over extended distances, including: large RCA “smoke” generators and irritant sprayers; multiple munition launchers; grenade launchers; rocket propelled grenades; mortar munitions; large calibre aerial munitions; heliborne munition dispensers;

1 See for example: Olajos, J. and Salem, H. *Riot Control Agents: Pharmacology, Toxicology, Biochemistry and Chemistry*, *Journal of Applied Toxicology*, volume 21, 2001, pp. 355–391; Salem, H., Gutting, B., Kluchinsky, T., Boardman, C., Tuorinsky, S. and Hout, J. *Riot Control Agents, in Medical Aspects of Chemical Warfare*, Borden Institute, Office of The Surgeon General, AMEDD Center & School, US Army, 2008, pp. 441–482.

2 See for example: Hu, H., Fine, J., Epstein, P., Kelsey, K., Reynolds, P. and Walker, B. *Tear Gas: Harassing Agent or Toxic Chemical?* *Journal of the American Medical Association*, volume 262, 1989, pp. 660–663; Karagama, Y., Newton, J. and Newbegin, C. *Short Term & Long Term Physical Effects of Exposure to CS Spray*, *Journal of the Royal Society of Medicine*, volume 96, issue 4, 2003, pp. 172–17; *Physicians for Human Rights, Weaponizing Tear Gas: Bahrain’s Unprecedented Use of Toxic Chemical Agents Against Civilians*, August 2012.

3 Organisation for the Prohibition of Chemical Weapons (OPCW), *Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on Their Destruction (Chemical Weapons Convention [CWC])*, 1993. Available from: http://www.opcw.org/index.php?eID=dam_frontend_push&docID=6357 (accessed 3rd November 2015), Article I.5.

4 OPCW, *Chemical Weapons Convention (1993) op.cit.*, Article II.9.

5 OPCW, *Chemical Weapons Convention (1993) op.cit.*, Article II.1.a

6 OPCW, *Chemical Weapons Convention (1993) op.cit.*, Article II.1.a.

7 See in particular: *United Nations, Basic Principles on the Use of Force and Firearms by Law Enforcement Officials*, 7th September 1990, adopted by the Eighth United Nations Congress on the Prevention of Crime and the Treatment of Offenders, Havana, Cuba, 27th August–7th September 1990; *United Nations, Code of Conduct for Law Enforcement Officials*, adopted by United Nations General Assembly Resolution 34/169 of 17th December 1979.

8 For further discussion see: Crowley, M. *Chemical Control: Regulation of incapacitating chemical agent weapons, riot control agents and their means of delivery*, Palgrave Macmillan, London, November 2015, pp. 48–87.

and cluster bombs;⁹

This report focuses upon “remote control” means of RCA delivery, including certain categories of “wide area” RCA delivery mechanisms that incorporate a “remote control” capability.

Regrettably, to date, the international community has failed to effectively address the regulation of “remote control” means of RCA delivery, either within the framework of the CWC or international human rights law. This regulatory lacuna has potentially serious consequences, including:

- *Employment in armed conflict:* There is a long history, dating back to the First World War, of the use of RCA means of delivery by State military forces in large scale armed conflict. In previous conflicts RCA means of delivery were employed to drive enemy combatants from entrenched, underground, enclosed or fortified positions; for subsequent area denial; to disable and incapacitate large numbers of combatants; or in conjunction with conventional arms as a “force multiplier”. More recently, a range of contemporary RCA means of delivery, including “remote control” devices have been promoted for use in counterinsurgency operations or urban warfare.
- *Proliferation to and misuse by non-State actors:* To date, there have been few confirmed cases of the use of RCA means of delivery by non-State actors in large scale attacks or armed conflict. However the current commercial availability of a wide range of RCA means of delivery, including for example via unmanned aerial vehicles, raises the danger of their acquisition and employment by a range of non-State actors including armed opposition forces, unregulated private military and security companies, and terrorist organisations
- *Employment of inappropriate RCA means of delivery in law enforcement:* Certain forms of RCAs means of delivery may be inappropriate for law enforcement use due to the dangers of serious injury or fatality to the targets and/or to uninvolved bystanders. Such delivery mechanisms include those that can potentially disperse RCAs in quantities and/or in circumstances that risk asphyxiating or poisoning the targets, such as through the rapid cumulative delivery of very large numbers of RCA projectiles over wide areas, or the dispersal of RCA from fixed installation devices in enclosed spaces. Further concerns relate to those delivery mechanisms that do not provide sufficient

levels of targetability or discrimination potentially, for example, as a consequence of the “remote” nature of operational control and consequent distance between the operator and the intended targets. Additional concerns relate to certain “remote control” RCA delivery mechanisms that are automatically target-activated and do not include sufficient human oversight.

- *Misuse of means of delivery to facilitate large scale human rights abuses:* Whilst “limited area” RCA means of delivery, such as hand held irritant sprayers, can be misused by law enforcement officials or non-State actors for human rights abuses against individuals; the inappropriate employment of a range of “remote control” RCA means of delivery potentially facilitates human rights abuses on a far greater scale. This could include the blanket application of significant quantities of RCAs against large peaceful gatherings or demonstrations resulting in en masse infliction of cruel, inhuman or degrading treatment or punishment. Alternatively RCA means of delivery could be employed as a “force multiplier” in conjunction with firearms or other lethal force, making such force more deadly.
- *Encourage and facilitate the development and proliferation of autonomous weapons systems:* There are concerns that continuing research and development of “remote control” RCA delivery mechanisms and unmanned systems more broadly may potentially contribute to the development, proliferation and use of fully autonomous weapons systems (AWS), i.e. unmanned systems with on-board computers, that once activated, can select and engage targets without further human intervention.¹⁰ Whilst the international community is currently engaged in seeking to address the potential development and use of lethal AWS in armed conflict¹¹, there has been very little consideration given to the potential implications of the development and employment of lethal or “less lethal” autonomous weapons systems by law enforcement agencies.¹²

9 See for example: Crowley, M. *Chemical Control* (November 2015) op.cit., pp.94-106 ; Crowley, M. *Drawing the Line: Regulation of “Wide Area” Riot Control Agent Delivery Mechanisms Under the Chemical Weapons Convention*, Bradford Non-Lethal Weapons Project and Omega Research Foundation, April 2013; BNLWRP, ISS and ORF, *Destruction by Turkey of all remaining 120mm mortar munitions containing CS: A briefing note for CWC States Parties*, 12th September 2011; BNLWRP, ISS and ORF, *The production and promotion by a Russian Federation company of a range of munitions containing chemical irritants: A briefing note for CWC States Parties*, 12th September 2011.

10 See: US Department of Defense, *Autonomy in Weapon Systems, Directive 3000.09* (21 November 2012), <http://www.dtic.mil/whs/directives/corres/pdf/300009p.pdf>. (accessed 20th November 2015); United Nations, *Report of the Special Rapporteur on extrajudicial, summary or arbitrary executions, Christof Heyns. UN General Assembly, A/HRC/23/47* (9 April 2013), paragraph 38, available at http://www.ohchr.org/Documents/HRBodies/HRCouncil/RegularSession/Session23/A-HRC-23-47_en.pdf (accessed 20th November 2015); for further discussion of scope and nature of definitions of AWS see:

11 Convention on Certain Conventional Weapons, Meeting of Experts on Lethal Autonomous Weapons Systems, 13th – 17th April 2015, for a collection of State and civil society statements, presentations and papers see: the UN office at Geneva website, at [http://www.unog.ch/80256EE600585943/\(httpPages\)/6CE049BE22EC75A2C-1257C8D00513E26?OpenDocument](http://www.unog.ch/80256EE600585943/(httpPages)/6CE049BE22EC75A2C-1257C8D00513E26?OpenDocument) (accessed 20th November 2015); see also: International Committee of the Red Cross (ICRC), *Autonomous Weapon Systems: Technical, Military, Legal and Humanitarian Aspects, expert meeting from 26-28 March 2014*, <https://www.icrc.org/en/download/file/1707/4221-002-autonomous-weapons-systems-full-report.pdf> (accessed 20th November 2015).

12 For notable exceptions see: United Nations, *General*

Development and promotion of “remote control” means of delivery

The widespread employment of “remote control” RCA means of delivery for law enforcement has not, to date, been documented. However, there are media reports that certain military, security or police forces or correctional services including those in China¹³, India¹⁴, Israel¹⁵, South Africa¹⁶, Turkey¹⁷, the United Arab Emirates¹⁸ and the United States¹⁹ have sought to develop or acquire a range of “remote control” systems that could be employed to deliver RCAs or other “less lethal” weapons²⁰. Furthermore, there have been

Assembly, *Report of the UN Special Rapporteur on extrajudicial, summary or arbitrary executions*, Christof Heyns, A/69/265, 6th August 2014, available at https://panoptikon.org/sites/default/files/extrajudicial_summary_or_arbitrary_executions.pdf (accessed 20th November 2015), paragraphs 65-89; Human Rights Watch and the International Human Rights Clinic, Harvard Law School, *Shaking the Foundations: The Human Rights Implications of Killer Robots*, May 2014, http://www.hrw.org/sites/default/files/reports/arms0514_ForUpload_0.pdf (accessed 20th November 2015); Amnesty International, *Autonomous Weapons Systems: Five Key Human Rights Issues for Consideration*, ACT 30/1401/2015, April 2015, available at <https://www.amnesty.org/en/documents/act30/1401/2015/en/> (accessed 20th November 2015).

13 Tonghua public security police UAV developed successful test flight, *New Culture Network*, enews.xwh.on, 25th January 2014, http://enews.xwh.cn/shtml/xwhb/20140125/content_2.shtml (accessed 22nd June 2015), [unofficial English translation]; Tonghua developed series of police drones in use, *Wuhan Public Security Bureau*, undated, <http://www.whga.gov.cn/mobile/newsPage.jsp?id=1201402271310500784> (accessed 22nd June 2015), [unofficial English translation].

14 Indian police to use ‘pepper-spray drones’ on protesters, *Daily Telegraph*, 8th April 2015, <http://www.telegraph.co.uk/news/worldnews/asia/india/11521639/Indian-police-to-use-pepper-spray-drones-on-protesters.html> (accessed 18th November 2015); *Pepper-spraying drones could be used on unruly crowds by Indian police*, *The Guardian*, 8th April 2015, <http://www.theguardian.com/world/2015/apr/08/pepper-spraying-drones-could-be-used-on-unruly-crowds-by-indian-police> (accessed 18th November 2015).

15 IDF robots to be used during raids, <http://www.ynetnews.com/articles/0,7340,L-3739422,00.html> (accessed 9th November 2015).

16 Kelion, L. *African Firm is Selling Pepper-Spray Bullet Firing Drones*, *BBC News*, 18th June 2014, available at <http://www.bbc.co.uk/news/technology-27902634> (accessed 3rd November 2015); Hurst, L. *Indian Police Buy Pepper Spraying Drones to Control ‘Unruly Mobs’*, *Newsweek*, 7th April 2015, available at <http://europe.newsweek.com/pepper-spraying-drones-control-unruly-mobs-say-police-india-320189> (accessed 9th November 2015).

17 Hurst, L./*Newsweek* (7th April 2015) op.cit.

18 Van Leijenn, M., *Dubai Police show smart aircraft and anti-riot vehicle*, *Emirates 24/7 News website*, 7th July 2013, available at <http://www.emirates247.com/news/emirates/dubai-police-show-smart-aircraft-and-anti-riot-vehicle-2013-07-07-1.513444> (accessed 5th November 2015).

19 Gammage, J. *Camden Jail Installs A System To Tear-Gas Prisoners*, *Philadelphia Inquirer*, 20th July 1990, http://articles.philly.com/1990-07-20/news/25895957_1_tear-gas-system-inmates-canisters (accessed 20th November 2015); Gammage, J., *Tear-gas System Put In N.j. Jail*, *Philadelphia Inquirer*, 5th August 1990, http://articles.philly.com/1990-08-05/news/25934203_1_jail-administrators-inmates-gas (accessed 20th November 2015); see also: CBSDC, *Groups Concerned Over Arming Of Domestic Drones*, 23rd May 2012, <http://washington.cbslocal.com/2012/05/23/groups-concerned-over-arming-of-domestic-drones/> (accessed 3rd November 2015).

20 There is continuing controversy over the nature and scope of the terms non-lethal and less lethal weapons. In recognition of this,

reports that certain non-State actors including private security companies and mining corporations have also explored acquisition of such delivery mechanisms.²¹

Consequently, the following sections of this report explore a variety of “remote control” RCA means of delivery that are reportedly being developed or have been developed or promoted by companies, State research institutes or other bodies, since the Chemical Weapons Convention came into force in 1997. Research in this area has proven difficult, often being constrained by restrictions on access to relevant information sources, and curtailed by issues of commercial confidentiality. Consequently, this review is by no means exhaustive, and the spread and frequency of entities cited does not claim to be representative of the companies or State bodies developing, promoting or holding such means of delivery – but instead reflects the open source information that could be obtained by the researchers at this time. Prior to publication, attempts were made to contact the relevant national oversight bodies and the companies developing these RCA delivery mechanisms to provide them with an opportunity for clarification; responses are cited, as appropriate.

Indoor RCA dispersion devices

Certain RCA dispersion devices have been developed for indoor installation, for use in building or area protection or alternatively in prisons, correctional centres, or other places of detention. The placement of such devices in confined spaces or poorly ventilated rooms, or their use in situations where prisoners, detainees, or other targets cannot leave the contaminated area rapidly due to limited exit routes, could pose a risk of resultant build-up of toxic chemicals, leading to serious injury or death. The employment of such devices in larger enclosed areas such as prison halls also has the potential to lead to injuries resulting from panic and stampedes.²²

the term “less lethal” will be placed in quotation marks when used by the author during this publication – unless quoted directly from other sources.

21 Kelion, L. *African Firm is Selling Pepper-Spray Bullet Firing Drones*, *BBC News*, 18th June 2014, available at <http://www.bbc.co.uk/news/technology-27902634> (accessed 3rd November 2015).

22 Crowley, M. *The use of riot control agents in law enforcement*, in Casey-Maslen, S. (ed.), *Weapons Under International Human Rights Law*, Cambridge University Press, 2014, p.346.

Automated area protection system [Germany]

Information contained in a 2007 German Government survey of civilian security research, highlighted the development by German company SIDAG GmbH of a range of automated defense systems utilising riot control agents (CS or OC).²³ According to the SIDAG report entry, the “task of these automated defence systems” was to “register a burglar or terrorist penetrating a secured area, to trigger a remote alarm and, at the same time, to give the perpetrator an acoustic warning and make him go back. If the perpetrator ignores the warning and penetrates further into the area, teargas is released in automatic doses, thus preventing the perpetrator from continuing his actions, until the alarmed intervention forces arrive.”²⁴

The survey included information on a range of systems that had been developed or were then under development by SIDAG GmbH for specific domestic, law enforcement or military needs:

*“Alongside civilian use, military applications have also emerged for protecting highly sensitive installations, e.g ammunition stores to prevent procurement theft or sabotage. Both application areas are undergoing further development. At the moment, a system is being developed for police vehicles and demonstration prevention.”*²⁵

The range of SIDAG products and projects detailed in the German Government survey, included:

- HouseGuard system for civil use as protection for rooms measuring up to 300 m³, wall mounting series;
- EWR 1 extension module for increasing the spray range for larger rooms;
- DA ceiling mounted system with hosepipes for teargas supply, system as above;
- ZG 010A large unit for military use for rooms measuring up to 3,000 m³, suitable for protecting supply infrastructures;
- WTS 010 designed for protecting security vehicles and for use in police vehicle protection and for preventing demonstrations.²⁶

²³ German Federal Ministry of Education and Research, *Research for Civil Security An Inventory: Research Landscape and Contacts, 2007*, available at http://web.archive.org/web/20130502073316/http://www.bmbf.de/pub/research_for_civil_security_an_inventory.pdf (accessed 3rd November 2015).

²⁴ German Federal Ministry of Education and Research (2007) *op.cit.*, p.35.

²⁵ German Federal Ministry of Education and Research (2007) *op.cit.*, p.35.

²⁶ German Federal Ministry of Education and Research (2007) *op.cit.*, p.35.



SIDAG RSS-O Automatic infrastructure and high security area protection system. ZR 010 photographed at Eurosatory 2010, Paris 14-18 June 2010. (Photo: © Robin Ballantyne/Omega Research Foundation)

Subsequent information concerning SIDAG development or promotion of fixed installation tear gas systems is limited. Although the company did promote such systems at the Eurosatory arms and security exhibition, held in Paris in June 2010 (see figure above), no details of acquisition of such systems by law enforcement agencies are available. Correspondence to BNLWRP/ORF from the German Foreign Office stated that it was “not aware of any business relations between ...SIDAG GmbH, and German law enforcement agencies.”²⁷

TG Guard Security Protection System [United States]



Images (left) from Mace Security Systems Product Catalogue and (below) Mace Security International, Inc. 2015 product catalogue



²⁷ Correspondence from Dr Israng, Ambassador and Permanent Representative of the Federal Republic of Germany to the OPCW, 24th November 2015.

