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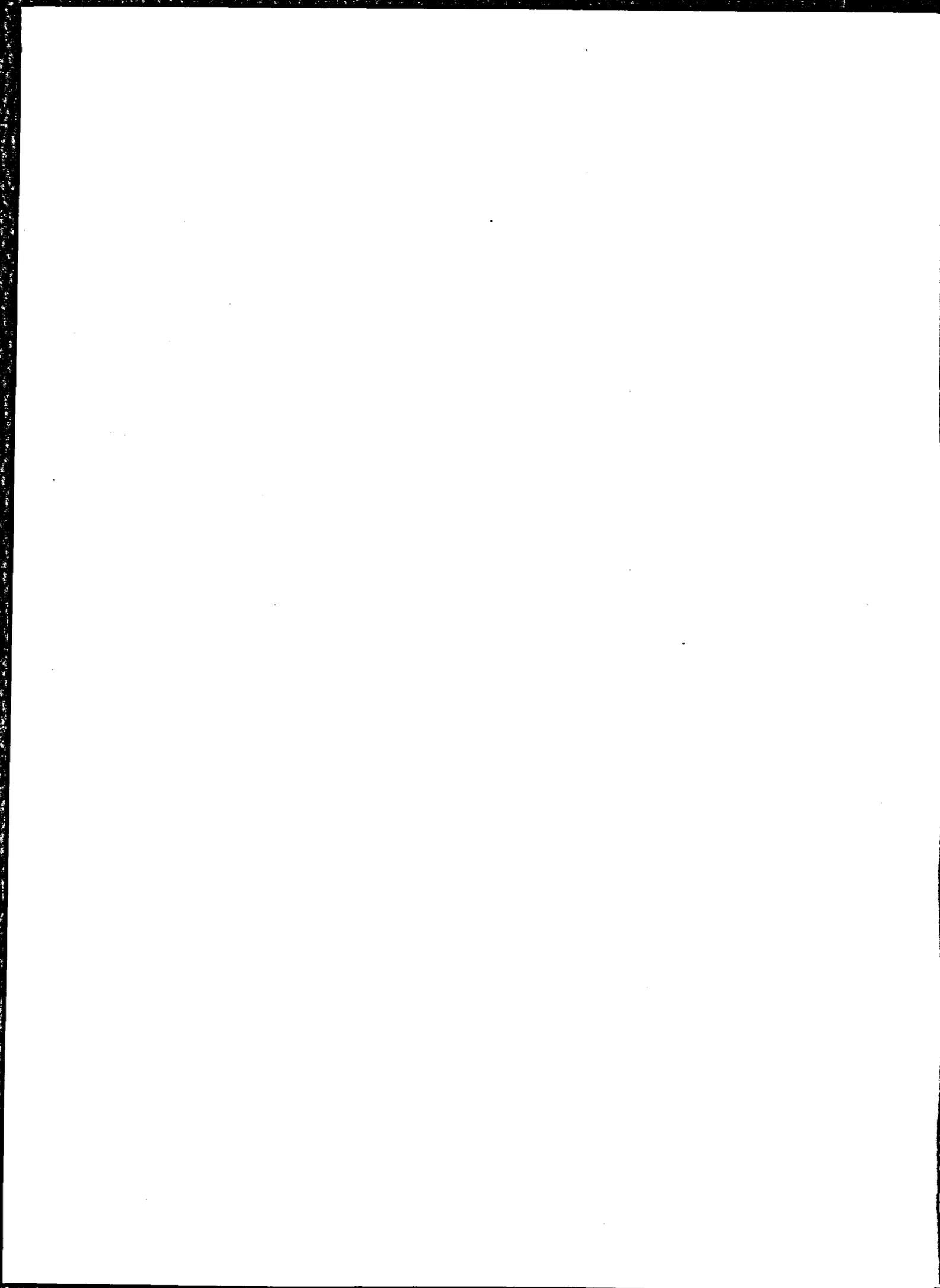
CANADA



**THE ROLE OF AMMUNITION CONTROLS
IN ADDRESSING EXCESSIVE AND
DESTABILIZING ACCUMULATIONS OF
SMALL ARMS**



APRIL 1998



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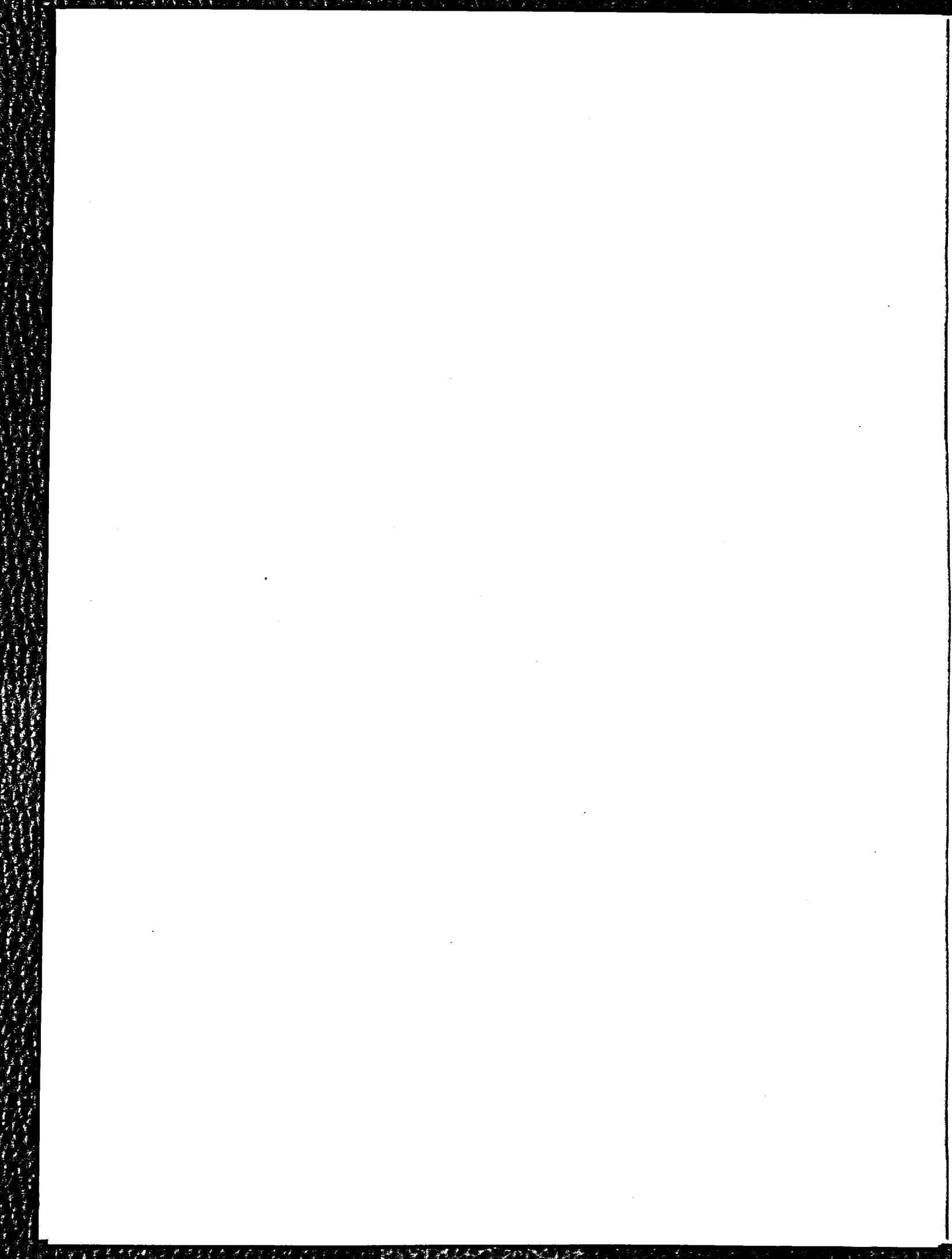


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PREFACE

Conventional weapons, especially small arms and light weapons, are taking a heavy toll in human lives in conflicts today, particularly internal warfare. The UN Secretary General reports¹ that women and children account for nearly 80 percent of the casualties resulting from the use of small arms. By 1988, as many as 200,000 children under the age of 16 were estimated to have participated in conflicts in 25 countries and, since then, this situation has worsened.