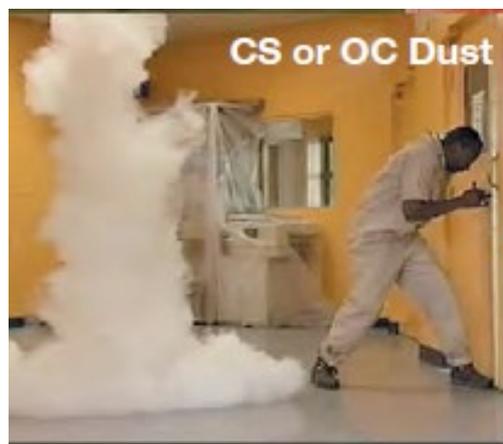
The TG Guard system was originally developed by the US company Mace Security Systems (now Mace Security International, Inc.), which as of November 2015, has continued to promote this RCA dispersal system. According to the company:

“The system is designed to move disruptive inmates out of an affected area without sending in correctional officers who may be harmed or taken hostage. Through the strategic arrangement of dispensers installed in ceilings or elevated fixtures the system moves the inmates in a controlled fashion. Dispenser placement and the amount of irritant agent discharged determines in which direction and in what manner the inmates move.”²⁸

Furthermore, the company has stated that:

“The chemical agent dispenser configuration is highly customizable. The TG Guard Security Protection System may be installed using single fixture, multi-fixture or a combination of fixtures throughout... In a typical correctional institution installation, each fixture contains one canister of low, medium, and high concentration of irritant agent. Upon triggering at the remote console, the respective chemical agent fixtures are activated. The operator has complete control over the system and may activate a variety of levels of agent to selected locations to contain, move, and thus quell the potential riot.”²⁹

According to the company, the TG Guard Security Protection System has been “designed for indoor installation and deployment. The system is typically installed in high traffic or congregation area where the maintenance of security is most challenging. These areas include: Dining halls...Gymnasiums...Housing units...Work areas... [The System] is capable of selective and rapid deployment of a powerful tear gas deterrent agent from single or multi-fixture dispensers. The fixtures are tamper-resistant and inaccessible to the general population. The remote firing console is customarily located in a secure area and requires a security key for activation.”³⁰



Images taken from Non-Lethal Technologies, Inc. 2014 product catalogue, showing the demonstration of system employment

A second US company, NonLethal Technologies, Inc., has promoted a very similar, if not identical, system. According to this company’s 2014 product catalogue, the TG Guard System has been designed to “provide critical force protection for personnel and facilities by use of remotely deployed tear gas as a deterrent to control disturbances, uprisings, and riots in any facility where protective security is required, whether it be prisons, government buildings, or embassies.”³¹

According to NonLethal Technologies, Inc., “the basic TG Guard Control Unit can operate and discharge up to 25 tear gas Dispensers selectively, which then can protect the dining areas, work areas, recreation areas, sally ports, and halls of most prison facilities, or critical approach areas of government buildings and embassies such as entry points, communications rooms and armories. Larger facilities can use multiple Control Units and Dispensers to accommodate their security needs.”³²

Whilst NonLethal Technologies, Inc. marketing material has indicated that “CS or OC dust” can be employed in the system³³, full details of the specific agents and quantities of such agents employed are not publicly available.

According to Mace Security International Inc. the TG Guard Security Protection System is “in use today in correctional facilities, embassies, and other sensitive installations around the world.”³⁴ Although further details of current employment are not available, there have been previous media reports that certain US prisons had installed the TG Guard system.³⁵

31 Less Lethal, Tactical Munitions and Weapons Systems for Military, Corrections and Law Enforcement, Product catalogue, NonLethal Technologies, Inc., 2014, p. 12

32 NonLethal Technologies, Inc. (2014) op.cit., p. 12

33 NonLethal Technologies, Inc. (2014) op.cit., p. 12

34 Mace Tactical Products, TG Guard, Mace Security International, Inc. <http://www.macetactical.com/products/> (accessed 3rd November 2015).

35 See for example: Gammage, J. Camden Jail Installs A System To Tear-Gas Prisoners, Philadelphia Inquirer, 20th July 1990, http://articles.philly.com/1990-07-20/news/25895957_1_tear-gas-system-inmates-canisters (accessed 20th November 2015); Gammage, J., Tear-gas System Put In N.J. Jail, Philadelphia Inquirer, 5th August 1990, <http://articles.philly.com/1990-08-05/>

28 TG Security Protection System, Mace Security International, Inc. <http://www.tgguard.com/what.html> (accessed 3rd November 2015).

29 TG Guard, How it works, Mace Security International, Inc. <http://www.tgguard.com/how.html> (accessed 3rd November 2015).

30 TG Guard, How it works, Mace Security International, Inc. <http://www.tgguard.com/how.html> (accessed 3rd November 2015).

External area clearing or area denial systems

Certain manufacturers have developed and promoted a range of “less lethal” systems, including those delivering riot control agents which appear to be intended to clear or ensure denial of specific outdoor areas. Some of these devices appear to be target-activated whilst others are controlled by a remote operator.

Water restraint system [Israel]



Images of water restraint system (WRS) taken from Beit Alfa Technologies website

The Israeli company, Beit Alfa Technologies, has developed and as of November 2015, promoted the Water Restraint System (WRS) which it described as “a non-lethal, high-pressure water stream restraining system designed specifically for control of dangerous inmate situations in correctional facilities.”³⁶ According to the company, the high-pressure water stream “provides enough force to restrain an average size human at a distance of 131 feet.” The WRS is available for both mobile and stationary mounting. Stationary installations are custom designed to each application and “typical installations” include “building rooftops viewing small exercise yards and on self-supporting towers.”³⁷

news/25934203_1_jail-administrators-inmates-gas (accessed 20th November 2015).

36 Water Restraint System, Beit Alfa Technologies, details available from the company website <http://www.bat.co.il/products2.htm> (accessed 9th November 2015).

37 *Ibid.*

In addition to the standard kinetic effects of high pressure water jets, the company marketing material has stated that: “[I]n extreme situations, chemicals can be injected in the water stream, under officer control, to further restrain and demobilize the inmate. For example, when the operator determines that the situation requires more severe action, Oleoresin Capsicum... can be automatically injected into the water stream. Options include the injection of Tear Gas and colored or colorless dyes if marking the object is desired.”³⁸

The company marketing materials have stated that:

“A subject sprayed with OC water stream will experience closing of the eyes, burning sensation of skin and mucous membranes, uncontrollable coughing, breathing difficulty, and possible muscle spasms. The subject is quickly immobilized though not seriously injured, eliminating the threat... B.A.T.’s Water Restraint System... will stop inmate fighting in less than 15 seconds...”³⁹

The company has stated that “[t]he chemical strengths are selected at the time the B.A.T.’s WRS is installed.”⁴⁰ No further details are provided as to the nature and strength of the chemical agents employed in this system.



Less than lethal mines displayed on the 9604 Factory Xiangfan City Hubei Province stall at China Police, 2008. Photograph: © Robin Ballantyne/Omega Research Foundation.

The Chinese State-owned No. 9604 Factory has developed and promoted a range of “Anti-Riot Warning Mines” which have the: “features of both mine and anti-riot grenade.” These mines “can immediately work and barricade rioters and raise an alarm when the distributed mine is lifted and knocked down.” They can also be used “for guard[ing] along with roadblocks under main roads and important departments.”⁴¹ According to State-owned No. 9604 Factory

38 *Ibid.*

39 *Ibid.*

40 *Ibid.*

41 No.9604 Factory Xiangfan City Hubei Province, Anti-riot grenades for police, [In English and Chinese], undated publication, distributed by company in 2006 [copy held by Omega Research Foundation].

publications, the following categories of “Anti-Riot Warning Mine” are produced: explosive tear gas mine, smoke tear gas mine, rubber ball mine, dye mine and flash mine, with the tear gas mine having a dispersion area greater than 200 m².⁴² Information on this product has also appeared in the 2006 edition of *Jane’s Police and Security Equipment* which described its status as: “in production and in service”.⁴³ A very similar (if not identical) product has also been promoted by a second Chinese company, Hubei Handan Mechatronics Co. Ltd, in its Military Products Manual.⁴⁴

Sphinx and Syproz area denial/protection systems [France]



Images of the Sphinx system taken from Etienne Lacroix Defence & Security marketing material

According to marketing literature distributed by French manufacturer, Etienne Lacroix Defence & Security (which is part of the Etienne Lacroix Group), the Sphinx is a portable delivery mechanism which is “designed to ensure area denial during riot control

42 No.964 Factory Xiangfan City Hubei Province (2006) op.cit
 43 *Janes Police and Security Equipment*, 3rd November 2006, *Janes Information Group*, p.519.
 44 *Hubei Handan Mechatronics Co. Ltd, Military Products Manual, the anti-riot warning mine series*, pp. 17-20, undated publication, distributed by company in 2008, [copy held by Omega Research Foundation].

operations.”⁴⁵ The *Jane’s Police and Homeland Security Equipment 2009-2010 Handbook* stated that the Sphinx system “strengthens the protection of fixed positions, temporarily parked units or command posts. It prohibits access to the area to be protected by firing lethal or less-lethal ammunition at short range, depending on the threat considered.”⁴⁶ Lacroix marketing material distributed at the Eurosatory 2014 arms and security exhibition, stated that the Sphinx system was “field & mission adaptable” for potential employment in protecting “critical infrastructure; FOB [forward operating base] and COP [command outpost]; border and pipeline security; counter mobility” operations.⁴⁷

According to Lacroix Defense & Security, the system covers a 140° arc within a distance of 50 metres and “immediately controls an area of around 3000m² in front of the launcher”.⁴⁸ The Sphinx system can be controlled through landlines or remotely, and firing cannot be initiated without the operator’s decision. It fires ammunition from the Galix range, produced in cooperation between Lacroix and Giat Industries (now part of the Nexter Group). This includes the Galix 15 80mm tear gas munition which weighs 1.5kg and is deployed at a range of 35 metres by the Sphinx launcher.⁴⁹ The Sphinx system has the capacity to fire three such Galix RCA munitions simultaneously.

According to Etienne Lacroix Defence, the Sphinx system “can be incorporated into the Syproz complete zone protection system.”⁵⁰ This system appears to be similar if not identical to Sphinx NT, which Lacroix Defense states: “ensures protection of strategic points, checkpoints and troop encampments.”⁵¹ The Sphinx NT system has a wireless remote command/control function, is modular, and has LOS (line of sight) and NLOS (non-line of sight) multi-effect applications. It has the following “AP/AV (anti-personnel/anti-vehicle) graduated effects: Galix ammunition; remote controlled hand grenades; 56mm ammunition range; anti-vehicle device.”⁵² All of these components, as featured in

45 *Lacroix Defence & Security, Law enforcement, control area/ launchers, Sphinx*, previously available from http://www.nachtsicht-germany.de/Nachtsichtneu/index_htm_files/CONTROLE%20DE%20ZONE_GB.PDF (accessed 14th February 2013).
 46 *Jane’s Police and Homeland Security Equipment 2009-2010 Handbook*, *Jane’s Information Group*, (ed) McBride, M., 12th August 2009, p.376.
 47 *Lacroix, Sphinx NT Area Protection System, brochure distributed at Eurosatory 2014, Paris, June 2014 (copy held by Omega Research Foundation)*.
 48 *Lacroix Defence & Security, Law enforcement, control area/ launchers, Sphinx*, previously available from http://www.nachtsicht-germany.de/Nachtsichtneu/index_htm_files/CONTROLE%20DE%20ZONE_GB.PDF (accessed 14th February 2013).
 49 *Etienne Lacroix Defence, Sphinx Perimeter Defence System, Brochure*, distributed at IDEX 2001, 18th – 22nd March 2001.
 50 *Lacroix Defence & Security, Law enforcement, control area/ launchers, Sphinx*, previously available from http://www.nachtsicht-germany.de/Nachtsichtneu/index_htm_files/CONTROLE%20DE%20ZONE_GB.PDF (accessed 14th February 2013).
 51 *Lacroix Defense website, our products, self-protection/ area protection*, <http://www.lacroix-defense.com/produit.php?nom=sphinxnt&categorie=land&souscat=SELF%20PROTECTION> (accessed 3rd November 2015).
 52 *Lacroix Defense website, our products, self-protection/ area protection*, <http://www.lacroix-defense.com/produit.php?nom=sphinxnt&categorie=land&souscat=SELF%20>

the schematic diagram (below), are described in the Etienne Lacroix documentation relating to Syproz.⁵³

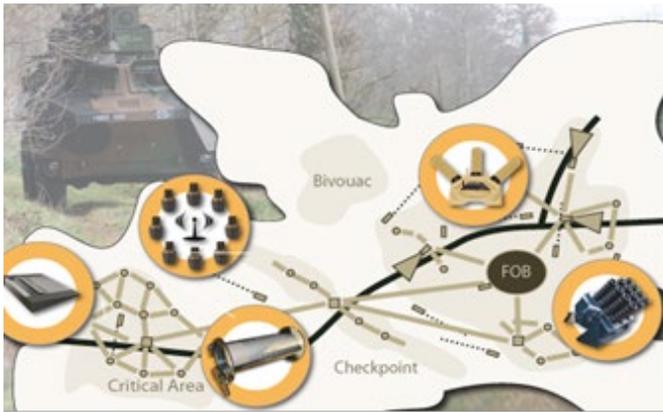


Image of the schematic for the Sphinx NT system taken from the Lacroix Defense website. The diagram indicates that the system can incorporate the Cougar 12 launcher, Sphinx system, Puma launcher and the WIT remote controlled “non-lethal” ammunition firing system.

Automatic grenade launchers and associated RCA projectiles

Certain automatic grenade launchers which incorporate a remote control capability can utilise a range of “less lethal” rounds, including RCA grenades. Although these launchers can fire singles shots; when employed in continuous firing mode, and given their potential high rate of fire, they have the capability to rapidly discharge large numbers of RCA projectiles blanketing wide areas, cumulatively delivering significant amounts of RCA and potentially affecting large numbers of people.

Vehicle mounted 38mm automatic grenade launcher

At both the Asia Pacific China Police Expos of 2012 and 2014, China Ordnance Equipment Research Institute (No.208 Research Institute of China Ordnance Industries) promoted a 38mm Automatic Riot Grenade Launcher designed to be mounted on land vehicles or naval craft and which can be remotely controlled by an operator inside the vehicle. The launcher is loaded by a belt-fed system with 60 grenades per belt, and it has a maximum firing rate of 200 grenades per minute.⁵⁴

According to an unofficial translation of the company marketing material: “The 38mm automatic riot grenade launcher system can adjust and switch firing rate, from single fire to interrupted fire and continuous fire, and can control and cope with mass events quickly and effectively.”⁵⁵ The maximum effective range of the

PROTECTION (accessed 3rd November 2015).

⁵³ Lacroix Defence & Security, Law enforcement, control area/ launchers, previously available from http://www.nachtsicht-germany.de/Nachtsichtneu/index_htm_files/CONTROLE%20DE%20ZONE_GB.PDF (accessed 14th February 2013).

⁵⁴ Information taken from China Ordnance Equipment Research Institute, undated catalogue, distributed at Asia Pacific China Police Expo 2012. [Information is from an unofficial English translation of the Chinese original on file with the Omega Research Foundation], p.8.

⁵⁵ China Ordnance Equipment Research Institute (undated catalogue) op.cit.,p.8.

launcher utilizing the 38 mm grenade series is at least 300 metres. It is compatible with a range of 38mm grenades, including 38mm tear gas grenades as well as smoke and stun grenades.⁵⁶ No further information is available concerning the tear gas grenades that can be employed i.e. the type and quantity of RCA which they contain.

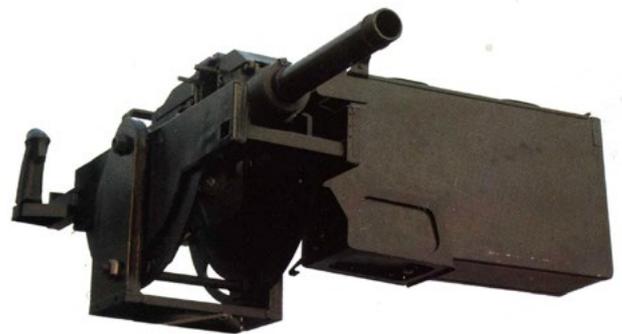


Image of vehicle mounted 38mm automatic grenade launcher taken from marketing material by No.208 Research Institute of China Ordnance Industries (right) and (left) product on display at China Police 2014 . Photograph: © Robin Ballantyne/Omega Research Foundation.

64mm automatic grenade launcher

In 2012, China Ordnance Equipment Research Institute (No.208 Research Institute of China Ordnance Industries) promoted a 64mm Automatic Riot Grenade Launcher. According to an unofficial translation of the original company marketing material, this weapon system is designed to “cope with large-scale mass events”, and can be mounted on land vehicles or naval craft. The launcher can be remotely controlled by an operator inside the vehicle.⁵⁷

It is compatible with a range of 64mm grenades including 64mm tear gas grenades, smoke grenades, stun grenades and explosive dye projectiles. The grenades are loaded by a belt-fed system with 30 grenades per belt. “The firing rate can be switched between single fire, interrupted fire, and continuous fire” with the launcher able to deliver a maximum firing

⁵⁶ China Ordnance Equipment Research Institute (undated catalogue) op.cit.,p.8.

⁵⁷ China Ordnance Equipment Research Institute (undated catalogue) op.cit., p.13.

rate of 60 shots/minute.⁵⁸ The maximum effective range of the launcher utilizing the 64 mm grenade series is 600m, which according to the company is “*much further than similar equipment in the domestic and foreign market.*”⁵⁹ No further information is available concerning the tear gas grenades that can be employed i.e. the type and quantity of RCA which they contain.