Speaking at the General Assembly in September 1997, Canada's Minister of Foreign Affairs, the Honourable Lloyd Axworthy, highlighted the importance of small arms issues:

"Landmines are not the only complex, cross-cutting problem to be addressed if we are to reduce or prevent conflict. All too often it is small arms, rather than the weapons systems targeted by disarmament efforts, that cause the greatest bloodshed today. In the hands of terrorists, criminals and the irregular militia and armed bands typical of internal conflict, these are true weapons of mass terror. As with landmines, their victims are all too often civilians. In addition, small arms proliferation undermines the security and development efforts of many developing countries."

Given the complexity of small arms issues, there is no simple single solution. Consequently, the focus of any international effort on small arms should be a multi-track series of coordinated efforts at the regional and global levels. These should address in an integrated fashion the development, arms control, peacekeeping, peacebuilding, crime, culture and terrorism dimensions of the issue. Three generic objectives for action on small arms issues can be identified:

- 1) suppression of the illicit transfer of small arms,
- 2) management, tracking and transparency in regard to the legal trade in small arms, and
- 3) practical disarmament efforts in pre- and post-conflict situations.

Without doubt, thinking about how to address small arms issues remains at a very preliminary stage. More research is necessary to explore the scope of the problem as well as potential measures to ameliorate it.

¹ Report of the United Nations Panel of Governmental Experts on Small Arms, A/52/298, 27 August 1997, p. 2 and 10.

The following report has been prepared as a preliminary examination of one possible approach to address excessive and destabilizing accumulations of small arms in regional security contexts. It is being made available to assist officials and researchers in their work on this subject, as part of the Department of Foreign Affairs and International Trade's on-going policy to share the results of independent research undertaken by the Verification Research Program.

The views contained in this report are those of the author and do not necessarily represent those of the Government of Canada, the Department of Foreign Affairs and International Trade, or those who contributed information and advice as private citizens or as representatives of Government departments. Any errors in fact or interpretation are the responsibility of the author.

Department of Foreign Affairs and International Trade
Ottawa, Ontario, Canada
April 1998

ACKNOWLEDGEMENTS

The Department of Foreign Affairs and International Trade wishes to acknowledge the work performed concerning this report under contract by Maj.(ret) David Declerq. Mr. DeClerq was a member of the 1997 United Nations Panel of Governmental Experts on Small Arms.

Mr. DeClerq, for his part, would like to thank those organizations and individuals who contributed advice and information towards the completion of this paper. In particular, he would like to thank Mr. David McCullough and Mr. Ron Vandebeek from the Explosives Regulatory Division of Natural Resources Canada; Mr. Roger Lucy, Mr. Gary York and Mr. Alan Crawford from the Department of Foreign Affairs and International Trade; Mr. Bob Anglin and all those companies listed at Annex B who contributed information; plus several other individuals who preferred anonymity due in part to the sensitivities of sources.

EXECUTIVE SUMMARY

Among the suggestions of the 1997 Report of the United Nations Panel of Governmental Experts on Small Arms with regards to preventing excessive and destabilizing accumulations and transfers of small arms was the initiation of "... a study on the problem of ammunition...". This report is intended as a preliminary step to addressing that aspect of the UN Report. It is, for the most part, a layman's technical analysis regarding the considerations and issues surrounding enhanced controls on ammunition. It attempts to address some of the hypotheses and speculation put forth in earlier writings on the subject.

This preliminary study suggests that, for the purpose of preventing excessive and destabilizing accumulations and transfers of small arms, ammunition is not the "choke point" that some might believe. There is a wide diffusion of ammunition production worldwide that involves at least 71 states and possibly as many as 100. As well, within states there tends to be further diffusion of ammunition production. Ammunition does not have a short shelf life, if stored with a modicum of care. It can be manufactured as a cottage industry, recognizing that there would be limitations in quality and quantity for such production. There are some possibilities for enhanced tracking through taggants and cartridge markings, but these may have limited value. As well, there is potential for enhanced export controls through instruments such as the Organization of American States' Convention of Illicit Firearms Trafficking as well as Codes of Conduct. Supply-side controls, however, should take into consideration the possibility that such efforts could contribute to a greater diffusion of production capacity. Any attempts at greater control will have to be backed up with augmented resources devoted to enforcement in both the supplying and receiving states. Ammunition, like the weapon itself, is just one component of the multi-faceted issue of small arms -- a holistic approach to solutions involving multiple complementary tracks is the most appropriate strategy to follow.

Much more study on ammunition controls is required. Definitive studies must include government and commercial organizations involved in regulating, producing, distributing and using ammunition. Studies are required to ascertain the unique characteristics of various regions with respect to the viability of controls. More technical studies are required on the utility of marking cartridges for tracing and detection. A survey by the UN is required to ascertain which states manufacture small arms, ammunition and ammunition components.

It is important to note that domestic firearms and ammunition regulation for the purpose of domestic public health and safety, particularly within the context of advanced states such as Canada, is not a focus of this study. The problems upon which this study concentrates relate to conflict and post-conflict situations which are, for the most part, in developing countries.

LE RÔLE DU CONTRÔLE DES MUNITIONS DANS LA LUTTE À L'ACCUMULATION EXCESSIVE ET DÉSTABILISATRICE D'ARMES LÉGÈRES ET DE PETIT CALIBRE

RÉSUMÉ

Le lancement d'une étude sur « ...le problème des munitions... » figure parmi les recommandations du Rapport du Groupe d'experts gouvernementaux sur les armes de petit calibre (1997) concernant les moyens de prévenir l'accumulation excessive et déstabilisatrice ainsi que le transfert de ces armes. Le document dont il est fait ici un résumé se veut une étape préliminaire de la réponse à cet aspect du Rapport. Il s'agit, en majeure partie, d'une analyse technique faite en termes simples des considérations et des questions à prendre en compte pour améliorer le contrôle des munitions. Le document examine certaines des hypothèses et des théories avancées jusqu'ici sur le sujet dans d'autres publications.

Cette étude préliminaire donne à entendre que, pour lutter contre l'accumulation excessive et déstabilisatrice ainsi que le transfert des armes de petit calibre, la question des munitions n'est pas le « maillon faible » que certains pourraient croire. En effet, entre 71 et 100 pays dans le monde produisent des munitions. En outre, certains États ont plusieurs centres de production. Les munitions peuvent se conserver longtemps si on en prend le moindre soin. Elles peuvent être fabriquées de façon artisanale, même si cela suppose des limites en termes de qualité et de quantité. Il est possible de suivre l'itinéraire des munitions par l'utilisation de traceurs et le marquage des cartouches, mais ces moyens donnent des résultats limités. On peut également améliorer les contrôles à l'exportation dans le cadre d'instruments comme la Convention sur le trafic illicite d'armes à feu, de l'Organisation des États américains, ou encore de codes de conduite. Dans les contrôles à la source cependant, on doit tenir compte de la possibilité que de tels efforts contribuent à une plus grande diffusion de la capacité de production. Toute tentative d'intensification des contrôles devra s'accompagner d'une augmentation des ressources consacrées à l'application de la loi aussi bien dans l'État fournisseur que dans l'État récipiendaire. Comme les armes elles-mêmes, les munitions ne sont qu'une composante du problème complexe des armes de petit calibre -- une approche globale à des solutions comportant plusieurs voies complémentaires est la meilleure façon de procéder.

De nombreuses autres études sur le contrôle des munitions devront être faites. Les études formelles doivent faire intervenir les gouvernements et les organisations commerciales impliqués dans la réglementation, la production, la distribution et l'utilisation des munitions. Il faut aussi établir les caractéristiques uniques des diverses régions aux fins de la viabilité des contrôles. Il faudra procéder à d'autres études techniques sur l'utilité du marquage des cartouches pour le suivi et la détection. L'ONU devra mener une enquête pour déterminer quels États fabriquent des armes de petit calibre, des munitions et des composantes de munitions.

Il importe de noter que les réglementations nationales sur les armes à feu et les munitions destinées à protéger la santé et la sécurité publiques, particulièrement dans le cas de pays avancés comme le Canada, ne sont pas visées par la présente étude. Les problèmes sur lesquels elle porte intéressent les situations de conflits et d'après-conflit, situations que l'on retrouve, pour la plupart, dans les pays en développement.

Les opinions émises dans l'étude sont celles de l'auteur, et ne représentent pas nécessairement les vues du ministère des Affaires étrangères et du Commerce international, ou des personnes qui, à titre privé ou de représentants de ministères, ont communiqué des informations et des avis à l'auteur. Ce dernier assume la responsabilité de toute erreur de fait ou d'interprétation. Le ministère des Affaires étrangères et du Commerce international tient à remercier M. David DeClerq (Major à la retraite) pour sa contribution à ce rapport. M. DeClerq, qui a travaillé à contrat, était membre du Groupe d'experts gouvernementaux sur les armes de petit calibre.

THE ROLE OF AMMUNITION CONTROLS IN ADDRESSING EXCESSIVE AND DESTABILIZING ACCUMULATIONS OF SMALL ARMS.

INTRODUCTION

The issue of "excessive and destabilizing accumulation and transfer" or "the "misuse of" ¹ military light weapons, particularly small arms² from both an arms control and humanitarian perspective has been a subject of discussion within relevant government, non-governmental organizations (NGO) and academic circles for several years.³ The focus has been almost exclusively on the weapon as a tool of violence, particularly within the context of conflict and post-conflict societies where destabilizing surpluses of military light weapons have led to increased violence often driven by economic, social, ethnic and political disparities. Some regions where this affliction has been particularly lethal are Central America and Southern Africa within a post-conflict scenario, and Central Africa and Afghanistan within an on-going scenario.

The issue moved the United Nations (UN) General Assembly to adopt Resolution 50/70B entitled "Small Arms". It mandated the formation of a "Panel of Governmental Experts on Small Arms" to investigate and prepare a report on:

- the type of small arms and light weapons actually being used in conflicts being dealt with by the UN;
- the nature and causes of the excessive and destabilizing accumulation and transfer of small arms and light weapons, including their illicit production and trade; and
- the ways and means to prevent and reduce the excessive and destabilizing accumulation and transfer of small arms and light weapons, in particular as they cause or exacerbate conflict.

¹ The term "excessive and destabilizing accumulation and transfer" focuses on the issue of light weapons and small arms in accordance with UNGA Resolution 50/70B. The term "misuse" is an attempt to capture one of the more politically sensitive and complex issues involved in the whole aspect of light weapons as an arms control concern, that is, the state as a perpetrator of violence and the creator of casualties using small arms and light weapons.

² The term "small arms" will be used in this paper to mean personal firearms primarily designed for military and security force operations, usually automatic and/or semi-automatic (self-loading) with a large capacity magazine (10 rounds but usually 20 to 30). The term "light weapons" includes small arms plus most other military weapons below a 100 mm barrel as well as grenades of various design. The term "firearms" means any barreled weapon which expels a bullet or projectile by the action of an explosive - this would include light weapons, small arms and sporting arms. The focus of this paper is on small arms. Small arms as defined herein are not legally available for civilians in Canada.

³ For details on the issue see "Canada, Department of Foreign Affairs and International Trade (DFAIT). *Small Arms and Light Weapons: An Annotated Bibliography*. Ottawa, November 1996; Canada, DFAIT. *Light Weapons and Micro-Disarmament*. Ottawa, January 1997. Both these publications refer to over 80 various studies.

The report was completed in July 1997 and contained a number of recommendations which included a suggestion "...to initiate a study on the problem of ammunition and explosives in all their aspects, as early as possible, within the available financial resources, and in cooperation with appropriate international and regional organizations where necessary."⁴

As described below, several researchers -- most from academic or non-governmental organization (NGO) advocacy perspective -- have suggested that ammunition rather than the weapon itself may be a key to controlling or restricting the illicit use of weapons. To re-coin and twist a truism "guns don't kill, bullets do." A review of some of the reasons put forth regarding why ammunition should be seen as a potential key in addressing the issue of destabilizing surpluses of small arms is warranted. While there may be feasibility in some of the suggestions, no technical or field analysis has been published that assesses the merits of the proposals. Even if there is sound technical credibility, the bureaucratic and political obstacles and the cost effectiveness of the implementation and enforcement mechanisms must be analysed.

At a meeting of NGOs concerned about the global effect of small arms and light weapons in Washington D.C., 10 December 1997, it was suggested that:

"...better control of ammunition production and sales was merited as ammunition has a shorter shelf-life than do the weapons themselves, and it is consumed very rapidly in conflict. Without ammunition, weapons are only political symbols, not instruments of destruction."⁵

Writing in 1995, Christopher Louise states that:

"Another possibility is to exploit the only aspect of light weapons that does not have an indefinite life span: ammunition...this is particularly the case for those weapons that are characterized by rapid rates of fire. Many countries produce ammunition under licence and...are major aid recipients. This invites the issue of aid conditionality..."⁶

⁴ United Nations. *Report of UN Panel of Experts on Small Arms A/52/298*, 27 August 1997. p. 30

⁵ See. <http://www.prepcom.org/text/pc4/pc4a> for "Notes on Small/Light Arms Campaign Meeting," 10 Dec 1997

⁶ Louise, Christopher. 1995. *The Social Impact of Light Weapons Availability and Proliferation: Discussion Paper 59*. United Nations Research Institute for Social Development, Geneva: U.N., March 1995. p.20

Ian Anthony, in a discussion of the difficulty in searching transit cargo for weapons in an era of free trade, suggests that non-intrusive detection devices such as sniffers, etc. might detect ammunition.⁷

Elsewhere, in a survey of light weapons manufacture in Pakistan, it was noted that the country is dependent on foreign sources of supply for the raw materials used in making light weapons and ammunition which increases the cost of production.⁸

Tara Kartha in her analysis of ammunition as a tool for conflict control (primarily within the regional context of south Asia) has made several recommendations.⁹ She suggests policy measures that include: regional intelligence and enforcement cooperation regarding illegal or illicit ammunition movement; transparency that entails visits to munition factories and technical cooperation; agreements not to arm insurgents operating in neighbouring states; reducing the number of para-military organizations and enhancing elite force capability; and finally instituting a policy of hot pursuit for smugglers.¹⁰ Proposed policy at the global level includes: reduction of war reserves; conflict monitoring to include monitoring ammunition shipments; and, greater transparency regarding shipments. On the manufacturing side she suggests: a strict marking and numbering system to prevent ammunition from going astray; in a given country restricting ammunition production to the types of rounds for weapons manufactured in that country; and, restricting certain calibers for military use and banning look-alike bullets.¹¹

A British American Security Information Council (BASIC) study¹² states:

“Because light weapons often last for decades, even if all transfers of light weapons were stopped today, the world would still be awash in them decades from now. But ammunition is rapidly consumed in conflict. Ammunition is also unattractive for smuggling, since it has relatively high weight and relatively low dollar value.

⁷ Anthony, Ian. *Evolving Approaches to Control the Spread of Small, Light and Other Similar Weapons*. A Presentation to the Panel of Government Experts To Study the Global Trade in Small Arms, UN, New York, 26 June 1997.

⁸ Ayesha Siddiq-Agha. *Light Weapons Manufacture in the Public and Private Sectors: A View from Pakistan*. British American Security Information Council (BASIC) Project on Light Weapons Working Paper #2, February 1996. p 3.

⁹ Tara Kartha. “*Ammunition as a Tool for Conflict Control*.” A Paper Presented at the BASIC Conference on Light Weapons. London: June 30 - July 2, 1996

¹⁰ Ibid, 17

¹¹ Authors comment: it is assumed she means .223 in. banned as it can be chambered in 5.56 mm x 45 mm and .308 in. vice 7.62 mm x 51 mm.

¹² Natalie Goldring. Project on Light Weapons, *Links between domestic laws and international light weapons control*, 11-12 Dec 1997 at <http://www.basicint.org/aaas97.htm>

Reliable (safe) ammunition is also difficult to produce. Ammunition also has a significantly shorter shelf-life than the weapons in which it is used..."¹³

How accurate are these observations? How feasible are ammunition control suggestions -- technically and politically? Are they cost-effective? Will they achieve what they are intended to achieve? Can ammunition controls make a realistic contribution to ameliorating the destabilizing and excessive accumulations and misuse of small arms? This paper will survey some of the issue areas surrounding ammunition control in an attempt to highlight the factors that must be considered in attempting to design an effective control system. It is intended as a preliminary study only; one that hopefully will point the way for a truly in-depth study such as that proposed in the recommendations of the UN Governmental Experts Panel on Small Arms. Because the research involved considerable use of various web sites on the Internet, the references in this study provide a good source of material for further study that can be easily accessed by others wishing to examine some of the issues in more detail.

It is important to note that domestic firearms and ammunition regulation for the purpose of domestic public health and safety, particularly within the context of advanced states such as Canada, is not a focus of this study. The problems upon which this study concentrates relate to conflict and post-conflict situations which are, for the most part, in developing countries. It is a fact that effective domestic firearms regulation can contribute to reducing firearms deaths and can ameliorate illicit exports and imports. The applicability of the Canadian experience to regions such as Central Africa, South-East Asia and other similar areas, however, may be problematic, particularly where military small arms are used by both state and non-state actors in a situation of serious turmoil involving such issues as political, ethnic, economic, security, and social inequalities coupled with a myriad of other problems including a lack of resources. Thus, if an observation is made in this report that a certain action may have little utility in addressing a certain situation, it does not necessarily apply to domestic firearms regulation in advanced states.