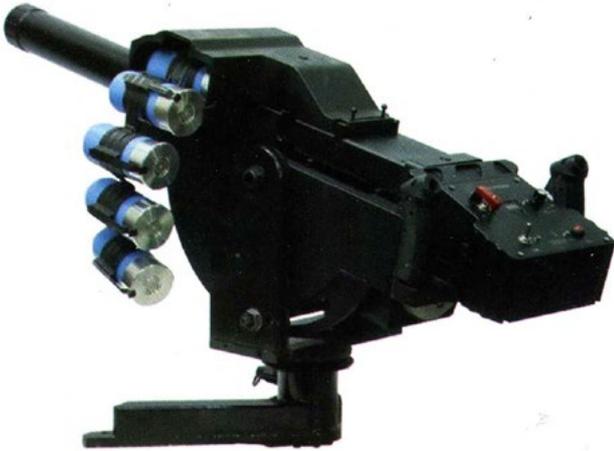


Image of vehicle mounted 64mm automatic grenade launcher taken from marketing material by No.208 Research Institute of China Ordnance Industries

Multi-launchers and associated RCA projectiles

A range of multi-launchers have been developed and promoted that are capable of delivering salvos of a variety of so-called “less lethal” projectiles, including those containing RCAs. Although these launchers can fire single shots, they also have the capability to rapidly discharge large salvos of RCA projectiles and can be employed to blanket wide areas, cumulatively delivering significant amounts of RCAs and potentially affecting large numbers of people. They vary in the maximum number of projectiles launched, rapidity and mode of fire, range and area coverage, as well as in terms of the calibre, weight and agent fill of the projectiles utilized. Unlike the automatic grenade launchers described previously which are belt or box fed, the multi-launchers are normally manually reloaded.

38mm/40mm Multiple Launchers [Republic of Korea]

The South Korean manufacturer Korea CNO Tech.Co., Ltd, has developed and promoted a “*remote controlled 38mm multiple launcher*” which has been “*designed to [be] install[ed] on the back of pick up truck or back side of SUV to disperse the crowd efficiently.*”⁶⁰ According to the manufacturer, “*Both single shot and multiple shots are available from the remote controller...Police*

58 China Ordnance Equipment Research Institute (undated catalogue) op.cit., p.13.

59 China Ordnance Equipment Research Institute (undated catalogue) op.cit., p.13.

60 Anti-Riot & Police Equipment brochure, Korea CNO Tech Co. Ltd, undated, distributed at Eurosatory 2012 security exhibition, Paris, France, 11th -15th June 2012, (copy on file with Omega Research Foundation), p.3.

can fire [the launcher from] inside [a] vehicle by using [the] remote controller without exposing themselves to various outside dangers...IR camera [provides] outside view both day and night time.”⁶¹ 38mm CS cartridges (or 38mm “rubber ball bullets”) can be fired from this device, though the promotional material also indicates that employment of 40mm projectiles is also possible. The firing distance is given as between 80-120 metres.⁶²

The company has also developed the Stark vehicle-mounted remote control multiple launcher. The launcher utilises either 38mm or 40mm CS cartridges and is available in 9, 15 and 30 shot varieties. The Stark remote control launcher is operated by a remote control console and the system also incorporates an IR camera. It is designed “*To be mounted [on] every kinds of vehicles and buildings [sic].*”⁶³ These launchers have been promoted on the company website and at security exhibitions.⁶⁴

Although the marketing materials for both launcher types does not provide details of the specific CS cartridges employed, the company does manufacture 38mm and 40mm CS/impact cartridges which can be “*fired from 38mm/40mm anti-riot launchers*” and which have a shooting distance of 120m.⁶⁵ For example, the 38mm (CN-38S) CS/impact cartridge weighs 145-150g, and the 40mm (CG-40) CS/impact cartridge weighs 175g – though no details of the amount of CS in each cartridge are given.⁶⁶

In correspondence to BNLWRP/ORF, dated 20th November 2015, explaining the reasons for incorporating remote control firing into the Stark launcher, Korea CNO Tech Co. Ltd. stated:

*“The main purpose of Remote control firing is to protect users from dangerous riot situation and, at the same time, to protect the people (riots) from improper firing of law enforcements which may be happened possibly. When the law enforcements are confronting the riot-control situation facing against annoying riots, they may use their hand-held launchers improperly to protect themselves instinctively. As you know well, non-lethal launchers and non-lethal ammunitions are to be aiming the area where the riots are gathered not any specific target. **The Stark can’t aim any target precisely - not like a hand-held launcher or a water cannon – as its principal purpose, it can fire the non-lethal ammunitions with maximum range 180 meter to disperse the riots. The Remote controller with monitor will secure safe and peaceful using of non-lethal agents while the law enforcements are in the vehicle feeling safely.**”*⁶⁷ [Emphasis added].

61 Korea CNO Tech Co. Ltd (undated) op.cit. p.3.

62 Korea CNO Tech Co. Ltd (undated) op.cit. p.3

63 Korea CNO Tech Co.Ltd website, http://en.cnotech.com/police23?gc_code=020203&seq=23#goods-detail23 (accessed 13th November 2015).

64 Ibid; Stark machine vehicle mounted remote control type, product brochure, Korea CNO Tech Co. Ltd, distributed at MILIPOL 2013, Paris, France, (copy on file with Omega Research Foundation).

65 Korea CNO Tech Co. Ltd (undated) op.cit. p.4.

66 Korea CNO Tech Co. Ltd (undated) op.cit. p.4.

67 Correspondence from J. Jong, General Manager,

Thunderstorm - MBL12 (multibarrel launcher) [Israel]



Image of Thunderstorm - MBL12 (multibarrel launcher) taken from ISPRA website

Israeli company, ISPRA, has developed and as of November 2015 promoted the Thunderstorm MBL12 Multi Barrel 38mm Launcher system, which it claims can “quickly disperse a mixture of different types of less lethal ammunition types, to variable ranges, providing law enforcement forces with the tools to get the situation under control while minimizing harm to civilians, police forces and public property.”⁶⁸ Thunderstorm “can deliver large quantities of less lethal ammunition in a very short time covering larger areas at distances from 50 up to 210 meters.”⁶⁹

The Thunderstorm Multi Barrel Launcher can be “mounted on vehicles, marine vessels or defensive structures”. It is supplied with an optional, specially designed, Pan and tilt positioner motor.⁷⁰ Amongst the RCA rounds that can be employed in the system are 38mm, 3 Sub Munition Tear Gas Rounds “which enable the Multi Barrel Launcher to disperse up to 36 Tear Gas Capsules in one single Burst”; 38mm Long Range CS Smoke Rounds; and 38mm Stun + Powder Rounds which are intended “to be used in conjunction with tear gas rounds, these rounds help achieve maximum deterrence and confusion in the rioting crowd, detonating over the crowds heads and dispersing pepper or CS powder from above.”⁷¹

IronFist 38mm and Cobra 40mm non-lethal weapon systems [United States]

According to marketing material distributed in 2013 by US manufacturer, NonLethal Technologies⁷², the

IronFist is “a new 38mm weapon system with up to 36 barrels...[intended] to rapidly deploy a blanket of less lethal munitions into, or over, a hostile crowd.”⁷³ The IronFist can employ “standard conventional 38mm less lethal CS, flashbang, and colored smoke rounds...or... NonLethal Technologies’ specially designed 10 inch 38mm rounds with higher capacity CS...”⁷⁴

When the IronFist 36 barrel system is loaded with high capacity 10 inch CS rounds (each with 7 mini-grenades) “it can rapidly deploy over 250 mini-grenades into the crowd within 2 minutes from... up to 150 metres. Two such configured systems mounted on one armoured vehicle can deploy over 500 CS mini-grenades, or a mix of CS mini-grenades and flashbang-distraction projectiles downrange in that...time...now that is nonlethal firepower!”⁷⁵ [Emphasis added].

The IronFist system is designed to be hard-mounted on a wide range of land vehicles and marine vessels, or to permanent structures “such as prisons, government buildings, military base perimeters, or embassy compounds.”⁷⁶ According to the company, “the IronFist can be configured in several forms to fit any tactical vehicle, whether hard mounted directly to the roof in front of a hatch, or hard mounted to a revolving turret with remotely controlled elevation capability.”⁷⁷

Nonlethal Technologies, Inc. has subsequently developed a 36 rifle-barrelled variant to this system, called Cobra40, which is capable of firing a range of low-velocity lethal 46x40mm munitions for use against “enemy combatants”.⁷⁸ When the “threat is one of civil unrest”, Cobra40 can instead be “loaded with any of the [company’s] less lethal 40mm rounds, or Hi-Load™ 37/38–40mm rounds”.⁷⁹ The company has subsequently promoted both IronFist and Cobra40 at the 2015 International Defence Exhibition and Conference (IDEX) held in the United Arab Emirates⁸⁰ and, as of November

distributed at IDEX 2013, Abu Dhabi, United Arab Emirates, 17th – 21st February 2013. The International Defence Exhibition and Conference (IDEX) 2013 was held in Abu Dhabi, United Arab Emirates from 17th – 21st February 2013. According to the conference organisers “IDEX is the only international defence exhibition and conference in the MENA [Middle East and North Africa] region demonstrating the latest technology across land, sea and air sectors of defence. It is a unique platform to establish and strengthen relationships with government departments, businesses and armed forces throughout the region.” For further details see: <http://www.idexuae.ae/page.cfm/link=20> (accessed 28th February 2013).

⁷³ IronFist, NonLethal Technologies, undated brochure, distributed at IDEX 2013, Abu Dhabi, United Arab Emirates, 17th – 21st February 2013.

⁷⁴ IronFist, NonLethal Technologies (undated) op.cit.

⁷⁵ IronFist, NonLethal Technologies (undated) op.cit.

⁷⁶ IronFist, NonLethal Technologies (undated) op.cit.

⁷⁷ IronFist, NonLethal Technologies, revised but undated brochure, available from NonLethal Technologies, Inc. website, available at <http://www.nonlethaltechnologies.com/pdf/NLT-BROCHURE.pdf> (accessed 2nd April 2015).

⁷⁸ IronFist, NonLethal Technologies, revised but undated brochure, available from NonLethal Technologies, Inc. website, available at <http://www.nonlethaltechnologies.com/pdf/NLT-BROCHURE.pdf> (accessed 2nd April 2015).

⁷⁹ IronFist, NonLethal Technologies, Product Brochure (Revised but undated) op.cit.

⁸⁰ IDEX 2015 was held in Abu Dhabi, United Arab Emirates, from 22nd–26th February 2015. The IDEX website provides information about NonLethal Technologies participation, and includes a link to its product brochure which includes details of IronFist and Cobra, available at <http://www.idexuae.ae/page.cfm/Link=1/t=m/goSection=1> (accessed 2nd April 2015).

International Sales Dept, Korea CNO Tech Co. Ltd. 20th November 2015.

⁶⁸ ISPRA Products, Thunderstorm - MBL12 multibarrel launcher, available from company website at <http://ispraltd.com/Product.asp?PiD=0.4.113&id=114> (accessed 20th November 2015). A product brochure containing information on the Thunderstorm MBL12 multibarrel launcher was also distributed by the company at MILIPOL 2015 arms and security exhibition, Paris, France, 17th -20th November 2015[copy on file with the Omega Research Foundation].

⁶⁹ Ibid.

⁷⁰ Ibid.

⁷¹ Ibid.

⁷² IronFist, NonLethal Technologies, undated brochure, Remote Control Project



Image of the Iron Fist 38mm non-lethal weapon system (left) and COBRA40 (above) taken from NonLethal Technologies brochures



VENOM 37mm non-lethal tube launched munition system (NLTL/MS) [United States]

The VENOM launcher was developed by Combined Systems, Inc. (CSI) for use by military security and police forces in a variety of scenarios. According to CSI: *“The CTS VENOM is a platform mounted high-capacity variable payload launching system for early warning signals at vehicle checkpoints, moving convoys or for determining the intent of approaching marine vessels. It is effective as a force multiplier, capable of precise area delivery of munitions while enhancing the capabilities of area denial and force escalation in riot control situations.”*⁸¹

The CTS VENOM is a modular launching system which accepts three cassettes, each loaded with ten 37mm cartridges.⁸² The 30 cartridges are contained in three levels at varying degrees elevation, and can be fired in immediate succession. Each cartridge is assigned an IP address allowing individual cartridge or desired sequence firing from a fire control panel,

communicating via cable or wireless device. VENOM is capable of delivering a variety of “non-lethal” payloads including 37mm “multi-7 smoke CS” munitions which have a maximum range of 150 metres.⁸³

CSI subsequently developed the VENOM Multi-Caliber (MC) Launching System and began promoting this product from January 2013. The VENOM MC is *“modular and is available in single, double and triple bank configurations. Each bank can launch ten 37mm or 40mm grenades, and five 66mm grenades”*.⁸⁴ CSI has promoted a range of associated payloads which *“run the spectrum of non-lethal responses from flash and sound distraction, smoke obscuration, fast obscuration, smoke irritant, and blunt trauma individual or combination effects to OC vapor grenades.”*⁸⁵ According to the company *“These effects support escalation of force, early warning & determination of intent, crowd dispersal and area denial objectives.”*⁸⁶ In

81 Combined Systems Inc. Product Catalogue, Venom launching systems, undated, catalogue distributed at IDEX 2013, Abu Dhabi, United Arab Emirates, 17th – 21st February 2013. Also available at: https://www.combinedsystems.com/userfiles/pdfs/CSI_MIL_Product_Catalog_2010.pdf (accessed 14th February 2013), p.4.

82 Combined Systems Inc. Product Catalogue (undated) op.cit., p.4.

83 See Combined Systems Inc. Product Catalogue (undated) op.cit., p.4; Non-lethal tube launched munition systems, Venom, V-10, Combined Systems, Inc. (undated)

84 Combined Systems Inc, Venom MC Launching System, https://www.combinedsystems.com/_pdf/SpecSheets/SmallVENOM%20MC%20Flyer-JAN2013.pdf (accessed 3rd November 2015).

85 Combined Systems Inc, Venom MC Launching System (January 2013) op.cit.

86 Combined Systems Inc, Venom MC Launching System (January 2013) op.cit.



Images of VENOM RCA launchers on the Provectus Robotics AMSTAF UGV (left) and the Gladiator TUGV (right)

addition to the 37mm Multi-7 CS smoke sub-munition, these payload options include: a super long range 40mm CS smoke sub-munition, with a maximum range of 450m; a 66mm high capacity CS smoke grenade, with a maximum range of 200m; and a 66mm high capacity OC vapour grenade, with a maximum range of 150m.⁸⁷

CSI previously attempted to integrate VENOM on unmanned vehicles such as the Gladiator TUGV [Tactical Unmanned Ground Vehicle] to “further enhance Venom capabilities and keep warfighters out of harms way in urban battlefields.”⁸⁸ The Gladiator TUGV was intended for use by the US Marine Corps⁸⁹, however the research and development programme was later cancelled.⁹⁰ VENOM was subsequently mounted on the Provectus Robotics AMSTAF unmanned ground vehicle [together with the long range acoustic device (LRAD)].⁹¹ This system was show-cased at the North American Technology Demonstration⁹² held in Canada in October 2011, which was sponsored by the North Atlantic Treaty Organisation (NATO) and the U.S. Joint Non-Lethal Weapons Directorate (JNLWD).⁹³ According to the

Supersound Security Group/WOLF GZ1 - an authorised strategic partner and representative of AMSTAF Technologies and Products – the AMSTAF UGV solution with: Venom & LRAD has been “recommended by the Israeli police and the Canadian RCMP for riots control, to keep police officers out of harm.”⁹⁴

(Land) Cougar 12 56mm multiple launcher [France]

According to the French manufacturer, SAE Alsetex⁹⁵, the Cougar 12 is designed for “any law enforcement and public order operations in urban and rural environments”.⁹⁶ It is a 12 barreller launcher that can be used on the ground or from a vehicle. It fires 56mm calibre munitions, in single shot fire, or in a 4 or 12 grenade salvo. The launcher has an effective firing range of between 50-200 metres. The maximum rate of fire is 12 grenades launched in less than a minute, which according to the company, allows “full coverage over a wide area”.⁹⁷ The Cougar 12 appears to be similar to the CHOU-K 12 barreller 56mm vehicle launcher, promoted by SAE Alsetex as “being tailored for law enforcement and peacekeeping support”.⁹⁸

87 Combined Systems Inc, Venom MC Launching System (January 2013) op.cit.

88 Combined Systems Inc, Venom Launcher, <http://www.combinedsystems.com/section/products/venom/index.html> (accessed 24th October 2008). This information has subsequently been removed.

89 See for example: Carnegie Mellon, United Defense To Provide TUGV's for US Marine Corps, Space Daily, 14th February 2005, <http://www.spacedaily.com/news/robot-05g.html> (accessed 14th February 2013); Gladiator Tactical Unmanned Ground Vehicle, <http://www.globalsecurity.org/military/systems/ground/gladiator.htm> (accessed 14th February 2013).

90 Schactman, N. Bad Eyes Keep Unmanned Infantry Out of the Fight, 11th August 2011, Wired, Danger room, <http://www.wired.com/dangerroom/2011/08/bad-eyes-keep-unmanned-infantry-out-of-the-fight/#more-54419> (accessed 14th February 2013)

91 For details of Provectus Robotics AMSTAF 6x6 Autonomous Unmanned Ground Vehicle see: <http://www.provectus-robotics.com/6x6.html> (accessed 14th February 2013)

92 For further details about this event see: NATO, Non-lethal weapons – the latest technology in defence products, 7th November 2011, http://www.nato.int/cps/en/natolive/news_80558.htm (accessed 14th February 2013).

93 Video footage of this demonstration is available via the websites of CSI North American Technology and Provec-

tus Robotics. See: Demonstration, a NATO and JNLWD sponsored event in Canada, Connaught Ranges, Eastern Ontario, Canada, 25th – 27th October 2011, <http://www.youtube.com/watch?v=641y4EYk4wE&list=UU9ZxYiN5pIXiI54AUufoEm-w&index=7&feature=plcp> (accessed 14th February 2013); and also <http://www.provectus-robotics.com/news.html> <http://youtube.com/taojwQCMBOQ> (accessed 14th February 2013)

94 AMSTAF 6 for anti-riot control, available on the website of Supersound Security Group/WOLF GZ1 at http://www.supersoundsecuritygroup.co.za/amstaf_ugv_solutions.html (accessed 3rd November 2015).

95 SAE Alsetex is part of Groupe Etienne LaCroix. For more information see company organisation and history sections of Groupe Etienne LaCroix website, <http://www.etienne-lacroix.com/index.php> (accessed 14th February 2013).