METHODOLOGY

While the foregoing applies to all firearms ammunition production in the broadest sense, specific queries and information collection for this report focused on the rounds associated with the most commonly used small arms or light assault weapons: i.e. the Avtomat Kalashnikova (AK-47 and its variants) using the 7.62 x 39 mm cartridge; the Uzi sub-machine-gun (SMG) and other SMGs using the 9 mm cartridge, the AR-15/M-16 and its variants using the 5.56 x 45 mm cartridge, and the many semi-automatic and automatic rifles using the 7.62 x 51 mm cartridge. Almost all states use these small arms rounds for the personal weapons of their military personnel and in many cases for their police and para-military security forces. In addition these rounds are frequently used in civilian firearms and are manufactured and distributed for the civilian as well as the military market. It would be safe to suggest that the vast majority of civilian and military

¹³ Ibid, 16

casualties in low intensity operations involving intra-state conflict are probably created by these rounds.¹⁴

One of the primary sources for technical data and availability of ammunition for this study was the Internet. This same source was used to contact a number of manufacturers in North America and Europe asking for their views on several technical and policy questions. As well, a number of experts on small arms ammunition and explosives were consulted in person and through E-Mail. A few of these sources, both government and private, for understandable reasons requested anonymity. The author is confident concerning the bona-fides of those individuals, thus the text will on occasion refer to a source with no attribution. The information from all of these sources plainly indicates both the problems and potential for addressing the issue of ammunition controls within the context of this study. Manufacturers that were contacted on the issue of ammunition controls were clearly told that the research was being conducted within the context of military small arms ammunition used in conflict and post-conflict situations of a criminal group, or political nature including state misuse. They were assured that this study was not connected with the politics of "domestic firearms regulation" within the North American or European context. Notwithstanding, there was a distinct indication from some of the individuals responding on behalf of the companies contacted in the USA that ammunition control within the framework of addressing destabilizing surpluses of light weapons in conflict and post-conflict regions of the world was surreptitious domestic "gun control"¹⁵ by another means. Thus, for that reason and perhaps others, returns were spotty and there was sometimes a reluctance to respond to the questions asked. Also inherent in some of the responses was the view that more controls would merely add to increased costs for producers and governments without solving the problems they were intended to address. Annex B contains a list of all the manufacturing companies contacted along with the questions and consolidated responses. Where appropriate the responses, along with other sources, have been used in the analysis contained herein.

AMMUNITION PRODUCERS

International Overview

There appears to be a belief expressed in some small arms studies that production of ammunition is limited to several large producers in a few states.¹⁶ This is not the case. As can be seen at Annex A, authoritative sources list at least 71 states that produce military small arms

¹⁴ This statement is based on the authors own 35 years of experience in the infantry and anecdotal evidence from research. It is unfortunate that the UN Panel of Experts Report did not address which "light weapons" were actually the greater casualty producers. This is another area that is ripe for study.

¹⁵ The term "gun control" is used here to indicate likely opposition to domestic firearms regulation..

¹⁶ Kartha states that in 1995 only 45 states manufactured rifles and seemed to equate this to ammunition production as well. Likewise she seemed skeptical of the capability of many third world states to produce adequate supplies of their own ammunition. Kartha, 3

ammunition.¹⁷ In most cases the references list only the state producers or large commercial producers that manufacture ammunition under state contract for armed forces. Missing is a plethora of smaller manufacturers that may or may not produce military small arms rounds but in all probability are quite capable of doing so.¹⁸ There is a distinct likelihood that ammunition producing states number close to 100 of which 60 indulge in some exports with 30 being significant exporters.¹⁹ While quality and quantity may vary, particularly in some of the developing countries, there is no doubt that there are many more small arms ammunition producing states than there are small arms producing states and within these states there are more ammunition manufacturers than there are small arms manufacturers.

The significance of the poor quality of ammunition produced by some developing countries may be somewhat overstated. Two references indicate that some of the worst excesses regarding the misuse of small arms and light weapons have, in the case of ammunition, direct links to non-European and non-American states. A British American Security Information Council (BASIC) study²⁰ within the African context clearly identifies the countries of Egypt, South Africa, Zimbabwe and Kenya as ammunition suppliers. Another source²¹ states that:

“U.S. officials maintain that Sudan also assists Algerian Islamists by allowing Iran to use Sudanese territory as a transit point for arms and ammunition smuggled through Chad and Niger to Algeria. The Algerian government broke relations with Iran and Sudan in 1993, charging that both Islamic regimes supported Algerian terrorists.”

Thus, from the perspective of controlling ammunition production insofar as the cartridge is concerned, diffusion of production both internationally and domestically within states would seem to present control problems greater than that for small arms. The very fact that ammunition is an expendable item, and weapons unless they are captured, destroyed or wear out over many years are not, is one of the reasons many states wish to have a modicum of ammunition self-sufficiency, particularly if they see themselves as being potentially isolated or have experienced embargos within a real or perceived national security threat. It would also appear that

¹⁷ Renner says that a UNIDIR study identified 52 states and 300 companies that produce firearms. See Michael Renner, *Small Arms, Big Impact: The Next Challenge of Disarmament* WorldWatch Paper 137., October, 1997, 32. One Internet page lists 323 Gun Makers, most in the USA see <http://www.shooters.com/cgi-bin/shotpage2?gunmakers>. The number of arms manufacturers large and small on a global basis are probably in the thousands.

¹⁸ See the paragraphs on Pakistan, the USA and Canada to appreciate the magnitude of the diffusion of ammunition manufacturing capability.

¹⁹ See Annex A for details.

²⁰ See BASIC Paper Number 23, *Africa: The Challenge of Light Weapons Destruction During Peacekeeping Operations*, Dec 1997. at <http://www.basicint.org/bpaper23.htm>

²¹ See <http://www.heritage.org/heritage/library/categories/forpol/log1060.html>

ammunition sources may be less connected to North-South flow than light weapons are alleged to be.

State, Commercial and Private Production

It is not within the purview of this study to list and analyze all state, large and small commercial, and private production facilities and capabilities. A few examples will serve to demonstrate the magnitude of such production and the challenge in tracking and controlling production, particularly small producers within the context of global constraints.

Pakistan is an interesting case in point.²² While the evidence presented here applies to light weapons and not necessarily ammunition, it is of all the more concern because of the likelihood that ammunition production facilities might be equivalent to or in excess of the number of firearms licensed producers. By far the most significant ammunition producer in Pakistan is Pakistan Ordnance Factories (POF). However, there are 23 licenced firearms manufacturers in Pakistan although only about eight seem to be operating on a regular basis.²³ According to Ayesha Siddiqa-Agha the quality and quantity of ammunition produced by public and private sources appears to be of a standard below that acceptable to many countries.²⁴ His sources suggest that the ammunition manufactured is inefficient and not competitive enough in price for export.²⁵ Be that as it is, there appears to be a significant potential for producing ammunition, even if on a relatively limited basis, and one must wonder how effective government regulation, controls and enforcement is under the circumstances. There is no indication of how many unlicensed ammunition producers there may be with regard to hand loading in small village workshops or family homes. In view of the weapons manufacturing activities so widely recorded regarding the infamous gun village of Darra, there is no reason to believe such activities are rare.

The USA has a tremendous ammunition production capability and distribution net. The military alone is responsible for overseeing some 23 very large ammunition plants producing a wide variety of ammunition, explosives and explosive devices.²⁶ The primary plant for small arms ammunition is in Lake City Missouri. Many of the army ammunition plants are in fact run on a

²² Most of this information on Pakistan can be found in. Ayesha Siddiqa-Agha. *Light Weapons Manufacture in the Public and Private Sectors: A View from Pakistan*. British American Security Information Council (BASIC) Project on Light Weapons Working Paper #2, February 1996.

²³ Ibid 12. It appears that these weapons are of the non-rifled shotgun variety but it is not clear.

²⁴ Tara Kartha in her study makes the same claim. The author fired several hundred rounds of 7.62 mm from a Pakistani made HK-G3 while in Pakistan in 1977 and experienced no misfires or jams and a good degree of accuracy. It is not known whether the ammunition originated from the POF, but there is no reason to believe it did not.

²⁵ Ibid 3

²⁶ Details on locations and product can be accessed on the Internet at <http://www.pica.army.mil/ardec/advocate/aaps.htm>.

contract basis by large commercial manufacturers. These commercial manufacturers, along with numerous others, also produce ammunition of a caliber used by the military such as 9 mm, 5.56 mm and 7.62 mm for the civilian market. A sampling of companies that have Internet web pages and produce ammunition or ammunition components are: 3-D Ammunition and Bullets, Bismuth Cartridge Company, Cascade Ammunition, Cor Bon Ammunition, Hornady Manufacturing Co, Impact Bullets, Lapua Ltd, Mullins Ammunition, Victory Cartridge Company and Winchester Ammunition to name a few. Most of these manufacturers produce ammunition and/or ammunition components in the magnitude of many millions of rounds annually. In addition companies such as Century International Arms Inc. import and export large amounts of ammunition and firearms, much of it surplus to various militaries.²⁷

Canada has very few major ammunition manufacturers. Expro Chemical Products Inc. is the only large Canadian manufacturer of propellants while SNC Technologies is the only large ammunition producer and the primary supplier of small arms ammunition for the Canadian Armed Forces. According to the records of the Explosives Regulatory Division of Natural Resources Canada, there are about 60 companies licenced to manufacture sporting ammunition or ammunition components.²⁸ Most of these, some 50 plus in all, are small companies specializing in hand loading custom built cartridges for sale to police forces or sports shooters. Canada has records of import from some 30 countries for ammunition and ammunition components. By far the greatest source is the USA where about 45 manufacturers of ammunition and ammunition components are listed as importers to Canada. Other import sources of note are the UK, Australia, France, Sweden, Italy, Germany, Russia, and South Africa. Also of interest are imports from Israel, Mexico, Malaysia, Poland, Brazil and China. The ammunition in question is firearms sporting ammunition which sometimes includes 7.62 mm, 5.56 mm and 9 mm rounds.

Legal private ammunition loading for personal use, primarily competitive shooting, but also for hunting and, mostly in the USA, for self-defence, is widespread, particularly in North America. Good hand loading equipment can be purchased from a variety of sources. Reloading kits capable of producing several hundred to several thousand rounds a day by one or two persons can be purchased in the range of US \$145 to \$355.²⁹ In addition, companies such as MAST Technologies³⁰ provide large scale high quality, new and used ammunition machinery. Their

²⁷ For details on prices and rounds available see <http://www.Centuryarms.com/ammo.htm> and <http://www.randomc.com/~atl/gator/>

²⁸ See <http://www.nrcan.gc.ca/mms/explosif> for details.

²⁹ For only one source see <http://www.huntingtons.com/>

³⁰ For details on what they offer see <http://www.bellammo.com/machine.html>.

customers include all major U.S. producers as well as major manufacturers in Central³¹ and South America, Europe, Africa, Australia and Asia. In addition to the commercially available products there are numerous references to making ammunition and firearms at home with basic tools.³²

AMMUNITION - COMPONENTS AND PRICES

The primary components for the manufacture of ammunition are: cartridge case, propellant or powder, primer and bullet.³³ Combine the above with hand loading equipment, even of the most basic type, and one is in the business of producing ammunition. It would seem that one area to investigate with regards to enhanced controls may be ammunition components.

Cartridge Case

Cartridge cases, brass or steel, can be purchased in bulk, new or used. Brass cases unlike steel are less susceptible to corrosion. Individuals, once in the possession of cartridges can recycle them after firing. Recycled casings, for various reasons, may no longer have the same tolerances as new casings and can cause extraction problems and chamber fit problems if not properly checked and refurbished. Within reason, damaged cases can be repaired. However, over time such cases will deteriorate to the extent that they may no longer be re-useable. One source³⁴ noted that casings for one caliber can sometimes be hand or machine modified for use as another caliber provided it is to fit a shorter chamber and has essentially the same base size; an example would be a 30-06 in. casing modified for a 7.62 mm chamber. Another source stated that cases can be re-used up to 20 times without significant deterioration.³⁵ In the opinion of a few sources the casing may be the ammunition component that is most difficult to adequately produce in a cottage industry -- it would be possible providing brass plate was available but the quality would not be particularly good and the amount produced would be quite low compared to factory

³¹ Including Central America is interesting. Open source literature that lists ammunition producing states is somewhat uncertain on this matter. As well, attendees at a Central American workshop on small arms as part of the UN Experts Panel on Small Arms seemed to imply that there was no production of ammunition in the region.

³² A few examples can be found at <http://www.cnw.com/~xbook/w5.htm>. Examples include producing SMGs and shotguns along with ammunition.

³³ An excellent technical overview on ammunition basics can be found on the Internet at: http://users.aol.com/vaquero760/a_index.htm

³⁴ Private communication with author.

³⁵ John Traister and Robert Traister, *Complete Reloading Guide*, Stoecker Publishing Company, 1996. 28

production.³⁶ However, the steps to manufacture a casing are not particularly daunting either technically or financially for most states.³⁷

Bullet

Bullets can be purchased in bulk. Of all the ammunition components a bullet is probably the easiest item to produce providing lead or a lead product is available. It requires very few tools -- a ladle, a lead melting pot, a bullet mold and some bullet lube -- to produce bullets in quantity.³⁸ Cottage industry or home-made production is not uncommon.

Propellant (powder)

There are only a few major producers of propellant powder in North America. Some of these are Expro Chemical Products Inc in Canada, and in the USA; IMR, Winchester, Alliant, Accurate and Primex³⁹. These sources provide most of the propellant to North American distributors. Powder can be purchased in bulk for home re-loading. It is subject to controls in most countries with regards to amounts sold, transportation and storage. For the most part these controls are aimed at explosive safety -- not restrictions for other reasons. See Annex C for a synopsis of Canadian controls. Controls notwithstanding, gunpowder or guncotton of the type used in modern ammunition can be produced as a cottage industry. The materials needed are cotton (cellulose), concentrated nitric acid, concentrated sulfuric acid and distilled water.⁴⁰ While the components to produce powder are easily obtainable, safety hazards, skill requirements and quality control make this a potentially dangerous task. Generally speaking, the quality of home made propellant is no way near as reliable as high grade commercial product. Cottage industry production appears to be relatively rare.

Primer

Primers may be a useful focus for closer control. As noted in Annex B the perception of shortages appeared to be of real concern to the USA domestic home ammunition market at one time.⁴¹ That said, primers like powder can be produced as a cottage industry using anything from match heads to toy caps. It would appear that using home made primers may be somewhat less

³⁶ Private correspondence with author. Also see Annex B.

³⁷ Traister, 28.

³⁸ Ibid, 462

³⁹ Traister and source at Canadian Explosives Research. Also see <http://www.westernpowders.com/>

⁴⁰ For additional details on this see <http://www.dodgenet.com/~kwantam/ac/198.doc>

⁴¹ For additional details see http://www3.10pht.com/pub/tezcat/Martial_Law/Feds-Stocking-Ammo.txt

unusual than producing home made propellant, but it is still dangerous and only suitable for very small quantities of ammunition. Primers are small and many thousands can be moved in a small container. Commercial primers are usually sold in primer lots of 1,000 with prices for rifle cartridges ranging from US \$17 to \$24 per thousand. Again, like propellants, there are relatively few major primer producers; examples in North America are Cascade Cartridge Incorporated, Federal Primer, Winchester, and Remington. Primers, like powder, are subject to regulation in terms of production, sales, transport and storage (see Annex C). Research into how many countries produce primers for their own ammunition factories could indicate the viability of more stringent primer control on an international basis.

The Price of Ammunition

Prices vary from country to country and are susceptible to market conditions. Like any commodity, the more one buys at a given time, the cheaper it is. As well, quality has much to do with price. Old military ammunition, berdan primed, corrosive, will cost less than newer boxer primed, non-corrosive.⁴² The same applies to new ammunition and re-load ammunition. One government source indicated that ammunition from eastern Europe and some countries in Asia can be purchased in bulk very cheaply -- a few cents a round.⁴³ Pricing and sourcing of ammunition, particularly in conflict and post-conflict society, is an area that requires some study. However, it is worth noting that ammunition invoices for the Rwandan military for the years 1993 and 1994 indicate costs very similar to commercially available ammunition in the USA. The ammunition was delivered by air and the invoices show the purchase originating in South Africa, Israel and Albania. The cost of small arms ammunition on a per round basis in US dollars was: 5.56 mm @ \$0.21 to \$0.27; and, 7.62 mm x 39 mm @ \$0.25 to \$0.36.⁴⁴ There is no indication as to whether the price included delivery -- it would appear unlikely. Quantities ranged from .5 million to 2 million rounds per purchase. Below is a sample of mostly USA company prices advertised on the Internet and other source derived:⁴⁵

⁴²For details on the difference between berdan and boxer primers and other ammunition component definitions and descriptions see http://users.aol.com/vaquero760/a_index.htm. Also see <http://home.cdsnet.net/~martin13/primers.htm>

⁴³ Private correspondence with author.