96 Law Enforcement 56mm Range, SAE Alsetex, (undated) catalogue distributed at the Special Operations Forces Exhibition and Conference (SOFEX) 7-10th May 2012, Amman, Jordan, p.26. (Copy held by the Omega Research Foundation).

97 SAE Alsetex, Law Enforcement 56mm Range, (undated) catalogue, op.cit., p.26.

98 The CHOU-K multiple launcher and an associated

[Emphasis added].

According to the manufacturer, the CHOU-K can fire “all types of riot control grenades equipped with 50, 100, 200m DPR [delayed fuse propellants]”⁹⁹, whilst the Cougar 12 can utilise the full range of SAE Alsetex 56mm grenades.¹⁰⁰ Consequently, both launchers could potentially employ the Alsetex CM 10 Tear Gas Grenade which comprises 10 CS capsules containing a total of 140g 10% CS tear gas smoke mixture and has a coverage area of approximately 1,300 m² to a height of 3 to 5 metres.¹⁰¹ A 12 grenade salvo of such munitions from either the Cougar 12 or CHOU-K 12 launchers would potentially result in high levels of CS tear gas smoke mixture being dispersed over a wide area.

In June 2014, at the Eurosatory 2014 arms and security exhibition, SAE Alsetex promoted a version of the Cougar 12 (called the Landcougar 12) mounted on the TSR202 UGV developed by eca Robotics. According to the companies’ joint promotional material, both the Landcougar 12 and the TSR 202 can be operated by radio, with the TSR 202 having an operational range of up to 500 metres.¹⁰²



Image of Cougar 12 multiple launcher (above) taken from SAE Alsetex brochure distributed at SOFEX 2012, and (left) SAE Alsetex landcougar 12 multiple launcher mounted on ECA Robotics TSR 202UGV on Sae Alsetex stand, Eurosatory 2014

information poster were displayed on the SAE Alsetex stand at Eurosatory 2008, Paris, 16th - 20th June 2008. See also Lacroix Defence & Security Catalogue, p.14, catalogue distributed at Milipol 2011, Paris 18th – 21st October 2011.

⁹⁹ The CHOU-K multiple launcher and an associated information poster were displayed on the SAE Alsetex stand at Eurosatory 2008, Paris, 16th - 20th June 2008. See also Lacroix Defence & Security Catalogue, p.14, catalogue distributed at Milipol 2011, Paris 18th – 21st October 2011.

¹⁰⁰ SAE Alsetex, Law Enforcement 56mm Range, (undated) catalogue, op.cit., p.26.

¹⁰¹ SAE Alsetex, Law Enforcement 56mm Range, (undated) catalogue, op.cit., p.26.

¹⁰² TSR 202 & Landcougar 12, ECA Robotics/SAE Alsetex promotional material displayed on SAE Alsetex stand, Eurosatory 2014, Paris, 16th – 20th June 2014.

Unmanned ground vehicles

A range of unmanned ground vehicles (UGVs) have been developed, intended to perform a variety of functions potentially including military, security or policing operations. Some of these UGVs incorporate RCA sprayers or foggers, others carry systems for the delivery of a range of “less lethal” weapons including RCA projectiles.

Unmanned Ground Vehicle [United Arab Emirates]

In May 2013, United Arab Emirate media reported the development and demonstration of an unmanned ground vehicle which had a maximum speed of 80km per hour and employed RCA projectile launchers with a reported range of 500 metres.¹⁰³ The UGV was designed by Major Maher Bin Haider of the Emergency section of Dubai Police. Although it was not then operational, the UGV was reportedly intended to be employed by the Dubai Police for large scale public order law enforcement. Major Bin Haider stated that: “In case of a riot, we can send this vehicle ahead. Sometimes policemen get hurt when they approach such situation. The vehicle is remote controlled and we can take distance; it will reduce the number of injuries in case of riots,”¹⁰⁴ No further details of this UGV or the associated RCA delivery mechanism are available.



Image of the UGV with tear gas launchers being examined by Dubai police officials. Image taken from Emirates 24/7 article which sourced dubaipolice.gov.ae.

RiotBot [Spain]

The Spanish company Technological & Robotics Systems (Technorobot) has developed the RiotBot - an “advanced security robot” especially designed for remote operation in areas considered to be too dangerous to deploy personnel.¹⁰⁵ Previous company

¹⁰³ Van Leijenm, M., Dubai Police show smart aircraft and anti-riot vehicle, Emirates 24/7 News website, 7th July 2013, available at <http://www.emirates247.com/news/emirates/dubai-police-show-smart-aircraft-and-anti-riot-vehicle-2013-07-07-1.513444> (accessed 5th November 2015); see also: Dubai police reveal cute little anti-riot vehicle, Albawaba.com, 9th July 2013, available at http://www.albawaba.com/editorchoice/dubai-police-reveal-cute-little-anti-riot-vehicle-505291?device=desktop&quicktabs_accordion=2 (accessed 5th November 2015).

¹⁰⁴ Ibid.

¹⁰⁵ See Technorobot, Riotbot applications, <http://www.technorobot.eu/en/riotbot.htm> (accessed 14th February 2013; See also: Technorobot, Riotbot brochure, undated, <http://www.technorobot>



(From left to right) Images of RiotBot, the PepperBall Tactical Automatic Carbine [TAC 700 launcher] and RiotBot at Mock Prison Riot Training and Exhibition 2010, all taken from Technorobot website.

promotional material stated that RiotBot employed a mounted PepperBall Tactical Automatic Carbine (TAC 700 launcher), which had been customised and adapted for use on the robot.¹⁰⁶ Subsequent information available on the Technorobot website, as of November 2015, has stated that “RiotBot employs a NLS 900 carbine modified and adapted for safe use in the robot with a shooting velocity of 900 balls per minute and a total capacity of 450 PAVA balls, a non-lethal ammunition. This carbine can only be shot using a remote control, which makes it impossible for unauthorized people to use it.”¹⁰⁷

Capable of speeds exceeding 20km per hour, RiotBot can be deployed by a single operator either through direct viewing or through incorporated video equipment at distances of more than 1.5km. The operator can remotely control the robot’s movement, as well as the vertical and horizontal position of the gun turret before firing the carbine. RiotBot can be operated continuously for more than two hours.¹⁰⁸

According to Technorobot, RiotBot was developed for a “wide range of police, military and general security operations, mainly those in which the personal safety of the members of the intervention units is not fully guaranteed or could be in danger.”¹⁰⁹ The company

literature stated that: “**some of the scenarios that have been studied for [RiotBot’s] development include:** “Riot control...civil order...area denial... boundary defense and intervention ...control point security...surrounding unit rescues...urban warfare.”¹¹⁰[Emphasis added].

As of November 2015, Riotbot has been promoted in the Americas by the Argentinian distributor Bienvenidos A Buccello Y Asociados S.R.L.¹¹¹

In correspondence to BNLWRP/ORF, dated 24th November 2015, describing the application of relevant controls in this area, the Spanish Government stated:

“...[M]anufacturing of unmanned ground vehicles is a legal activity under the Chemical Weapons Convention and relevant international human rights law. Therefore, it is also not prohibited by Spanish national Law. Riorobot seems to be a remote system designed for purposes not prohibited for the CWC.”¹¹²

In addition, the Spanish Government highlighted the applicability of national and European Union military and dual-use technology export controls:

“In Spain, military and dual-use technologies export licences are evaluated case-by-case by “Junta Interministerial Material de Defensa y Doble Uso” (JIMDDU) as mandated by...Regulation on Control of Foreign Trade in Defense, other material and products and dual-use technologies (Royal Decree 679/2014 of August 1st)...In this case, Riorobot would be included in items under Annex II, whose export would require a specific licence carefully evaluated by JIMDDU.”¹¹³

[eu/en/pdf/dip_ing.pdf](#) (accessed 14th February 2013).

¹⁰⁶ According to marketing materials published by Pepperball Technologies Inc, which manufacture the TAC 700 and related munitions, the launcher “averages 700 rounds per minute in full automatic mode with up to 60 ft. target accuracy and up to 150 ft. accuracy for saturating an area with pepper.” [See PepperBall Technologies Inc, PepperBall products, military, <http://www.pepperball.com/mil/products.html#proj> (accessed 18th January 2013); See also: PepperBall Technologies Inc, The TAC 700 Launcher: PepperBall Tactical Automatic Carbine, Brochure, available from either PepperBall Technologies Inc website or Technorobot website <http://www.technorobot.eu/en/pdf/tac700.pdf> (accessed 14th February 2013)]. The TAC 700 utilises the 3 gram PAVA pepper projectile and, according to TechnoRobot, the RiotBot has a total capacity of 450 these PAVA projectiles [See Technorobot, Riotbot, specifications, http://www.technorobot.eu/en/riotbot_specifications.htm (accessed 14th February 2013)].

¹⁰⁷ Technorobot, Riotbot, Specifications, available at http://www.technorobot.eu/en/riotbot_specifications.htm (accessed 3rd November 2015).

¹⁰⁸ See: Technorobot, Riotbot, specifications, http://www.technorobot.eu/en/riotbot_specifications.htm (accessed 14th February 2013); and Technorobot, Riotbot brochure, undated, http://www.technorobot.eu/en/pdf/dip_ing.pdf (accessed 14th January 2013).

¹⁰⁹ See Technorobot, Riotbot applications, http://www.technorobot.eu/en/riotbot_specifications.htm (accessed 14th February 2013).

[technorobot.eu/en/riotbot.htm](http://www.technorobot.eu/en/riotbot.htm) (accessed 14th February 2013).

¹¹⁰ *Ibid.*

¹¹¹ <http://buccelloyassociados.com.ar/robots/technorobot/riotbot/> (accessed 3rd November 2015).

¹¹² Correspondence from Ambassador Arias, Permanent Representative of Spain to the OPCW, to BNLWRP and ORF, 24th November 2015.

¹¹³ Correspondence from Ambassador Arias, Permanent Representative of Spain to the OPCW, to BNLWRP and ORF, 24th November 2015.

Mega Hurtz [United States]



Image of Mega Hurtz UGV taken from Inspectorbots website

The US company Inspectorbot, has developed, and as of November 2015 promoted, the Mega Hurtz - a “very rugged, tactical robotic platform” - incorporating a steel plated shell - which can “demolish... concrete walls”.¹¹⁴ It is a 4 wheeled unmanned electric vehicle with a maximum speed of 20 miles per hour, which is remotely controlled by an operator from up to 1,200 feet away.¹¹⁵ It has a “teleoperated pan/tilt turret with a 20 round per second non-lethal weapon system.”¹¹⁶ The modified paintball gun has a 100 round capacity and an interchangeable magazine that allows it to fire a range of .68 calibre projectiles including pepper balls (filled with capsaicin), paintballs or hardened rubber rounds. The UGV may also incorporate a night vision camera and red dot laser.¹¹⁷

According to its manufacturers, “it is perfect for covert surveillance, security, SWAT, tactical response, and law enforcement.”¹¹⁸ Among the other potential applications highlighted by the company are: “**Security Services; Reconnaissance; Covert Investigation; Tactical; Hostage Situations; Crowd Control; Situational Awareness; Border Patrol; Homeland Security; Diversion Tactics; Intimidation; Medical Evacuation; Search and Rescue**”¹¹⁹ [emphasis added].

According to the company, no law enforcement and military entities in the US or elsewhere have purchased this product, to date.¹²⁰

114 Inspectorbot, Mega Hurtz, undated, available at http://www.inspectorbots.com/Mega_Hurtz.html (accessed 20th November 2015)

115 Correspondence from Mr Rogers Managing Director, Inspectorbot.com, to BNLWRP/ORF, dated 25th November 2015

116 Inspectorbot, Mega Hurtz, (undated) op.cit.

117 Inspectorbot, Mega Hurtz, (undated) op.cit.; Correspondence from Mr Rogers (25th November 2015) op.cit.

118 Ibid

119 Ibid

120 Correspondence from Mr Rogers Managing Director, Inspectorbot.com, to BNLWRP/ORF, dated 25th November 2015

WRS Roving Vehicle [United States]

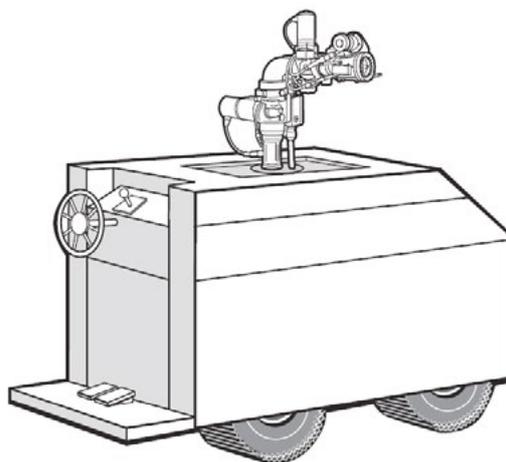


Image of the WRS Roving Vehicle taken from a product brochure available on Priax Corporation's website.

The US company, Priax Corporation, developed and promoted the Water Restraint System (WRS) Roving Vehicle, a “compact movable pepper spray delivery system that supports rapid deployment and rapid response.”¹²¹ The system has a firing range of approximately 30 feet; it can “deliver chemical at approximately 125 gallons/minute” and has the storage capacity to “provide ... up to 83 three-gallon chemical pulses.”¹²² No details were given regarding the specific nature or quantity of the pepper spray employed.

The system can either be manually driven or operated by remote control. According to the company marketing materials “all chemical operations can be operated remotely. On command, the unit will open the roof panel over the nozzle, extend the nozzle and begin spraying operations. All operations will be the same as for a manual operator except that the movement speed is reduced to 8 MPH maximum for safety reasons.”¹²³

The WRS Roving Vehicle also incorporated an “on-board countermeasures system” which consisted of six spray nozzles located on the sides, front, and top of the vehicle. On command, either manual or remote control, the nozzles would spray a fog of high potency OC. According to the company, “the countermeasures fog potency is much higher than normal pepper spray strength to discourage vehicle damage from an attack”¹²⁴ although no further details are given. Whilst the WRS Roving Vehicle has been promoted by the company since 2004, no further details are available about whether this vehicle went into large-scale production.

121 WRS Roving Vehicle, Priax Corporation, 2004, available on the company website at http://www.priax.com/WRS_Roving_Vehicle.pdf (accessed 9th November 2015).

122 Ibid

123 Ibid

124 Ibid

Modular Advanced Armed Robotic System (MAARS) [United States]



Image of Modular Advanced Armed Robotic System (MAARS) taken from QinetiQ North America website

The US company QinetiQ North America, Inc. (QNA) has developed, and as of November 2015 promoted, the Modular Advanced Armed Robotic System (MAARS®), an unmanned ground vehicle developed through “partnership with various agencies in the Department of Defense.”¹²⁵ It was “freshly created... to meet U.S. SOCOM [Special Operations Command] requirements.”¹²⁶ MAARS has been “designed expressly for reconnaissance, surveillance, and target acquisition (RSTA) missions to increase the security of personnel manning forward locations.”¹²⁷ It is remotely controlled by an operator who can be from over 1 kilometre¹²⁸ and reportedly up to 3 kilometres away.¹²⁹ According to QNA, MAARS can be “positioned in remote areas where personnel are currently unable to monitor their security, and can also carry either a direct or indirect fire weapon system.”¹³⁰

According to QNA, MAARS is the “first fully modular ground robot system capable of providing a measured response including non-lethal, less-lethal and even lethal stand-off capabilities”.¹³¹ As well as a M240B medium machine gun firing 7.62mm ammunition, MAARS incorporates a 4 barrelled 40mm grenade

125 QinetiQ North America, MAARS Advanced armed robotic system, <http://www.qinetiq-na.com/products/unmanned-systems/maars/> (accessed 3rd November 2015).

126 QinetiQ North America, Modular Advanced Armed Robotic System (MAARS), Product Overview, http://www.qinetiq-na.com/wp-content/uploads/2013/01/pdf_maars.pdf (accessed 14th February 2013), p.1.

127 QinetiQ North America, MAARS Advanced armed robotic system, <http://www.qinetiq-na.com/products/unmanned-systems/maars/> (accessed 14th February 2013).

128 QinetiQ North America, MAARS Product Overview, op.cit., p.1.

129 Dubiel, J. Robots can stand in for Soldiers during risky missions, 11th August 2008, <http://www.army.mil/article/11592/robots-can-stand-in-for-soldiers-during-risky-missions/> (accessed 14th February 2013).

130 QinetiQ North America, MAARS Advanced armed robotic system, <http://www.qinetiq-na.com/products/unmanned-systems/maars/> (accessed 14th February 2013).

131 QinetiQ North America, QinetiQ North America ships first MAARS robot, (undated but related press articles commence on 4th June 2008) <http://www.qinetiq.com/news/pressreleases/Pages/qna-ships-first-maars-robot.aspx> (accessed 14th February 2013).

launcher that has the capability to utilise either 40mm high-explosive grenades or a range of less-lethal ammunition, including 40mm tear gas grenades.¹³² No details are available concerning the grenade launcher’s rate of fire or range; nor of the area coverage, weight, or fill of the 40mm tear gas grenades.

In June 2008, QNA announced that it had “shipped the first MAARS ground robot to the US military under a contract from the Explosive Ordnance Disposal/ Low-Intensity Conflict (EOD/LIC) Program within the Combating Terrorism Technical Support Office (CTTSO).”¹³³ According to a November 2010 New York Times article, US Army Special Forces had bought six MAARS “for classified missions”, and the National Guard had requested “dozens more to serve as sentries on bases in Iraq and Afghanistan.”¹³⁴ Although there have been no subsequent reports of its field deployment by the US military, MAARS has reportedly continued to be trailed and studied; for example in October 2013 at Fort Benning by the US Army Maneuver Center of Excellence’s Battle Lab,¹³⁵ and in January 2015 by the US Marine Corps Warfighting Laboratory.¹³⁶

Firestorm 40mm multi-barrel launcher [Australia/ United States]



Images of Firestorm demonstrations using munitions with simulant chemical payloads taken from (above) 2010 U.S. Navy promotional video and (next page) 2009 Metal Storm promotional video.¹³⁷

132 QinetiQ North America, MAARS Modular Advanced Armed Robotic System, Warfighter controls the escalation of force, http://www.qinetiq-na.com/wp-content/uploads/2011/12/pdf_maars.pdf (accessed 22nd January 2013); QinetiQ North America, MAARS Product Overview op.cit.p.2.

133 QinetiQ North America, QinetiQ North America ships first MAARS robot, undated but related press articles commence on 4th June 2008) <http://www.qinetiq.com/news/pressreleases/Pages/qna-ships-first-maars-robot.aspx> (accessed 14th February 2013).

134 Markoff, J. War Machines: Recruiting Robots for Combat, The New York Times, 27th November 2010, http://www.nytimes.com/2010/11/28/science/28robot.html?pagewanted=all&_r=0 (accessed 14th February 2013).

135 UGV Models Face Off Over Firepower, Load Carrying, Armytimes.com, 12th October 2013, available at <http://www.armytimes.com/article/20131012/NEWS/310140003/UGV-models-face-off-over-firepower-load-carrying> (accessed 3rd November 2015).

136 Stewart, J. Marine Corps Considers New Unmanned Tank, Micro-Drones, The Marine Times, 30th January 2015, available at <http://www.marinecorpstimes.com/story/military/pentagon/2015/01/30/new-unmanned-vehicle-has-tracks-machine-gun/22537723/> (accessed 3rd November 2015).

137 US Navy promotional video, 10th March 2010, originally available on Metal Storm website <http://www.metalstorm.com/release/video/2010MarNAWCWDEmpireVideoh.html> (last accessed 7th October 2011). Although removed from the Metal



The Firestorm 40mm launcher, was originally developed by Australian-US company, Metal Storm. The company described Firestorm as:

*“A flexible multi-barrel 40mm Remotely Operated Weapon System (ROWS) that delivers a scalable lethal or non-lethal response for Defence, Security and Law Enforcement operators. The **system can be mounted to fixed or mobile platforms to provide mission support** for operations including: **Military Operations in Urban Terrain (MOUT)**, Reconnaissance and Border Patrols, Critical Infrastructure Protection, Crowd Control Missions.”¹³⁸ [Emphasis added].*

Metal Storm Inc. – the US office of Metal Storm - developed and promoted a range of lethal and “less lethal” 40mm munitions for this delivery system, which included: **“Frangible nose blunt impact chemical dispersion rounds [which] combine single target blunt impact with an area dispersion of an irritant or marker dye.”**¹³⁹ In addition **“a chemical payload round was adapted for delivering tear gas or other payloads in stacked munition Metal Storm launchers.”**¹⁴⁰ [Emphasis added].

Metal Storm reported that during 2009, a 40mm 4 barrel FireStorm system fitted to an iRobot 710 Warrior unmanned ground vehicle was demonstrated at the Naval Air Warfare Center Weapons Division at China Lake¹⁴¹ “where the system was tested in a climate and terrain similar to Afghanistan.”¹⁴² Scenarios included crowd control and a road clearing demonstration and the trial included “semi-automatic and automatic fire using Less than Lethal (LTL) frangible nose projectiles”

Storm website, it is still available on: http://www.youtube.com/watch?v=nDXQiCJssAM&feature=player_embedded (accessed 3rd November 2015).

¹³⁸ Metal Storm, Firestorm brochure, 12th November 2010, http://www.metalstorm.com/component/option,com_docman/task,doc_download/gid,68/Itemid,170/ (accessed 14th February 2013).

¹³⁹ Metal Storm, 2008 Annual Report, 9th April 2009, available from the US Securities and Exchange Commission archives at: <http://www.sec.gov/Archives/edgar/data/1119775/000095012309022347/y78238e20vf.htm> (accessed 12th November 2015), p.17.

¹⁴⁰ Metal Storm (9th April 2009) op.cit., p.17.

¹⁴¹ See Metal Storm, 2009 Annual Report, 20th April 2010, previously available at: <http://investor.metalstorm.com.au/IRM/Company/ShowPage.aspx/PDFs/1836-33832100/2009AnnualReport> (accessed 14th February 2013), p.9; and Metal Storm Weapons Participate in UGV Live-Fire Scenario, Metal Storm Press Release, 12th March 2010, available from: <http://in.reuters.com/article/2010/03/12/idUS41298+12-Mar-2010+MW20100312> (accessed 13th November 2015).

¹⁴² Metal Storm (20th April 2010) op.cit., p.9.

¹⁴³ which contained “a simulated irritant.”¹⁴⁴

The standard FireStorm launcher had four barrels each with a capacity to hold six rounds per barrel, allowing 24 shots before reloading. According to Metal Storm¹⁴⁵ and industry publications¹⁴⁶, the company also developed a 30 barrel version of the launcher – Firestorm FURY – which was capable of carrying “both non-lethal and lethal ammunition in different barrels at the same time”.¹⁴⁷

Due to financial difficulties, Metal Storm was placed in voluntary administration in July 2012.¹⁴⁸ In August 2015, the Australian based weapons research and development company, DefendTex, announced that it had “acquired all of the assets of MetalStorm Pty Ltd and MetalStorm Inc from liquidation. This included the patents, intellectual property, trademarks and weapon prototypes.”¹⁴⁹ DefendTex’s Chief Executive Officer (CEO), Travis Reddy, stated “We are looking forward to commercialising the long held potential of the Metal Storm technology”.¹⁵⁰

As of November 2015, Firestorm is promoted on the DefendTex’s website, which states:

*“FireStorm™ has successfully demonstrated its capabilities under separate contracts for the U.S. Navy and U.S. Army. Recent demonstrations have proven the system capable of delivering High Explosive (HE) and a range of less lethal munitions. FireStorm brings the operational community a total force continuum application.”*¹⁵¹

In addition, the company promotional material specifically highlights FireStorm™ FURY

*“[This] is a configurable multi-barrel, multi-caliber crew-served or remotely operated electronic weapon system that provides escalation of force and scalable effect across less lethal and lethal continuum. The system can be mounted to fixed or mobile platforms to provide mission support for operations to include: **Military Operations on Urban Terrain (MOUT)**; Reconnaissance Patrol; Border Patrol; Critical*

¹⁴³ Metal Storm (20th April 2010) op.cit., p.9.

¹⁴⁴ Metal Storm (12th March 2010) op.cit.

¹⁴⁵ Metal Storm Limited, CEO Bulletin, 17th June 2011, available from: http://web.archive.org/web/20120320154051/http://www.metalstorm.com/component/option,com_docman/task,cat_view/gid,37/dir,ASC/order,date/limit,15/limitstart,15/ (accessed 14th February 2013), p.3.

¹⁴⁶ Metal Storm launches new FireStorm FURY Weapon Systems, Aerospace and Defence News, 18th May 2011, http://www.asdnews.com/news/35518/Metal_Storm_launches_new_FireStorm_FURY_Weapon_Systems.htm (accessed 14th February 2013).

¹⁴⁷ Metal Storm Limited, CEO Bulletin (17th June 2011) op.cit.

¹⁴⁸ Metal Storm in voluntary administration, Sydney Morning Herald, 26th July 2012, <http://www.smh.com.au/business/metal-storm-in-voluntary-administration-20120726-22t9t.html> (accessed 13th November 2015).

¹⁴⁹ DefendTex Acquires Metalstorm Assets, 12th August 2015, Defendtex press release, <http://www.defendtex.com/press-releases-1.html> (accessed 13th November 2015).

¹⁵⁰ Ibid.

¹⁵¹ Firestorm, Metalstorm by Defendtex, Products, Defendtex website <http://www.defendtex.com/firestorm.html> (accessed 13th November 2015).

*Infrastructure Protection; Crowd Control.*¹⁵² [Emphasis added].

No detailed information is available regarding the specific range of “less lethal” munitions that can be utilised with these systems, whether such munitions include RCA projectiles, and whether DefendTex currently produces such munitions.

In correspondence to BNLWRP/ ORF dated 24th November 2015, the Australian Government stated that:

*“The development, production, acquisition, stockpiling, transfer of chemical weapons, or assisting anyone to do this, is prohibited in Australia under the Chemical Weapons (Prohibition) Act 1994 (the Act). Technical advice would be required to determine whether riot control agents and their means of delivery, including the Firestorm and the Firestorm FURY launchers fall within the scope of the definitions under Article II of the Chemical Weapons Convention, as these definitions apply in the Act.”*¹⁵³

*“The Firestorm and the Firestorm FURY are controlled goods under Australian legislation (ML2.a of the Defence and Strategic Goods List 2015), and as such, would require a permit for export from Australia. In addition, the supply of intangible technology related to the development, production or use of the Firestorm or Firestorm FURY or the brokering of these items is also controlled under the provisions of the Defence Trade Controls Act 2012. The Defence Export Control Office (DECO) which is responsible for regulating the export of defence and dual-use goods as part of Australia’s export control system has not undertaken any formal review of the Firestorm or Firestorm FURY to determine the item’s legality under the Chemical Weapons Convention and relevant international human rights law.”*¹⁵⁴

Afterburner 2000 smoke and RCA dispersal system [United States]

The US manufacturer, MSI Delivery Systems Inc., has developed and, as of November 2015, promoted the Afterburner 2000 (AB2K). Company marketing material has described the AB2K as a “robust multi-mission, multi-purpose smoke generator capable of rapidly blanketing large areas with dense smoke. The smoke solution can be mixed with specific chemicals to upgrade the mission requirements ...”¹⁵⁵ Company information detailing mission specific formulations state that the Afterburner 2000 is capable of “dispensing many less-than-lethal formulations in a high density

¹⁵² Firestorm, Metalstorm by Defendtex, Products, Defendtex website <http://www.defendtex.com/firestorm.html> (accessed 13th November 2015).

¹⁵³ Correspondence from Mr Michel, First Secretary, Australian Embassy in the Hague to BNLWRP and ORF, 24th November 2014.

¹⁵⁴ Correspondence from Mr Michel, First Secretary, Australian Embassy in the Hague to BNLWRP and ORF, 24th November 2014.

¹⁵⁵ MSI Delivery Systems .Inc., The AB2K, Multi-Mission Aerosol Delivery System, available at <http://www.msi-deliverysystems.com/Products/page9/page9.html> (last accessed 14th February 2013, now removed).

aerosol form”. This included: “Standard non-toxic training smoke mixed with irritants such as OC, CS, or Pepper [that] upgrades the capabilities to include: Crowd Control and Civil Unrest, SWAT Teams and Tactical Incursions, Corrections Dept. (Riots/Prisoner Extraction), Less-lethal Terrorist Suppression, **Urban Warfare (MOUT/COIN)** ...”¹⁵⁶ (emphasis added).

According to the company, the Afterburner 2000 can release over 1,500 cubic feet of smoke with a range greater than 100 feet (30 metres) in one second.¹⁵⁷ The marketing material stated that “[the]standalone version” of the Afterburner 2000 “expels 50,000 cubic feet (1,416 cubic meters) of smoke on a single charge”; whilst the “dependent version with high-capacity backpack expels 320,000 cubic feet (9,061 cubic meters) of smoke on a single charger”.¹⁵⁸

According to the manufacturer’s website, the Afterburner 2000 can: “[be] mounted on walls, buildings and fixed on stationary structures on vehicles including small craft, military style boats, US military, law enforcement and Homeland Security vehicles, Humvees, riot control and other armor piercing vehicles”.¹⁵⁹

In addition, the manufacturer has stated that the Afterburner 2000 can also be “incorporated onto unmanned ground vehicles and aircraft, drones for deployment dependent upon size”, and that it “has been tested for compatibility with military small craft boats”.¹⁶⁰

A variation of the Afterburner 2000, called the AB2K-Robot Smoke Generator (AB2K-RSG): “has been designed for use with the Striker 12 Mount by Remotec, a subsidiary of Northrop Grumman.”¹⁶¹ According to MSI-Delivery Systems, the company was requested by Remotec “to develop a unit for one of the Andros™ series robots. The result is a robot mounted unit which can be used with the Andros™ F6B Robot Striker Mount and remotely operated up to 4 miles distance via the Andros™ weapons circuit. The mount itself may be further accessorized with a video sighting camera.”¹⁶² According to MSI- Delivery Systems “The AB2K-RSG has also been tested for compatibility and used with the LandShark UGV from Black-I Robotics.”¹⁶³

¹⁵⁶ MSI Delivery Systems Inc., Mission Specifications, available at <http://ab2kmmads.com/mission-specs> (last accessed 22nd November 2013, now removed). The company further stated that it “only provides the non-toxic training smoke. Additives for ‘Irritants’ are provided by the customer through their local suppliers.” MSI Delivery Systems Inc., Mission Specific Formulations (undated) op.cit.

¹⁵⁷ MSI Delivery Systems Inc. (14th February 2013) op.cit.

¹⁵⁸ Ibid.

¹⁵⁹ MSI Delivery Systems Inc., AB2K Capabilities, available at <http://ab2kmmads.com/ab2k-mmads-variants> (accessed 22nd November 2013).

¹⁶⁰ Ibid.

¹⁶¹ MSI Delivery Systems Inc., AB2K – Robot Smoke Generator (AB2K-RSG), <http://msi-deliverysystems.com/products/ab2k-robot-smoke-generator-ab2k-rsg> (accessed 3rd November 2015).

¹⁶² MSI Delivery Systems Inc., AB2K – Robot Smoke Generator (AB2K-RSG), <http://msi-deliverysystems.com/products/ab2k-robot-smoke-generator-ab2k-rsg> (accessed 3rd November 2015).

¹⁶³ MSI Delivery Systems Inc., AB2K – Robot Smoke Generator (AB2K-RSG), <http://msi-deliverysystems.com/products/ab2k-robot-smoke-generator-ab2k-rsg> (accessed 3rd November 2015).



Images taken from the MSI Delivery Systems Inc. website showing: demonstration of SuperDroid Robots Custom Modification for MMADS Remote Smoke Generator (top left and right), AB2K demonstration (bottom left) and AB2K-MMADS Robot Smoke Generator (bottom right)

Although there is no information publicly available concerning which (if any) law enforcement and military entities in the US or elsewhere have purchased the Afterburner 2000, the manufacturer has stated that “MSI Delivery Systems Inc ... has commenced volume production and sales”.¹⁶⁴

Guardium unmanned ground vehicle [Israel]



Image of Guardium semi-autonomous unmanned ground system taken from G-NIUS product brochure

The Israeli company G-NIUS has developed and promoted a range of UGVs based upon the Guardium -

¹⁶⁴ MSI Delivery Systems Inc., Multi-Mission Aerosol Delivery System press release, 10th January 2010, available at <http://ab2kmmads.com/ab2kdocs/Press%20Release%20Intro-11112013.pdf> (accessed 3rd November 2015).

a “semi-autonomous unmanned ground system”.¹⁶⁵ The vehicle can carry out “autonomous mission execution” and conduct “real-time, self-ruling, obstacle detection and avoidance”.¹⁶⁶ It has a maximum speed of 50kph and can operate continuously for at least 24 hours. It is designed to “perform routine missions, such as programmed patrols along border routes”. In addition it can also “autonomously react to unscheduled events, in line with a set of guidelines specifically programmed for the site characteristics and security doctrine.”¹⁶⁷ According to G-NIUS, the Guardium has already been “operationally deployed by the Israeli Army”.¹⁶⁸

The Guardium can carry a modular selection of payloads for different mission requirements including “remotely operated weapons systems” and “non-lethal weapon systems” – although no further details of specific systems are available. Whilst it is unknown whether any of the Guardium series of UGVs currently incorporates RCA delivery mechanisms, there are indications that the Israeli military previously conducted research and development of UGVs with such capability. For example, in 2009 Israeli news website ynetnews.com reported that the robotics department at the Israeli Defence Force (IDF)’s Ordnance Corps had “recently developed a prototype robot that can

¹⁶⁵ G-NIUS, Guardium UGV brochure, undated, available at: <http://g-nius.co.il/pdf/brochures/GuardiumUGV.pdf> (accessed 22nd September 2015), p. 1.

¹⁶⁶ *Ibid.*

¹⁶⁷ *Ibid.*

¹⁶⁸ *Ibid.*

spray tear gas and allow troops to “paralyze” suspects during raids.”¹⁶⁹ According to the article, the innovation was meant to “improve the forces’ ability to operate in populated areas, especially during searches for suspects. The IDF stressed that the new technology will not be effective as means for dispersing riots.”¹⁷⁰ To date, there have been no reports of IDF deployment of UGVs with RCA delivery mechanisms.

Unmanned aerial vehicles

Unmanned aerial vehicles (UAVs) have been developed for a wide range of potential purposes including surveillance, law enforcement and armed conflict. Companies and/or law enforcement bodies have explored the development and potential application of a range of UAVs for the delivery of RCAs. Whilst certain small UAVs and associated RCA delivery mechanisms appear to be designed to deliver relatively limited amounts of RCAs to a target in a highly focussed manner, other UAVs appear capable of delivering significantly larger quantities of RCAs over wide areas.