⁴⁴ The ammunition prices and sources for Rwanda are courtesy Human Rights Watch. Special thanks to Massimo Alberizzi of Corriere della Sera who obtained the Mil-Tec documents in Goma. The ammunition prices obtained also included 12.7 mm [.50 cal], numerous rifle grenades, hand grenades and light anti-tank weapons or rocket propelled grenades (RPG-7).

⁴⁵ Canadian sources indicate that the Canadian military pays \$0.66 Cdn per rd of 9 mm, and \$0.55 per rd of 5.56 mm. The high cost is explained as reflecting the way the ammunition is packaged for shipment and storage. It is also quite probable that it is a case of economies of scale and a closed market. This is a good indication as to why poorer countries may choose to buy ammunition abroad, or, if they establish their own ammunition factory why they may seek additional markets in order to effect economies of scale and subsidize self-sufficiency.

- 9 mm boxer primed, non-corrosive 1,000 rds, \$0.16 each
- 9 mm berdan primed, corrosive 1,000 rds, \$0.15 each
- 9 mm US Military cost bulk buy several million rds, \$0.11 each
- 5.56 mm new 50gr Ballistic Tip, 1,000 rds, \$0.37 each
- 5.56 mm reload 50gr Ballistic Tip, 1,000 rds, \$0.27 each
- 5.56 mm re-manufactured, 1,000 rds, \$0.16
- 7.62 x 39 mm, Russian Manufactured, 1,320 rds, \$0.21 each
- 7.62 x 39 mm Winchester, 20 rds, \$0.31
- 7.62 x 51 mm Winchester, 20 rds, \$0.30
- .308 in. Similar to 7.62 x 51 mm, 1,000 rds, \$0.22 each
- 7.62 x 51 mm Pakistan Ordnance Factory 100 rds, \$0.25⁴⁶
- .50 cal ball, Greek, 1000 rds, \$1.25 each

MISCELLANEOUS

Small Arm Ammunition Tolerance

Some small arms are much more tolerant than others when it comes to firing ammunition. According to one authoritative source, the AK-47 has a long stroke piston and a relatively high weight of recoiling mass which makes it less susceptible to minor differences in propellant loads than short stroke pistons, delayed blowback or recoil operation small arms.⁴⁷ Ammunition difficulties may result from either minuscule propellant load differences or variations in brass hardness. According to the same source, a recent purchase of a number of 9 mm firearms of a particular model by a police force necessitated a special ammunition production run due to the sensitivities of the firearms to minute differences in standard commercial load ammunition. No military force would want an ammunition sensitive weapon for obvious reasons.⁴⁸

Smuggling -- Small Arms Versus Ammunition

It has been suggested that ammunition is an attractive target for controls because it is more difficult to smuggle -- largely because of weight and bulk problems. An AK-47 weighs approximately 4.8 kgs. An equivalent weight in 7.62 mm ammunition is approximately 200 rounds. The same ratio applies to the M-16 which at around 2.9 kgs has an equivalent weight in 5.56 mm ammunition of about 200 rounds. If one takes the cost of each item it would easily suggest that, on a pricing evaluation alone, it is far more lucrative to smuggle small arms than ammunition. The same rationale does not, however, apply to bulk. Ammunition cartons can be broken down -- if only 100 rounds of 200 rounds gets through, they are still effective. If a firearm is broken down for shipment most of its individual parts will be larger and bulkier than several

⁴⁶Ayesha Siddiqa-Agha. 10. It is assumed he is referring to the 7.62 mm rd as the reference is not clear.

⁴⁷ Private correspondence with author.

⁴⁸ The Canadian built Ross Rifle of WWI infamy had problems with cartridge variation frequently causing jamming and putting soldiers at high risk on the battlefield. The Ross Rifle was replaced by the Lee-Enfield.

rounds of ammunition. As well, half a rifle will not generally be effective, except for spare parts. Another consideration would be the cost of seizure for the smuggling organization. An organization that loses 10,000 rounds of 5.56 mm ammunition in transit may in effect be losing a maximum dollar value of about US \$2,500.⁴⁹ The equivalent weight in M-16s would be 50 rifles -- it is difficult to believe that they could be purchased for US \$50.00 each. Tracking guns to an illicit source and obtaining a conviction may be easier than trying to do it for ammunition. Most firearms have serial numbers and records are available at least at the new sale level. The same is not true for ammunition. Focusing on ammunition control primarily because it is deemed more difficult or less lucrative for smuggling purposes is, at best, based on speculative analysis. This proposition requires more study as it would appear to be situational in its application -- particularly in terms of a country's willingness and ability to monitor and detect such transactions. On the other hand, monitoring legal ammunition transfers may be more useful as they are generally ongoing and large in scale.

Detecting Smuggled Ammunition

The ability to monitor and detect illicit ammunition in transit has been the subject of some speculation in the light weapons arms control literature. The focus is on the use of chemical detectors to find "explosives". Most current explosives detectors were developed in the context of airline security and are based, for the most part, on monitoring airport baggage.⁵⁰ They are expensive and as currently developed would not generally be appropriate for scans of bulk cargo areas such as large border crossing points and ports. Examples of scanners used at airports include the CTX-5000 produced by InVision which costs approximately US\$ 1 million and Thermedics Inc which produces a hand held scanner called EGIS at US\$ 165,000 -- it is labour intensive and much slower to operate than the CTX-5000.⁵¹ Each must be in close proximity to the source it is scanning. IONSCAN, a Barringer Inc product, can detect some components of ammunition propellants (nitroglycerine and sulfur from black powder), but according to a Barringer representative, current advanced X-ray systems suitable for detecting cartridge cases even through the outside of a truck or container might be more practical. Trace chemical detectors are generally good only for close proximity detection. If the ability to detect ammunition through the development of enhanced detectors or by propellant tagging was improved, it would still require a commensurate commitment by governments to use effectively the resource and may be prohibitively expensive for developing countries. The advent of free

⁴⁹ See pricing details. This is closer to the high end of the cost spectrum.

⁵⁰ There are a number of Internet sites that deal with commercially available bomb detectors and explosive detection, particularly within the context of airport and aircraft security. See <http://www.thesite.com/0896w1/life>; <http://www.westergaard.com:8080/Secrime/magsf2.html>

⁵¹ For further details see http://www/pbs.org/newshour/bb/transportation/jul96/security_7.25a.html.

trade and the continuing increase in the flow of people and goods across borders serves to complicate the issue of detection even more.⁵²

AMMUNITION CONTROLS

The Regulations

Most states have some form of controls on the manufacture, shipping, storage, export and import of ammunition and ammunition components.⁵³ In Canada these controls fall under a myriad of different regulatory bodies ranging from various divisions within the Department of External Affairs and International Trade (DFAIT) through Revenue Canada (Customs and Excise), the Explosives Regulatory Division, to the RCMP. The regulatory agencies are in turn bound by numerous legislative and administrative acts and directives.⁵⁴

In Canada the Explosives Regulatory Division of Natural Resources Canada monitors the manufacture and storage of explosives including ammunition under the Explosives Act and the Transportation of Dangerous Goods Act. The Canadian Explosives Research Laboratory tests all commercial explosives, sporting ammunition, etc. The Explosives Regulatory Division, among other things, provides licencing for and inspects the manufacturing, importing, storage and transportation of explosives.⁵⁵ No small arms ammunition (with the exception of certain flare and dummy ammunition) or components such as powder and primer can be legally exported without the official authorization of the Export Control Division of DFAIT.⁵⁶

⁵² A "Towards Collaborative Peace" research project has made a link between free trade and an increased flow in illicit arms trafficking in South America. TCP Project News 1 *Institute for Defence Policy*, September, 1996

⁵³ Firearms and ammunition regulations in the USA run a gamut of federal, state and municipal controls of varying degrees. Most ammunition restrictions are centered on explosive controls dealing with handling, storage and exports. (see Annex C).

⁵⁴ Some acts relevant to ammunition are: Criminal Code, various Criminal Law Amendment Acts, Customs Act, Explosives Act, Export and Import Permits Act, and the National Defence Act. Also see Canadian Firearms Centre <http://canada.justice.gc.ca/Orientations/CCAF> for useful information on civilian ammunition regulations.