ShadowHawk Unmanned Aerial System [United States]

The ShadowHawk Unmanned Aerial System (UAS) has been manufactured and as of November 2015 promoted by Vanguard Defense Industries (VDI). According to VDI ShadowHawk is “a Group II tactical UAS with an endurance of over three hours and a range in excess of 35km. The ShadowHawk can operate in austere environments day or night and in winds in excess of 40kph. With the standard auto takeoff and landing capability, 1,000 fully programmable waypoints and a return to base function, the ShadowHawk provides unprecedented tactical or strategic support.”¹⁷¹

According to the Shadow Hawk Specification Sheet, previously available on the VDI website, “U.S. Military and Law Enforcement consumers have less-lethal/lethal options including single or multiple shot 37mm/40mm grenade launcher, 12g shotgun, XREP Taser [electroshock projectile]”.¹⁷²

From Autumn 2011, US media reported the acquisition of the ShadowHawk by police in Texas. In October 2011 and November 2011 the Houston Chronicle reported that the Montgomery County Sheriff’s office had purchased the ShadowHawk from VDI with federal

homeland security grant funds.¹⁷³ In November 2011, telepresenceoptions.com stated that a ShadowHawk had been “unveiled by the Montgomery County Sheriff’s office and will be operational within a month.”¹⁷⁴ It further reported that “[A]lthough its initial role will be limited to surveillance, the ShadowHawk Unmanned Aerial Vehicle, [was] previously used against suspected terrorists in Afghanistan and East Africa, and has the ability to tase suspects from above as well as carrying 12-gauge shotguns and grenade launchers.”¹⁷⁵

On 23rd May 2012, CBSDC reported that Chief Deputy Randy McDaniel of the Montgomery County Sheriff’s Office in Texas told “The Daily” that his department was “considering using rubber bullets and tear gas on its drone.” According to CBSDC, Chief Deputy McDaniel stated that: “Those are things that law enforcement utilizes day in and day out and in certain situations it might be advantageous to have this type of system on the UAV (unmanned aerial vehicle)”¹⁷⁶



Images of ShadowHawk unmanman aerial system taken from Vanguard Defense Industries website

169 IDF robots to be used during raids, <http://www.ynetnews.com/articles/0,7340,L-3739422,00.html> (accessed 9th November 2015).

170 *Ibid.*

171 Vanguard Defense Industries, Vanguard’s unmanned applications, <http://unmanned.wix.com/vanguarddefense#!applications/galleryPage> (accessed 3rd November 2015). See also: <http://www.military.com/video/aircraft/pilotless-aircraft/taser-drone-launched-in-texas/1253351749001>;

172 Vanguard Defense Industries, Shadow Hawk Specification Sheet, undated, (originally displayed 17th February 2011, subsequently removed now available on <http://web.archive.org/web/20111005144627/http://vanguarddefense.com/wpcontent/uploads/2010/10/SHADOWHAWK-SPEC.pdf> (accessed 3rd November 2015).

173 Stanton, R. Texas civil libertarians have eye on police drones, *Houston Chronicle*, 31st October 2011, available at <http://www.chron.com/news/houston-texas/article/Texas-civil-libertarians-have-eye-on-police-drones-2245644.php> (accessed 20th November 2015); Lovelady, N. Sheriff’s Office adds to law enforcement arsenal, *Houston Chronicle*, 15th November 2011, <http://www.chron.com/neighborhood/woodlands-news/article/Sheriff-s-Office-adds-to-law-enforcement-arsenal-2269924.php> (accessed 20th November 2015).

174 DHS-Funded Taser Drone Launched in Texas’, 1st November 2011: www.telepresenceoptions.com/2011/11/dhsfunded_taser_drone_launched/, accessed on 15 March 2015.

175 *Ibid.*

176 CBSDC, Groups Concerned Over Arming Of Domestic Drones, 23rd May 2012, <http://washington.cbslocal.com/2012/05/23/groups-concerned-over-arming-of-domestic-drones/> (accessed 3rd November 2015).

Autonomous Helicopter [China]



Image of Autonomous helicopter taken from Hawk Group promotional material, distributed at Asia Pacific China Police Expo 2012

The “Autonomous Helicopter” has been developed and promoted by the Chinese company, Hawk Group. According to Hawk Group’s promotional material, this relatively small UAV has a fuselage of 15.20cm in length, an empty weight of 8.5kg and a take-off weight of 11kg. It can fly at an altitude of 1,000 metres, has a cruising speed of 52 km per hour and a cruising time of 25 minutes.¹⁷⁷

According to Hawk Group promotional material, the “Autonomous Helicopter” is a multi-purpose vehicle intended for use in a range of tasks including law enforcement and anti-terrorism activities.¹⁷⁸ In May 2012, it was promoted at the Asia Pacific China Police 2012 exhibition.¹⁷⁹ The UAV is equipped with an autonomous flight control system together with infrared thermal imager, cameras, and anti-riot equipment. According to Hawk Group promotional material, the manufacturers have developed a tear gas projectile system mounted on the “Autonomous Helicopter” for use in riot control situations, which can distribute small tear gas projectiles to disperse large-scale crowds and riots.¹⁸⁰ No further information is publicly available concerning the specifications of the “Autonomous Helicopter” and the associated tear gas dispersal system.

Unmanned aerial vehicle with tear gas projectile launcher [China]

In May 2014, at the Asia Pacific China Police 2014 expo, Hubei Handan Mechatronics Ltd promoted a small unmanned aerial vehicle with attached tear gas projectile launcher. A demonstration video displayed by the company showed the UAV being employed as part of a simulated police operation, during which an RCA projectile was fired from the hovering UAV into a building. No further information is publicly available

177 *Autonomous Helicopter, Hawk Group, promotional brochure, undated, distributed at at the Asia Pacific China Police 2012 exhibition. [Information is from an unofficial translation of the Chinese original on file with the Omega Research Foundation].*

178 *Ibid.*

179 *Asia Pacific China Police 2012, 22nd – 25th May 2012, China National Conventional Centre, Beijing, China. For further information on this exhibition see: <http://www.cpexhibition.com/police/> (accessed 29th January 2013).*

180 *Autonomous Helicopter, Hawk Group, promotional brochure, undated, distributed at at the Asia Pacific China Police 2012 exhibition. [Information is from an unofficial translation of the Chinese original on file with the Omega Research Foundation].*

concerning the specifications of the UAV and the associated tear gas projectile launcher system.



UAV promoted by Hubei Handan Mechatronics Ltd at Asia Pacific China Police 2014 expo, photograph: Robin Ballantyne/Omega

“Tong Fei” II police unmanned aerial vehicle [China]

According to Chinese media and the Wuhan Public Security Bureau¹⁸¹, the Tonghua public security police developed and trialled at least three UAVs in January 2014. They included the “Tong Fei” II UAV which was described as a “large heavy rescue-cum-attack aircraft”.¹⁸² It is reportedly intended for the remote handling and delivery of equipment and materials, or alternatively for the delivery of “non-lethal weapons, such as smoke bombs, tear gas...”¹⁸³ At present there is no further information available concerning the mechanism of RCA dispersal nor of the nature or quantity of RCAs that could be dispersed.



Image of “Tong Fei” II police unmanned aerial vehicle during demonstration/test flight, 23rd January 2014, Tonghua, China. Image taken from New Culture Network, article.

181 *Tonghua public security police UAV developed successful test flight, New Culture Network, enews.xwh.on, 25th January 2014, http://enews.xwh.cn/shtml/xwhb/20140125/content_2.shtml (accessed 22nd June 2015), [unofficial English translation]; Tonghua developed series of police drones in use, Wuhan Public Security Bureau, undated, <http://www.whga.gov.cn/mobile/newsPage.jsp?id=1201402271310500784> (accessed 22nd June 2015), [unofficial English translation].*

182 *Ibid.*

183 *Ibid.*

Cyclone riot control drone system [Israel]

The Israeli company, ISPra, has developed and in 2015 promoted the Cyclone riot control drone system, including at MILIPOL 2015 arms and security exhibition in Paris, France, in November 2015.¹⁸⁴ According to the company's marketing materials, the Cyclone "provides police forces with less lethal munitions from drones – allowing maximum accuracy, real time control of riot situations and minimum injuries to civilians while maintaining distance between police forces and rioters."¹⁸⁵ The company has stated that the Cyclone unit can be easily mounted on drones, with fast and simple reloading on site. The Cyclone system incorporates 12 submunitions and the total weight of the "pyrotechnic mixture" contained is 400+/- 20 grammes.¹⁸⁶ Although the munitions have been described as "less lethal", the specific nature of the "pyrotechnic mixture" is not identified in the marketing materials.



Cyclone riot control drone system attached to a UAV, displayed on ISPra stand at MILIPOL 2015, Paris, France, November 2015; photograph: Robin Ballantyne/Omega Research Foundation

Unmanned aerial vehicle with pepper spray delivery mechanism [India]

According to an 8th April 2015 AFP report, police in the city of Lucknow, in the northern Indian State of Uttar Pradesh, had acquired five unmanned aerial vehicles incorporating a "pepper spray" delivery mechanisms.¹⁸⁷ The UAVs can each reportedly carry two kilograms (4.4 lbs) of unspecified "pepper spray" and can be flown within a one kilometre (0.6 mile) radius of their operator. Each UAV is also equipped with

184 Cyclone riot control drone system, ISPra product leaflet, distributed at MILIPOL 2015, Paris, France, 17th - 20th November 2015 (copy on file with Omega Research Foundation).

185 Ibid.

186 Ibid.

187 Indian police to use pepper-spraying drones on unruly protesters, AFP, 7th April 2015 subsequently reprinted very widely see for example: Indian police to use 'pepper-spray drones' on protesters, Daily Telegraph, 8th April 2015, <http://www.telegraph.co.uk/news/worldnews/asia/india/11521639/Indian-police-to-use-pepper-spray-drones-on-protesters.html> (accessed 18th November 2015); Pepper-spraying drones could be used on unruly crowds by Indian police, The Guardian, 8th April 2015, <http://www.theguardian.com/world/2015/apr/08/pepper-spraying-drones-could-be-used-on-unruly-crowds-by-indian-police> (accessed 18th November 2015).

a high-resolution camera. Although there is no further information concerning the make or manufacturer of the UAVs, each is reported to have cost 600,000 rupees (£6,400).¹⁸⁸

In an interview with AFP, the police chief of Lucknow, Mr Yashasvi Yadav, stated that Lucknow police had successfully test-flown the UAVs which he explained were intended for use in crowd-control situations. According to Mr Yadav "The results were brilliant. We have managed to work out how to use it to precisely target the mob in winds and congested areas...Pepper is non-lethal but very effective in mob control. We can spray from different heights to have maximum results,"¹⁸⁹ Although the UAVs were reportedly intended to be introduced in April 2015¹⁹⁰, to date there have been no reports of their employment by Lucknow police.

Skunk riot control copter [South Africa]



Image of the Skunk riot control copter taken from Desert Wolf website

The Skunk riot control copter is an unmanned aerial vehicle (UAV) which has been developed by South African company, Desert Wolf. According to the company website, the UAV is designed to "control unruly crowds without endangering the lives of the protesters or the security staff".¹⁹¹ It is equipped with four high-capacity paintball barrels which can fire solid plastic balls, dye marker projectiles or pepperballs. Each barrel can fire up to 20 paintballs per second, consequently releasing "80 Pepper balls per second stopping any crowd in its tracks".¹⁹² Company marketing material stated that "the current hopper capacity of 4000 balls [combined] with [the] High Pressure Carbon Fiber Air system ... allows for real stopping power".¹⁹³ The UAV is also equipped with Bright Eye Safe Lasers, and on-board speakers enabling communication and warnings to the crowd. In addition, according to company marketing material,

188 Ibid.

189 Ibid.

190 Ibid.

191 Skunk Riot Control Copter, Desert Wolf website, available at <http://www.desert-wolf.com/dw/products/unmanned-aerial-systems/skunk-riot-control-copter.html> (accessed 2nd April 2015).

192 Desert Wolf website (Undated) op.cit.

193 Ibid.

the UAVs can be “operated in formation by a single operator [employing] the Desert Wolf Pangolin ground control station”.¹⁹⁴

In October 2015, Desert Wolf had reportedly entered into an agreement with an un-named South American manufacturer who would supply a range of “non-lethal” grenades including smoke, flash-bang and tear gas for use in an upgraded Skunk model – the Skunk GL UAV. It was reported that each UAV would be capable of carrying “up to 48 grenades”. And that “the grenades will be dropped over crowds and descend via parachute, minimising collateral damage on the ground and allowing the smoke to spread from above.”¹⁹⁵

The Skunk UAV was first promoted at IFSEC in Johannesburg, South Africa in May 2014¹⁹⁶ and at subsequent exhibitions including AAD 2014 also in South Africa, in September 2014¹⁹⁷, at IDEX held in Abu Dhabi, United Arab Emirates, in February 2015¹⁹⁸, and at LAAD in Brazil in April 2015.¹⁹⁹

In a July 2014 interview with BBC News, Desert Wolf’s managing director Hennie Kieser stated that the company “received an order for 25 units just after [IFSEC]” from “an international mining house”.²⁰⁰ Mr Kieser claimed other potential customers included “Some mines in South Africa, some security companies in South Africa and outside South Africa, some police units outside South Africa and a number of other industrial customers.”²⁰¹ According to subsequent reports in *Sputnik International website*²⁰² and *Newsweek*²⁰³, in 2014 Desert Wolf sent one Skunk UAV to police in South Africa and Turkey.

According to reports on *defenceweb.com*, Desert Wolf had been manufacturing approximately 50 Skunk UAVs per month in South Africa, but was seeking to establish manufacturing facilities outside of South Africa – potentially in Malta and/or Oman - to enable it to build at least a thousand Skunk UAVs a month, in

response to what it claims was a “massive demand”.²⁰⁴ In an October 2015 interview with *defenceweb.com*, Mr Kieser stated that Desert Wolf had been manufacturing its Skunk UAV in Europe, and was currently fulfilling orders from seven different customers, totalling approximately 400 devices.²⁰⁵

Concerns about the potential application of the Skunk riot control copter have been raised by certain trade union organisations within South Africa and internationally. For example, in a June 2014 with BBC News, Tim Noonan, International Trade Union Confederation spokesman stated:

*“This is a deeply disturbing and repugnant development and we are convinced that any reasonable government will move quickly to stop the deployment of advanced battlefield technology on workers or indeed the public involved in legitimate protests and demonstrations.”*²⁰⁶

On 24th November 2015, in correspondence with BNLWRP/ORF the South African Government described the current activities of Desert Wolf:

*“The Secretariat of the South African Council for the Non-Proliferation of Weapons of Mass Destruction (the Council) in its capacity as South Africa’s National Authority held a meeting with the company, Desert Wolf on Monday, 23 November 2015. During that meeting it was determined that the company builds the UAVs and sells them without the payload (pepper balls, as indicated in the request). Furthermore, they do not supply the delivery barrels that are attached to the UAV - the end user supplies specifications for their barrels and Desert Wolf only ensures that the brackets for the attachment of the barrels are the correct dimensions.”*²⁰⁷

The South African Government also disclosed the current lack of applicable national controls on the export of these UAVs:

*“South Africa has legislation that controls delivery systems in terms of the Missile Technology Control Regime [MTCR]... The MTCR lists UAVs, however the specifications of the Skunk UAV is below the control specifications listed in the MTCR. As Desert Wolf does not supply the payload (CS or any other riot control agent or any other chemical) and the specifications of the system are below control thresholds, the Council cannot institute controls on the Skunk UAV.”*²⁰⁸ [Emphasis added].

194 Ibid.

195 Martin, G., *Defenceweb*, Desert Wolf adding grenades to Skunk riot control UAV, 7th October 2015 http://www.defenceweb.co.za/index.php?option=com_content&view=article&id=40961:dese-rt-wolf-adding-grenades-to-skunk-riot-control-uav&catid=35:Aerospace&Itemid=107 (accessed 3rd November 2015).

196 International Fire and Security Exhibition and Conference, Johannesburg, South Africa, 13th – 15th May 2014.

197 Africa Aerospace and Defence Exhibition, Pretoria, South Africa, 17th – 21st September 2014.

198 International Defence Exhibition and Conference, Abu Dhabi, United Arab Emirates 22nd -26th February 2015.

199 Land Defence and Security, Rio de Janeiro, Brazil, 14th – 17th April 2015.

200 Kelion, L. African Firm is Selling Pepper-Spray Bullet Firing Drones, BBC News, 18th June 2014, available at <http://www.bbc.co.uk/news/technology-27902634> (accessed 3rd November 2015).

201 Kelion, L./BBC News (18th June 2014) op.cit.

202 India to Become First Country to Use Weaponized Drones for Crowd Control, *Sputnik International*, available at: <http://sputniknews.com/news/20150407/1020552653.html#ixzz3r5v7YCVi> (accessed 9th November 2015).

203 Hurst, L. Indian Police Buy Pepper Spraying Drones to Control ‘Unruly Mobs’, *Newsweek*, 7th April 2015, available at <http://europa.newsweek.com/pepper-spraying-drones-control-unruly-mobs-say-police-india-320189> (accessed 9th November 2015).

204 Martin G. Desert Wolf establishing production facilities in Oman for Skunk UAV, other products, 9th April 2015, available at http://www.defenceweb.co.za/index.php?option=com_content&view=article&id=38716 (accessed 7th July 2015);

Martin, G. *Defenceweb*, Desert Wolf aiming to build 1000 Skunk riot control UAVs a month, Martin, G.. 16th September 2014, available at http://www.defenceweb.co.za/index.php?option=com_content&view=article&id=36281:desert-wolf-aiming-to-build-1000-skunk-riot-control-uavs-a-month&catid=35:Aerospace&Itemid=107 (accessed 2nd April 2015).

205 Martin, G., *Defenceweb* (7th October 2015) op.cit.

206 Kelion, L./BBC News (18th June 2014) op.cit.

207 Correspondence from Mr Ceke, Counsellor, Deputy Permanent Representative of South Africa to the OPCW, 24th November 2015.

208 Correspondence from Mr Ceke, Counsellor, Deputy

Long range airborne dispenser capable of carrying riot control agents [Germany]



Airborne Long-Range NLW Dispenser, image taken from NATO RTO report, April 2012, original source Fraunhofer-Institut für Chemische Technologie

In 2007, researchers from the Fraunhofer-Institut für Chemische Technologie (ICT) presented a paper at the 4th European symposium on non-lethal weapons, describing their research and development of an “airborne, optically guided system, capable of accurately delivering 1kg of non-lethal payload even to moving targets.”²⁰⁹ The system consisted of two coupled mini unmanned aerial vehicles (UAVs) which separate before delivery of the payload. “The larger reusable plane carries propulsion and course navigation systems, the smaller is a lightweight, precision guided glider carrying the payload into the target.”²¹⁰ The system which weighed 5kg, had a reported maximum range of between 1-2 kilometres.²¹¹ There was some discussion in the ICT paper of the utility of “non-lethal” weapons in military, law enforcement and peace support operations, and a range of scenarios were identified where the delivery of “heavy non-lethal payloads over large distances is especially useful”²¹², including “delivering irritant agents through a building window without LOS [line of sight] conditions.”²¹³ According to correspondence with the ICT in November 2011, the UAV research and development programme has been terminated.²¹⁴ This was confirmed in correspondence from the German Ambassador to the OPCW, also received in November 2011.²¹⁵

Although the ICT paper did not specifically address

the potential “non-lethal” weapon (NLW) payloads that could be carried by the airborne dispenser or the potential missions for which it could be employed, these issues were raised in papers developed as part of an “Assessment of possible disruptive technologies for defence and security” conducted by a NATO study group which published its report in February 2010.²¹⁶ The goal of this horizon-scanning study was to “assess and enhance the knowledge in expected and so-called possibly disruptive developments and the consequences for military systems and operations when applied by own or opposing forces.”²¹⁷

One aspect of the NATO study incorporated table-top Disruptive Technology Assessment Games (DTAG) utilising a wide variety of developing technologies including the “airborne long-range NLW dispenser”, as detailed in its final report published in April 2012²¹⁸. In its summary of the “airborne long-range NLW dispenser” the NATO study group report described possible payloads: “**NLW-payloads could be irritant agents, malodorants, kinetic impact, flash-bang, nets...** Payloads will be modular so that the payload required for the mission can be chosen during setup for launch. Lethal payloads are a possibility as well.”²¹⁹ [Emphasis added].

In the analysis of the employment of the “airborne long-range NLW dispenser” in the table-top games, the report stated that:

*“[It] was used rather often, especially by RED [Team]. The uses were, however, not only to deliver NLWs (for riot control) but also for transporting other items – e.g. MicroRobots (IoS-066), explosives, CBRN agents, narcotics and money... Among suggested improvements were increased range, speed, payload, flight time and stealth as well as reduced size. This [idea of system] IoS showed the need for a simple delivery of systems like NLWs, Micro-Robots (IoS-066) or Autonomous Offensive Nano-UAV (IoS-084). It fills a gap.”*²²⁰

In its summary of the employment of the NLW dispenser during the table top games, the overall Study Final Report, stated: “This system was used in a variety of situations, including crowd and riot control, and to carry out attacks where collateral damage is unacceptable ... Range was the biggest limitation to its use ... The system could have an impact on TTP [Tactics, Techniques and Procedures] if it had a larger range as it

Permanent Representative of South Africa to the OPCW, 24th November 2015.

209 Liehmann, W. Zettl, S. and Thiel, K., Airborne long-range NLW dispenser, Fraunhofer-Institut für Chemische Technologie, paper presented at 4th European symposium on non-lethal weapons, Ettlingen, Germany, 21st -23rd May 2007.

210 Liehmann, W. Zettl, S. and Thiel, K. (2007) op.cit, p.1.

211 Liehmann, W. Zettl, S. and Thiel, K. (2007) op.cit, p.1.

212 Liehmann, W. Zettl, S. and Thiel, K. (2007) op.cit, p.1.

213 Ibid.

214 Correspondence with ICT researcher engaged in this project. Email received 4th November 2011.

215 Correspondence from Ambassador Gregor Koebel, Permanent Representative of the Federal Republic of Germany, 21st November 2011.

216 NATO, Assessment of possible disruptive technologies for defence and security, Final report of task group 062, February 2010, RTO-TR-SAS-062 AC/323(SAS-062) TP/258. NATO Unclassified.

217 NATO (2010) op.cit, Chapter 1, p.xiv; see also: https://www.cso.nato.int/Activity_Meta.asp?ACT=1300 (accessed 10th November 2015).

218 NATO, Disruptive Technology Assessment Game – Evolution and Validation, NATO Research and Technology Organisation, AC/323(SAS-082)TP/427, April 2012, [http://natorto.cbw.pl/uploads/2012/4/\\$STR-SAS-082-ALL.pdf](http://natorto.cbw.pl/uploads/2012/4/$STR-SAS-082-ALL.pdf) (accessed 10th November 2015).

219 NATO RTO (2012) op.cit., p.A-27.

220 NATO RTO (2012) op.cit., p.F-1.

would give a new long range NLW capability.”²²¹

It should be noted that this NATO study, and the DTAGs in particular, were intended to stimulate creative thinking amongst participants regarding possible future impacts of advances in relevant technologies, and were not intended as detailed analysis of specific technologies.²²²

Camcopter S-100 UAV [Austria]

The Camcopter S-100, manufactured by Austrian company, Schiebel, is a UAV incorporating a Vertical Takeoff and Landing (VTOL) system. It is capable of autonomous flight and can fly a programmed mission without operator intervention.²²³ It is designed to carry a payload of up to 75 lbs (34 kg) for more than 6 hours whilst travelling at 55 knots.²²⁴



Camcopter S-100 on display at International Exhibition of Means for Provision of State Security, INTERPOLITEX 2011, Moscow, 25th-28th October 2011. (Photo: © Robin Ballantyne/Omega Research Foundation)

According to a press release by Schiebel Technology, Inc., [Schiebel's US subsidiary] this US company “conducted extensive experimentation” with the Camcopter UAV system in November 1997 at the McKenna MOUT (Military Operations in Urban Terrain) facility at Fort Benning in Georgia, USA. The experimentation evaluated the ability of the VTOL UAV to deliver non-lethal munitions. All experimentation was completed using soldier operators. The non-lethal deliveries “**included smoke grenades which were fired from a modified chaff and flare block and used as a surrogate for Riot Control Agents (RCA). These munitions were delivered during both day and night operations at area and point type targets within the MOUT environment.**”²²⁵ [Emphasis added].

221 NATO (2010) op.cit, Annex L, p.3

222 Correspondence with member of SAS-062 NATO study group. Email received 2nd November 2011.

223 Schiebel, Camcopter S-100, Introduction, <http://www.schiebel.net/Products/Unmanned-Air-Systems/CAMCOPTER-S-100/Introduction.aspx> (accessed 11th November 2015).

224 Schiebel, Camcopter S-100, System performance, <http://www.schiebel.net/Products/Unmanned-Air-Systems/CAMCOPTER-S-100/System.aspx> (accessed 11th November 2015).

225 Schiebel, Press Release, US Army Dismounted Battlespace Battle Lab conducts non-lethal weapon experiments with the Camcopter VTOL UAV, [date of release unknown] The press release was available on the Schiebel website until 29th April 2001 It has subsequently been removed. It is still available on: (<http://web.archive.org/web/20010429204330/http://www.schiebel.com/industries/N0045.htm>) (accessed 11th November 2015).

These trials were described in a June 2001 Jane's article which stated that:

“What was, essentially, a surveillance vehicle underwent an astonishing transition during the experiment. The US Army decided to extend the evaluation envelope around the ability of a... (VTOL) UAV to deliver non-lethal munitions and other loads. Thus the Camcopter became an earlyUCAV (Unmanned Combat Air Vehicle), if not the first rotary-wingUCAV altogether.”[Emphasis added]. Among the reported munition payloads were “*tear gas and liquid/powdered surrogates for Riot Control Agents (RCA).*”²²⁶

In correspondence to BNLWRP/ORF, dated 24th November 2015, Schiebel stated:

*“The mentioned press release from 1998 is referring to the CAMCOPTER 5.1, an obsolete predecessor model, not the current CAMCOPTER@ S-100. Various design-studies and potential applications were evaluated for this new technology at that time but our product was never deployed for dispersal of riot control agents. The final and current product — the CAMCOPTER@ S-100 - was solely built as a platform for reconnaissance and monitoring missions. Therefore, it was never designed for and it has also never been promoted within the context of such dispersal applications.”*²²⁷

Furthermore, Schiebel informed BNLWRP/ORF that: *“No research activities or tests regarding chemical payload or riot control agent delivery are currently conducted nor are such planned for the future.”*²²⁸

No reference has been made in Schiebel's current publicly available marketing literature to the Camcopter's potential use as a means to deliver riot control agents.²²⁹ However, in an interview on 22nd November 2010, with the online publication, Defense Professionals, Chairman of Schiebel Group of Companies, Hans-Georg Schiebel, stated that:

*“Fields of application for the CAMCOPTER S-100 are numerous – both military and civilian... Among the “special military applications” highlighted were precision delivery and recovery of remote controlled munitions, and the deployment of riot control agents, smoke, flares, and non-lethal munitions.”*²³⁰

226 Jane's International Defense Review, 16th June 2001, <https://janes.ihs.com/CustomPages/Janes/DisplayPage.aspx?DocType=News&ItemId=+++1099721&Pubabbrev=IDR> (accessed 14th February 2013).

227 Correspondence from Hans Hecher, Managing Director/CEO of Schiebel to BNLWRP/ORF, 24th November 2015.

228 Correspondence from Hans Hecher, Managing Director/CEO of Schiebel to BNLWRP/ORF, 24th November 2015.

229 For example see Schiebel's website <https://www.schiebel.net/> (accessed 20th November 2015).

230 Defence professionals, CAMCOPTER – More Than a Foot in the Door in the US Market, 22nd November 2010, <http://web.archive.org/web/20101127062159/http://defpro.com/daily/details/698/>

As of November 2015, an Indonesian company, Dharma Magna, continued to market the Camcopter S-100, and has promoted the Camcopter's potential utility for RCA delivery. Dharma Magna has claimed to have "been the trusted partner in providing defense and security services and solutions to Indonesia's military and police".²³¹ The company website has stated that, "To provide excellent solutions and state of the art technology, DHARMA MAGNA joined hands with world leading defense companies"; among the companies listed are Schiebel.²³²

The Dharma Magna website has detailed the Camcopter's specifications and potential applications.²³³ With regard to "**Special Military Applications**" of the Camcopter, Dharma Magna has stated that:

*"Using two control stations... it is possible to mount a joint operation where both surveillance and specialist tasks can be run concurrently. **Tasks already trialed include:** [p]recision delivery, and recovery, of remote controlled munitions; [d]eployment of riot control agents, smoke, flares, non-lethal munitions ..."*²³⁴ [Emphasis added]

In its November 2015 correspondence to BNLWRP/ORF, Schiebel has stated that:

*"Although we explored cooperation with Dharma Magna in the past, we had no contact with Dharma Magna for at least five years. We were not aware that Dharma Magna was promoting our products in the context of said field of application, neither was this or would this have been sanctioned or was S-100 or would it be supplied for such purposes."*²³⁵

In addition, the Austrian Government, in its November 2015 correspondence to BNLWRP/ORF, has stated that:

*"Camcopters without dissemination equipment and not specially prepared for military use are considered to be dual-use items and are therefore controlled under the EU Dual Use Regulation and the 2011 Foreign Trade Act. Their export is only authorised if it is in conformity with obligations under the Chemical Weapons Convention and relevant international human rights law. The licensing criteria are in principle the same as for military items."*²³⁶

(accessed 11th November 2015).

231 Dharma Magna, Profile, <http://www.dharmamagna.com/profile.php#> (accessed 11th November 2015).

232 Ibid.

233 Camcopter S-100, Dharma Magna available at <http://www.dharmamagna.com/21-Camcopter-S-100.php> (accessed 11th November 2015).

234 Dharma Magna, Camcopter s-100, Special Military Applications, <http://www.dharmamagna.com/21-Camcopter-S-100-4-Special-Military-Applications.php> (accessed 11th November 2015).

235 Correspondence from Hans Hecher, Managing Director/CEO of Schiebel to BNLWRP/ORF, 24th November 2015.

236 Correspondence to BNLWRP/ORF, from Gerhard Eisl,

*"Austria would not authorize ...exports [of Camcopters for "special military applications" including the "deployment of riot control agents"] to end users where there are human rights concerns. Austria has not authorized such exports to end users where there are human rights concerns."*²³⁷

AVS 100 unmanned vehicle with multiple purpose payload launcher [France]



Image of the ASV-100 unmanned aerial vehicle with attached Multi-purpose launcher/aero cougar taken from Shepherdmedia.com. Aero cougar photograph at MILIPOL 2015 © Robin Ballantyne/Omega Research Foundation.

On 17th November 2015, at Milipol 2015 arms and security exhibition in Paris, the French UAV manufacturer, Aero Surveillance released details of its Multi-purpose Payload Launcher - the MPL 30. This launcher, developed in cooperation with Etienne Lacroix Group would allow the deployment of a range of payloads including tear gas grenades, hygroscopic torches and explosives from two of Aero Surveillance unmanned aerial vehicles – the ASV 100 and ASV 150. According to media reports the MPL30 can be deployed from an altitude of several hundred meters. It can "provide real-time imagery of the situation while being positioned at the best possible position for firing supported payloads."²³⁸

The MPL 30 can reportedly "carry up to 9 Tear Gas grenades on each side of the aircraft skid for a total of 18 tear gas grenades."²³⁹ Philippe Roy, President and CEO of Aero Surveillance stated: "We are very pleased with our collaboration with the Etienne Lacroix Group... The MPL 30 announced today allows us to propose complete and modular drone based solutions for law enforcement, homeland security as well as a range of civilian applications."²⁴⁰

Minister, Permanent Mission of Austria to the OPCW, 24th November 2015.

237 Correspondence to BNLWRP/ORF, from Gerhard Eisl, Minister, Permanent Mission of Austria to the OPCW, 24th November 2015.

238 Aero Surveillance introduces payload launcher, 18th November 2015, Shepherdmedia.com, <https://www.shepherdmedia.com/news/uv-online/aero-surveillance-introduces-payload-launcher/> (accessed 19th November 2015); MILIPOL 2015 Air Security: Aero Surveillance Introduces A New Multi Purpose Payload Launcher, 17th November 2015, Emergency-Live.com, available at <http://www.emergency-live.com/en/equipment/milipol-2015-air-security-aero-surveillance-introduces-a-new-multi-purpose-payload-launcher/> (accessed 19th November 2015).

239 Ibid.

240 Ibid.

The Aero Cougar launcher utilised in this system has been developed by Alsetex/Ettiene Lacroix Group in partnership with Aero Surveillance. The version shown in the marketing material (above) is designed for “crowd control” and is intended to fire 2 sets of 9 munitions. The Aero Cougar launcher has also been promoted

for use in “counter-terrorism; area protection; [to] combat IEDs; [and] enhance combat effectiveness (i.e. illuminating combat field)”. The launcher fires 56mm munitions, though no further details about the types and specifications of the range of munitions that can be employed is publicly available.



Aero Cougar system being carried and fired from a UAV, images taken from Ettiene Lacroix Group/Alsetex Aero Cougar brochure, distributed at MILIPOL 2015

Application of the Chemical Weapons Convention to the regulation of RCA means of delivery

Under Article I of the Chemical Weapons Convention: “Each State Party to this Convention undertakes never under any circumstances:

- a. To develop, produce, otherwise acquire, stockpile or retain chemical weapons, or transfer, directly or indirectly, chemical weapons to anyone;
- b. To use chemical weapons;
- c. To engage in any military preparations to use chemical weapons;
- d. To assist, encourage or induce, in any way, anyone to engage in any activity prohibited to a State Party under this Convention.”²⁴¹

Article II.1 of the Chemical Weapons Convention, defines a chemical weapon as:

- a. **“toxic chemicals or their precursors, except where intended for purposes not prohibited by the Convention, as long as the types and quantities are consistent with such purposes;**
- b. **munitions and devices specifically designed to cause death or other harm through the toxic properties of those toxic chemicals specified in subparagraph (a), which would be released as a result of the employment of such munitions and devices;**
- c. **any equipment specifically designed for use directly in connection with the employment of the munitions and devices referred to in (b).”** [Emphasis added].²⁴²

The “purposes not prohibited” are defined under Article II.9 of the Convention and include: “(c) Military purposes not connected with the use of chemical weapons and not dependent on the use of the toxic properties of chemicals as a method of warfare; (d) Law enforcement including domestic riot control purposes.”²⁴³

In addition, the Convention specifically defines riot control agents (RCAs) as: “Any chemical not listed in a Schedule, which can produce rapidly in humans sensory irritation or disabling physical effects which disappear within a short time following termination of exposure.”²⁴⁴

Whilst the Convention expressly prohibits the use of “riot control agents as a method of warfare”²⁴⁵, States Parties are permitted to possess and employ RCAs for

“purposes not prohibited” including “law enforcement including domestic riot control purposes.” However, such use would be acceptable only “as long as the types and quantities [of toxic chemicals] are consistent with such purposes.”²⁴⁶

Under Article VII of the CWC all States Parties are required to “adopt the necessary measures to implement [their] obligations under this Convention” and “not permit in any place under [their] control any activity prohibited to a State Party under this Convention.”²⁴⁷

Certain forms of “remote control” RCA means of delivery may have utility in a variety of law enforcement situations provided they meet the CWC “types and quantities” restrictions and are employed in conformity with the CWC and human rights standards (see below); however, there is a risk that some of these could also be readily misused in armed conflict or for human rights violations. Such RCA means of delivery should be stringently regulated to prevent misuse.

Other forms of “remote control” RCA delivery mechanisms may be determined to be intrinsically inappropriate for law enforcement. Such mechanisms would potentially breach the CWC and their development, possession, transfer and use should be prohibited.