⁵⁵ For further details see: <http://www.cisti.nrc.ca/programs/indcan/edlabs/text/91.html>

⁵⁶ For details on export restrictions see: "Annex C to - Canada, DFAIT. *Light Weapons and Micro-Disarmament*. Ottawa, January 1997 and Canada, DFAIT. *A Guide to Canada's Export Controls*. September, 1996 see <http://www.dfait-maeci.gc.ca/eicb/cdaexp-e.htm>. For details on the responsibilities of the Explosive Regulatory Division see <http://www.nrcan.gc.ca/mms/explosif>

Canada is also a signatory to several international agreements that provide for some controls on the export of ammunition. Thirty-three countries⁵⁷ are current members of the Wassenaar Arrangement. The aim of the Wassenaar Arrangement is to ensure that goods and technologies designed for military use or dual-use technologies with civilian and military use are not shipped to areas where regional military stability would be undermined. The intent is to contribute to regional and international security by promoting transparency and responsibility in selling such goods. It would appear that the potential of the Wassenaar Arrangement to control seriously small arms and ammunition transfers is marginal given its terms of reference and the subjective nature of defining destabilizing as it relates to small arms and ammunition. As well, the Wassenaar Arrangement is identified as a "discriminatory supply side regime" by many developing countries, some of which have a substantial ammunition producing capability themselves. It would seem that any agreement that is exclusive in nature and supply-side oriented would have minimal success in controlling access to ammunition.

The Organization of American States (OAS) Convention Against Illicit Manufacturing of and Trafficking in Firearms, Ammunition and Explosives and Other Related Material, hereafter identified as the OAS Convention, shows more promise as a method of controlling the illegal or illicit export and transfer of ammunition. Signed in November 1997, the OAS Convention is a regional effort to control the illicit manufacturing and trafficking in firearms, ammunition and explosives. It requires signatories to carry out among other things the following:

- adopt legislation to criminalize under their domestic law all aspects of illicit manufacturing and trafficking in firearms, ammunition and explosives;
- mark firearms in accordance with several criteria for both domestic use and especially for export;⁵⁸
- take unspecified security measures regarding the materials in question;
- establish effective export, import and transit licenses or authorizations;
- strengthen controls at export points;
- maintain records to trace and identify illicit materials as defined in the Convention;
- exchange information on all aspects of illicit activities; and
- provide technical assistance and exchange experience and training.

⁵⁷ It is significant that many of the major ammunition producing countries are members of Wassenaar. Of the 33 Wassenaar states at least half are major exporters of ammunition or components including ammunition factories under licence. Most of the remaining states have some form of ammunition production capability.

⁵⁸ It should be noted that there are no marking requirements for ammunition. Included in the ammunition definition are cartridge cases, primers, propellant powder and bullets.

A guideline that would assist in implementing the OAS Convention called "Model Regulations For the Control of the International Movement of Firearms, Their Parts and Components and Ammunition" was developed within the context of work carried out under the Inter-American Drug Abuse Control Commission.⁵⁹ Canada was one of 19 countries involved in its development. It provides detailed procedures for exporting and importing ammunition. Of significance is the requirement to obtain the agreement of transit countries and to include ports of entry and exit on the documentation. While information on exports and imports is available to the relevant agencies of participating countries, there is no transparency in the arms control sense with regard to the public at large, due in part to commercial privacy concerns. While a country such as Canada may release such information as it pertains to its own exports and imports, no such obligation rests with other signatories.

It will be some time before it can be determined whether the OAS Convention will achieve its objectives. The signatory countries reflect disparate resources for enforcement, differing histories of bureaucratic efficiency and honesty, differing legal and legislative systems, and differing political priorities. As well, there is a general vagueness to some of the requirements in the Convention. If the Convention is even partially successful it will serve as a model for other regional and perhaps a global agreement.

Codes of Conduct

While not strictly speaking controls or regulations, codes of conduct do offer guidelines for the sales or export of arms.⁶⁰ Ammunition and ammunition components should form part of such codes. Care will be required in defining certain items within the context of military versus civilian: for example, propellant and primers could be designated for "sporting" use or certain explosives for mineral extraction purposes. Generally speaking quality, quantity and type should determine the likely end use. Again, as this is by-and-large a supply-side control, the possibility of encouraging more diffusion in production is always a consideration. It is easier for a state to start manufacturing ammunition as opposed to tanks or fighter aircraft.

Cartridge Marking

Almost all new cartridge casings used for producing ammunition by major commercial and state ammunition manufacturers are base stamped to identify the manufacturer and the caliber.⁶¹ It would be difficult but not impossible to add more information using a stamp process. Considering various new technologies such as laser and bar code marking, it might be possible to

⁵⁹ Draft copy obtained from DFAIT. *Model Regulations for the Control of the International Movement of Firearms, Their Parts and Components and Ammunition*. dated September 15, 1997.

⁶⁰ For a good discussion of Codes of Conduct see: <http://www.gn.apc.org/sworld/code.html>

⁶¹ For details on various base stamps see : Janes, *Ammunition Handbook*. 1997-98.

enhance identification to the extent that at least large orders would be marked to identify the purchaser and the country of manufacture as well. Thus, if Giat Industries in France produced 5 million rounds of 5.56 mm for country x, the cartridge base would provide that information in plain or code. If country x then diverted the ammunition illicitly it could be identified. Costs might be prohibitive for small producers and recycled casings would not be candidates for such markings particularly within the context of home based hand loading. It should be noted that cartridge box sizes run from 20 rounds to 64 rounds and higher and are generally marked with a batch or lot number and the contract number. It is quite easy for cartridges to be transferred to non-marked containers.

Identification taggants are microscopically color-coded particles that, if added to explosives or gun powder during their manufacturing, might facilitate tracing those products after a bombing or a shooting back to the manufacturer. Through the use of distribution records, tracing would continue through wholesaler, dealer, original purchaser (and subsequent ones if records were kept) or to the point of theft. There are also detection taggants that may facilitate detection of a product before it is used. Analysis of the merit of taggants is currently underway in the USA⁶² involving such issues as powder stability, crime scene contamination, record keeping, and cost effectiveness. It would also be worthwhile to investigate the merits of a taggant or identifier that would be susceptible to detection by sniffers or other devices to aid in customs and port authorities in detecting illicit shipments. Within the context of ammunition export and import, it could provide a means of identifying clandestine suppliers providing most major ammunition producers from most major producing countries used them. To ensure there was no cheating some form of verification inspection may be required at most plants.

A more novel marking procedure has been identified and tested with regards to marking individual bullets.⁶³ Tests were conducted by stamping the bullet base and then firing it. Apparently the markings remained intact. A laser technology company confirmed that computer-directed laser technology could be used to imprint the bullets as they went through an assembly line. Based on the analysis it was deemed that bullets could all have their own unique identification based on a number letter coding that allowed combinations of 52 to the sixth power. While the technology appears viable, it would appear that the required controls on ammunition in terms of record keeping at manufacture, wholesale, distributor, and purchaser level would severely limit its application, unless there was a wholesale acceptance of domestic and international regulation that exceeded that of even the most strict states on the matter at present. Along with that, significant commensurate resources to support it would be needed.

With regard to markings, one source has stated that several large countries involved in arms supplies conveniently ensured that the weapons produced for clandestine delivery contained no serial numbers. In one case, the weapons supplied were not ones normally manufactured by the

⁶² Canada has an explosive expert from the Explosives Regulatory Division participating in the meetings.

⁶³ See an article by Dr Norman Rubenstein at <http://members.aol.com/NRubenstei/gcontrol.htm>

country making the delivery.⁶⁴ All this is to say that when states see it as in their best interest to circumvent an agreement or a practice, it will probably be done, whether it is small arms or ammunition. It may be easier to do it with ammunition.

Diversion and Theft

Laws and enforcement mechanisms are one thing, implementation is something else. A snapshot of some of the issues to be considered can best be illustrated by a few examples of ammunition control problems. There are undoubtedly hundreds of similar examples available.