No OPCW policy making organ (PMO) [i.e. the Executive Council or the Conference of States Parties], has made any interpretative statements regarding application of the CWC in this area or issued guidance as to which types of “remote control” RCA means of delivery can be employed for law enforcement purposes and if so, under what circumstances, and with what constraints. It is, therefore, left to individual States Parties to interpret the scope and nature of their obligations in this area.

²⁴¹ OPCW, Chemical Weapons Convention (1993) op.cit., Article I.1.

²⁴² OPCW, Chemical Weapons Convention (1993) op.cit., Article II.1

²⁴³ OPCW, Chemical Weapons Convention (1993) op.cit., Article II.9.

²⁴⁴ OPCW, Chemical Weapons Convention (1993) op.cit., Article II.7.

²⁴⁵ OPCW, Chemical Weapons Convention (1993) op.cit., Article I.5.

²⁴⁶ OPCW, Chemical Weapons Convention (1993) op.cit., Article II.1.a

²⁴⁷ OPCW, Chemical Weapons Convention (1993) op.cit., Article VII. The importance of ensuring effective and comprehensive national implementation has been repeatedly recognised by States Parties, and reflected in the Final Documents of the First, Second and Third Review Conferences. See for example: OPCW, Third Review Conference RC-3/3, 8th – 19th April 2013, 19th April 2013, Report of the Third Special Session of the Conference of the States Parties to Review the Operation of the Chemical Weapons Conference, National Implementation Measures, paragraphs 9.96 -9.103.

Application of human rights law and standards to the regulation of RCA means of delivery

All States employing RCAs and related means of delivery for law enforcement purposes must ensure that such use is consistent with their obligations under relevant international law, with particular attention given to international and regional human rights law as the primary area of law regulating the use of force by law enforcement officials and other agents of the State.²⁴⁸

While several human rights norms are applicable to the regulation of RCAs and related means of delivery for law enforcement purposes, the most notable are the rights:

- to life²⁴⁹
- to liberty and security;²⁵⁰
- to human dignity;²⁵¹
- to freedom from torture and cruel, inhuman or degrading treatment;²⁵²
- to freedom of opinion, expression, association and assembly;²⁵³
- to health;²⁵⁴

Guidance to States on their attendant obligations to restrain and govern the use of force in law enforcement is provided by the UN Basic Principles on the Use of Force and Firearms by Law Enforcement Officials (UNBP)²⁵⁵ and the UN Code of Conduct for Law Enforcement Officials (UNCoC).²⁵⁶ These two

248 For further discussion see: Crowley, M. *The use of riot control agents in law enforcement*, in: *Weapons under international human rights law* (ed Casey-Maslen. S.) Cambridge University Press, 2014.

249 See, e.g., *Universal Declaration of Human Rights*, adopted and proclaimed by UN General Assembly Resolution 217 A (III), 10th December 1948, Article 3; *International Covenant on Civil and Political Rights*, adopted on 16th December 1966, Article 6.

250 See, e.g., UN, *Universal Declaration of Human Rights* (1948) op.cit., Preamble and Article 1; UN, *ICCPR* (1966) op.cit., Preamble.

251 See, e.g., UN, *Universal Declaration of Human Rights* (1948) op.cit., Article 3; and UN, *ICCPR* (1966) op.cit., Article 9.

252 UN, *Universal Declaration of Human Rights* (1948) op.cit., Article 5; UN, *ICCPR* (1966) op.cit., Article 7; UN, *Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment*, adopted by UNGA Resolution 39/46, 10th December 1984.

253 See, e.g., UN, *Universal Declaration of Human Rights* (1948) op.cit., Articles 19 and 20; UN, *ICCPR* (1966) op.cit., Articles 19, 21 and 22.

254 *United Nations, Universal Declaration of Human Rights* (1948) op.cit., Article 25; *International Covenant on Economic, Social and Cultural Rights*, adopted by UNGA Resolution 2200 (XXI), 16th December 1966, Article 12.

255 *United Nations, Basic Principles on the Use of Force and Firearms by Law Enforcement Officials*, 7th September 1990, adopted by the Eighth United Nations Congress on the Prevention of Crime and the Treatment of Offenders, Havana, Cuba, 27th August–7th September 1990.

256 *United Nations, Code of Conduct for Law Enforcement Officials*, adopted by United Nations General Assembly Resolution 34/169 of 17th December 1979.

instruments specify that the use of force must be proportionate, lawful, accountable and necessary. Under Principle 5 of the UNBP, law enforcement officials are required to “exercise restraint in such use [of force] and act in proportion to the seriousness of the offence and the legitimate objective to be achieved; minimize damage and injury, and respect and preserve human life; ensure that assistance and medical aid are rendered to any injured or affected persons at the earliest possible moment”²⁵⁷ Article 3 of the UNCoC, states that “law enforcement officials may use force only when strictly necessary and to the extent required for the performance of their duty.”²⁵⁸ The attendant official commentary to Article 3 states that law enforcement officials may not use a degree of force “which is disproportionate to the legitimate objective to be achieved”.²⁵⁹

To fulfil their obligations under international human rights law and to ensure the responsible use of force by law enforcement officials, States will need to implement review mechanisms to ensure that any new weapons – including RCA means of delivery - developed or otherwise acquired are consistent with such obligations. This has been recognised in Principles 2 & 3 of the UNBP. Under Principle 2 :

“Governments and law enforcement agencies should develop a range of means as broad as possible and equip law enforcement officials with various types of weapons and ammunition that would allow for a differentiated use of force and firearms. These should include the development of non-lethal incapacitating weapons for use in appropriate situations, with a view to increasingly restraining the application of means capable of causing death or injury to persons.”²⁶⁰

UNBP Principle 3 clarifies State responsibility covering the development, deployment and use of such weapons: “The development and deployment of ‘non-lethal’ incapacitating weapons should be carefully evaluated in order to minimize the risk of endangering uninvolved persons, and the use of such weapons should be carefully controlled.”²⁶¹

A number of UN human rights bodies and mechanisms have highlighted the importance of the effective regulation of the introduction and employment of “non lethal” or “less lethal” weapons. For example, the UN Human Rights Council in its Resolution

257 *UN Basic Principles on the Use of Force and Firearms by Law Enforcement Officials* (1990) op.cit., Principle 5 (a)-(c).

258 *UN Code of Conduct for Law Enforcement Officials* (1979) op.cit., Article 3.

259 *UN Code of Conduct for Law Enforcement Officials* (1979) op.cit., Article 3. Commentary, paragraph (b).

260 *UN Basic Principles on the Use of Force and Firearms by Law Enforcement Officials* (1990) op.cit., Principle 2.

261 *UN Basic Principles on the Use of Force and Firearms by Law Enforcement Officials* (1990) op.cit., Principle 3.

25/38 of April 2014: “underline[d] the importance of thorough, independent and scientific testing of non-lethal weapons prior to deployment to establish their lethality and the extent of likely injury, and of monitoring appropriate training and use of such weapons”.²⁶²

The current UN Special Rapporteur on extrajudicial, summary or arbitrary executions, Christof Heyns, has examined the application of relevant international human rights law and standards to the development and employment of “less lethal” weapons and unmanned systems. In his August 2014 report to the UN General Assembly²⁶³, the Special Rapporteur noted that “While there is a high level of agreement on the international standards applicable to the use of force during law enforcement, the increasingly advanced technology requires a more detailed regulatory framework.”²⁶⁴ Consequently, the Special Rapporteur stated that “A process involving States and the international community, in addition to civil society, is needed to set out how the standards set by the Basic Principles on the Use of Force and Firearms by Law Enforcement Officials and the relevant jurisprudence should be applied to the scenarios created by the new technology.”²⁶⁵

Furthermore, the Special Rapporteur has argued that “Minimum standards need to be set for the development of weapons and their use, and good practices need to be identified.”²⁶⁶ Among the areas requiring greater specificity, the Special Rapporteur highlighted: “accuracy required of a projectile” and “the safe levels of a chemical irritant to be delivered by an aerosol spray”.²⁶⁷ The Special Rapporteur also argued that “The same applies to where such devices could be used (e.g. tear gas grenades should not be used in closed spaces...)” and that “The new technologies may require that monitoring of force is mandatory in many cases.”²⁶⁸

In addition to the risk of serious injury or death resulting from the inappropriate use of certain “less lethal” weapons, the Special Rapporteur has specifically highlighted the danger that the inappropriate employment of unmanned systems will undermine other human rights of the targeted individuals or groups.

“Using unmanned systems to deliver force in the law

²⁶² UN, Human Rights Council, Resolution 25/38, *The promotion and protection of human rights in the context of peaceful protests*, A/HRC/RES/25/38, 11th April 2014, paragraph 15.

²⁶³ UN General Assembly, *Report of the Special Rapporteur on extrajudicial, summary or arbitrary executions, Christof Heyns*, A/69/265/ 6th August 2014, available at https://panoptikon.org/sites/default/files/extrajudicial_summary_or_arbitrary_executions.pdf (accessed 20th November 2015).

²⁶⁴ UN, *Report of Special Rapporteur on extrajudicial executions* (6th August 2014) *op.cit.*, paragraph 73.

²⁶⁵ UN, *Report of Special Rapporteur on extrajudicial executions* (6th August 2014) *op.cit.*, paragraph 73.

²⁶⁶ UN, *Report of Special Rapporteur on extrajudicial executions* (6th August 2014) *op.cit.*, paragraph 75.

²⁶⁷ UN, *Report of Special Rapporteur on extrajudicial executions* (6th August 2014) *op.cit.*, paragraph 75.

²⁶⁸ UN, *Report of Special Rapporteur on extrajudicial executions* (6th August 2014) *op.cit.*, paragraph 75.

*enforcement context is also likely to be seen in many contexts as adding insult to injury, and an affront to human dignity. For example, using unmanned systems against striking mine workers, even if less lethal, could easily be viewed as less than human treatment.”*²⁶⁹

However, despite the recommendations of human rights bodies and the continuing widespread well-documented utilization of certain “less lethal” weapons (including RCA means of delivery) in human rights violations (sometimes resulting in serious injury or death), there are currently no internationally accepted procedures for evaluating new “less lethal” weapons, for effectively controlling their subsequent employment, or monitoring and recording data relating to serious injuries or deaths arising from their use.

²⁶⁹ UN, *Report of Special Rapporteur on extrajudicial executions* (6th August 2014) *op.cit.*, paragraph 85.

Recommendations for OPCW

In the light of the concerns raised in this paper and previously by BNWLRP and ORF with regard to the development, promotion and potential transfer and employment of a range of RCA means of delivery of concern, we recommend that the Organisation for the Prohibition of Chemical Weapons (OPCW) should:

1. Conduct a review of the existing constraints, under relevant international law, upon the use of RCA means of delivery in law enforcement

Although the CWC allows the use of appropriate “types and quantities” of RCAs for “law enforcement purposes including domestic riot control”, the nature and scope of activities consistent with “law enforcement” have not been elaborated under the Convention, or by a relevant OPCW policy making organ.

Consequently, CWC States Parties must give appropriate consideration to their direct obligations under relevant international law (specifically including international human rights law and associated standards on the use of force by law enforcement officials), and determine how such obligations are to be fulfilled at the national level.

In addition, States should determine how such obligations inform the interpretation and implementation of their obligations under the CWC. In order to facilitate full and effective implementation of the CWC in this area by States Parties, the OPCW Director General should institute a review by the Office of the Legal Advisor (OLA), of the existing legal constraints under relevant international law, upon the use of RCAs and related means of delivery in law enforcement, and determine their bearing upon the implementation of the CWC. The OLA should report its findings to a suitable policy making organ of the OPCW.

2. Develop a process for determining which means of RCA delivery are prohibited under the Convention

The OPCW should develop criteria and a suitable process for determining which means of RCA delivery are inherently inappropriate for law enforcement purposes and would breach Article II.1 and/or Article I.5 of the CWC. The OPCW should subsequently develop a clarificatory document for States Parties detailing those means of RCA delivery that are considered inherently inappropriate for law enforcement purposes. All States Parties would be prohibited, under Article I.1 of the CWC, from developing, producing, stockpiling, marketing, transferring or using such means of delivery. Subsequently, all States Parties currently possessing

such prohibited means of RCA delivery should declare such items to the Technical Secretariat as required under Article III.1 and verifiably destroy such means of delivery as required under Article I.2 of the Convention.

If agreed by the Organisation, a clarificatory document containing a proposed list of prohibited means of RCA delivery should be developed by the Technical Secretariat, potentially with the assistance of the Scientific Advisory Board (SAB). This document could then be submitted for the consideration, review and approval of an appropriate forum of the OPCW, such as the Executive Council (EC) or Conference of States Parties (CSP). The clarificatory document should be reviewed regularly in an appropriate forum such as the EC or CSP to determine whether additional items should be added in the light of developments in science and technology.

3. Strengthen existing RCA declaration and reporting measures, and explore the feasibility and utility of introducing appropriate monitoring and verification measures

The OPCW should expand the range of information provided by States Parties in their RCA declarations in fulfilment of Article III.1(e). To facilitate this process, the Technical Secretariat should be tasked with developing recommendations for relevant information categories for consideration by States Parties at the appropriate OPCW forums i.e. Executive Council or Conference of State Parties. Such information should include details of:

- Name, structural formula and CAS number of each type of RCA and quantities held;
- Name, nature and quantities of the associated RCA means of delivery;
- Locations of, and authorities responsible for holding, stockpiles of RCAs and associated RCA means of delivery;
- Entities permitted to use RCAs and associated RCA means of delivery;
- Nature of intended use.

In line with existing obligations, States Parties should be required to provide an update of the initial declaration 30 days after any change has become effective. These expanded reporting obligations could be introduced as voluntary confidence building measures (CBMs). As a

means of promoting confidence and best practice in this area, all States Parties should now consider unilaterally providing the Technical Secretariat with the additional information regarding holdings of RCAs and related means of delivery outlined above.

The OPCW should also study the potential feasibility and utility of introducing appropriate monitoring and verification measures undertaken by the Technical Secretariat to ensure that declarations submitted by States Parties concerning possession of RCAs and associated means of delivery are full and accurate.

4. Utilise existing CWC consultation, investigation and fact-finding mechanisms

All CWC States Parties should utilise existing CWC consultation, investigation and fact-finding mechanisms where activities of potential concern come to their attention such as the reported development, production, marketing, transfer, stockpiling or use of prohibited RCA means of delivery or the emergence of militarily significant stockpiles of other RCA means of delivery. If bilateral consultations with the relevant States Parties are not fruitful, concerned States Parties could consider a formal request under Article IX of the CWC.

Recommendations for States deriving from human rights law and standards

Although the Chemical Weapons Convention is clearly applicable to the regulation of “remote control” RCA means of delivery, it is critical that the international governmental community also examine the constraints imposed upon these devices under international and regional human rights law and related standards. Consequently we recommend that all States should:

1. Ensure effective national assessment of new weapons (including RCA means of delivery) to be employed in law enforcement; and undertake subsequent monitoring and regulation of their trade and use

In line with the recommendations of the UN Human Rights Council²⁷⁰ and the UN Special Rapporteur on extrajudicial, summary or arbitrary executions²⁷¹, all States should ensure that the selection and testing of all (lethal and “less lethal”) weapons developed or acquired for law enforcement (including RCA means of delivery) is carried out in each State by a legally constituted, independent, multidisciplinary and transparent panel of experts, free of direct commercial or law enforcement interests. This independent panel should:

- ensure that all weapons (whether developed or acquired) are not inherently of a nature to violate relevant international human rights law and standards; and,
- identify whether there are specific circumstances in which use of developed or acquired weapons may breach international human rights law and attendant standards (in the case of RCA means of delivery, this would include situations where the quantity of RCA dispersed becomes hazardous to the health of the targeted individuals or groups, for example as a result of repeated employment of multi-RCA munition launchers or the use of high capacity RCA dispersal devices in enclosed spaces), and restrict such use accordingly.

Furthermore, States should establish effective laws and regulations based upon international human rights standards to strictly control the use of all weapons (including RCA means of delivery) in law enforcement, and establish effective monitoring mechanisms to ensure such laws and regulations are adhered to, and kept under review.

In addition, States should establish effective laws and

²⁷⁰ UN, Human Rights Council, Resolution 25/38 (11th April 2014) *op.cit.*, paragraph 15

²⁷¹ Report of Special Rapporteur on extrajudicial executions (6th August 2014) *op.cit.*, paragraph 76.

regulations to control the trade in lethal and “less lethal” weapons (including RCA means of delivery), prohibiting any transfers of such goods that are likely to facilitate human rights violations.

2. Establish an international expert group to examine application of international human rights law to “less lethal” weapons

States should consider requesting that a suitable body, such as the UN Human Rights Council, the Office of the UN High Commissioner for Human Rights, or the UN Office on Drugs and Crime, develops guidance/procedures for evaluating the human rights compatibility or incompatibility of “less lethal” weapons and unmanned systems (including those for dispersing or delivering RCAs). If appropriate, the relevant body could also recommend constraints on the use of any “less lethal” weapons deemed compatible with human rights standards, and develop guidelines for monitoring and ensuring subsequent use is in accordance with human rights law.

3. Bring cases of concern to the attention of appropriate human rights bodies and mechanisms

Where reliable reports of the employment of RCA means of delivery for serious human rights violations come to their attention, States should raise such cases with the appropriate human rights mechanisms, including: UN Special Procedures and the UN Human Rights Council; relevant regional or international treaty bodies (e.g. UN Human Rights Committee, UN Committee against Torture); regional judicial mechanisms capable of delivering binding legal judgements regarding violations of regional treaties (e.g. European Court of Human Rights, Inter-American Court, African Commission on Human and Peoples Rights). Since a number of such regional judicial mechanisms are potentially open to individual petition, victims and their families can also directly seek redress in cases of agent misuse, and civil society organizations can attempt to employ such mechanisms to develop human rights case law on these issues.

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