Two thousand rounds of 9 mm ammunition legally shipped from the USA to Trinidad disappeared either at sea or in the docks in Port-of-Spain.⁶⁵ In a now classic case of government panic and collapse, ammunition stores all over Albania were looted in February and March of 1997.⁶⁶ One estimate puts the number of ammunition rounds looted at 10.5 billion.⁶⁷ Much of this will never be re-captured. An FBI agent in Alexandria Virginia allegedly stole between 100,000 and 200,000 rounds of ammunition from an FBI training academy over a number of years.⁶⁸ A report from the USA General Accounting Office (GAO) noted the theft of military small arms parts from US military stores that ended up on the black market.⁶⁹ As well, between 1990 and 1993 about 250 small arms were reported lost, missing or stolen.⁷⁰ Considering the size of the US military, including reserves and national guard, this is not a large number. It is quite conceivable that ammunition, an expendable item and thus not easy to control, is also being pilfered. One source recounted a situation that involved the establishment of a mining and mineral exploration company that was a front for the diversion of explosives through "skimming" to a certain terrorist organization. The company actually conducted mining exploration, thus it was sometime before its activities were discovered.⁷¹

The accounting of expended cartridges by returning the empty cases and counting them is one way of countering pilferage. By and large most professional militaries collect expended

⁶⁴ Private correspondence with the author

⁶⁵ For details see <http://sshs.mit.edu/int/news/guardian>.

⁶⁶ For details see among other sources <http://www.yahoo.com/headlines/special/albania/albania.97.html>

⁶⁷ Renner. 35

⁶⁸ For details see http://www.nando.net/newsroom/ntr/nation/010296/nation692_16.html

⁶⁹ See Federation of American Scientists Web Site <http://www.clark.net/fas/faspir/pir0797.htm> for additional details and other examples.

⁷⁰ E-Mail reference from GAO, 20 Jan 1998

⁷¹ Private correspondence with author.

casings from firing ranges, and in the process effect ammunition declarations and occasionally conduct spot checks through the turning out of pockets etc. The fact remains, however, that this is largely done to clean up the range and to re-cycle the casings. Individual counts are seldom conducted. There is little evidence available that indicates significant quantities of ammunition disappear in this manner.

With regards to legal shipments of ammunition, one government source suggested a "secure conduit" approach for ammunition and small arms of military type; i.e. assault weapons and their ammunition such as 9 mm, 7.62 mm and 5.56 mm. The source believes that specialized government approved carriers with security cleared personnel should be used for shipping all such material.⁷² This would require some form of international standard and agreement and would probably be somewhat more expensive than current methods. It should, however, probably limit the amount of cargo skimming, thefts and diversions taking place and could make legal transfers more transparent. Some sources believe that it is illicit ammunition that is most susceptible to theft in transit because it would not be reported as missing.⁷³ Those few companies that responded to the questions regarding loss of ammunition in transit all said that it was not a problem. This could be the subject of further study but it would require the cooperation of police forces, shipping companies and ammunition distributors, both commercial and state, none of which are prone to transparency on this issue -- some for valid reasons.

Ammunition Numbers and Shelf-Life

In another study concerning US military services ammunition, the GAO noted that the US military had over five million tons of conventional ammunition, explosives and missiles in storage valued at \$80 billion dollars.⁷⁴ Much of this was surplus to requirement -- for example .30 caliber ball ammunition exceeded army requirements by a factor of 517. In addition, there was some doubt as to the actual accuracy of the accounting procedures. Reasons for overstocking were various, running from the ridiculous (needed for military funerals); to the possibly more perturbing within the context of ammunition controls (trade purposes and foreign military sales). There are numerous anecdotal references to huge supplies of small arms ammunition available from eastern Europe and the countries of the former Soviet Union.

It is quite clear that ammunition does not time expire. As stated by the GAO in their report on surplus US military ammunition:

"We observed ammunition dating to the 1940s. Service officials generally said that unless ammunition has a shelf life, its age does not alter its serviceability. They

⁷² Private correspondence with author.

⁷³ See Annex B.

⁷⁴ Complete details can be obtained in GAO/NSIAD-96-129 see: <http://www.gao.gov>. A search of this site will find several reports on ammunition.

noted that if ammunition is stored properly, it is as good as the day it was manufactured."⁷⁵

Comments and examples contained at Annex B support this finding. Thus, it would seem that statements concerning the short shelf-life expectancy of ammunition may have been based on incomplete information.

Ammunition shortage does not seem to be an apparent problem, particularly in conflict and post-conflict areas, given the admittedly superficial but all too frequent television coverage of irregular and regular troops firing thousands of rounds in the air in celebration of a victory of some sort in the Middle East or Africa. Although it demonstrates poor discipline, it also seems to demonstrate a lack of concern over ammunition availability. There are several ways a group may address ammunition shortages ranging from theft to ambushes of security forces. There are few examples of inadequate supplies of ammunition creating a significant problem.⁷⁶ This is an area that requires more study.

Prohibiting Certain Ammunition For Civilians

There are several potential "ammunition solutions" that might be seen by some to have merit. In the view of this author their utility and the likelihood of their successful implementation are both highly problematic. One possibility is to deny the use of 9 mm, 7.62 mm and 5.56 mm of all chamber sizes to civilians⁷⁷. This would include making it illegal to own guns that chamber these rounds. That this would, in effect, be "global gun control"⁷⁸ is anathema to some individuals, groups and states. Furthermore, it is questionable whether it would address the problems inherent in so many developing states where enforcement mechanisms are woefully inadequate. It would not necessarily deny these weapons to groups that are supplied by states nor would it prevent leakage deliberate or otherwise from state sources. It would do nothing to stop the misuse of these weapons by some states themselves. It would probably take years to collect from civilians, particularly in developing countries, even 50 percent of the weapons capable of firing those rounds. In the mean time other small arms using different calibers may move to the forefront. Without a global agreement involving all major ammunition producing states and a commensurate massive enforcement capability, such an approach may be worse than useless. It could well use resources, particularly financial resources, that might be better used in addressing more pressing concerns, that in the short and long term may save many more lives.

⁷⁵ Ibid

⁷⁶ Kartha, 7. Kartha claims some insurgents in the sub-continent have experienced ammunition supply problems.

⁷⁷ It should be noted that this would probably mean that the .308 in and .223 in round would have to go, notwithstanding the .223 in was around as a civilian round long before it was adopted by military forces.

⁷⁸ "Gun control" is used here to indicate likely opposition to domestic firearms regulation.

Another potential solution is to design a new military caliber for a new military assault/personal weapon unlike any present caliber and restrict this to military and security forces only. Again, it is highly improbable that most countries would agree to this. A common global round is not to the liking of some states. As well, many military forces have adapted the 5.56 mm round over the past decade and are unlikely to want to switch to a new weapon unless it is demonstrably better than current models. Such a change would be extremely expensive to initiate. It would still not address the large number of 7.62 mm, 5.56 mm and 9 mm firearms and ammunition still at large and still being produced. And, like the previous solution, it would do nothing to control the misuse of small arms by states, either through redistribution to non-military groups or through misapplication of force.

CONCLUSIONS

Observations

From the perspective of dealing with "excessive and destabilizing accumulation and transfer" or "the "misuse of " military light weapons (particularly small arms), ammunition does not appear to be a significant choke point that can be easily addressed with improved controls. There is a dispersed and diffused ammunition production capability that is significantly larger than the arms manufacturing industry. More countries produce ammunition than small arms, and by and large, there are more ammunition producers, particularly small scale ones in a given country, than there are weapons manufacturers. State-to-state controls, at least, may have more applicability to cartridge components, particularly primers and propellant than to the cartridge itself.

Most advanced states such as Canada have reasonably tight controls on the export and import of ammunition. The problem is that ammunition is expendable and small arms in general are not. Ammunition can be accumulated over time with no record and can be stolen or pilfered with less chance of attracting attention or being caught, primarily because it is an expendable commodity and much less susceptible to meaningful inventory checks. Ammunition can be claimed as having been used -- verification is often difficult. Small arms ammunition can be manufactured legally at home in many countries. Overall small arms cannot, and even if manufactured at home are inferior in quality to commercial products and probably dangerous to the user. In short, ammunition is much more difficult for enforcement personnel to deal with in comparison with firearms, particularly in small quantities.

While ammunition is susceptible to degradation under poor storage conditions, experience has shown that ammunition can fire after many years, even many decades, unless exposed to extreme dampness or other corrosive elements. Any attempt to establish a shelf life that would involve a built-in expiry date for powder or primer would not be acceptable to most security or military forces and could result in injury or death to a small arms user due to the difficulty in controlling powder deterioration. As well, such a move would, unless every major small arms

ammunition manufacturer complied, probably shift business from the complying company or state to the non-complying company or state.

Ammunition production relies on four major components: cartridge case; bullet; powder; and primer. All of these can be locally produced using makeshift material. The quality of such "home made ammunition" is much lower than that of commercially or privately produced ammunition using commercially available high grade components. Poor quality cartridges may be subject to misfires, cause jamming (extraction and/or ejection problems), be in-accurate, could possibly damage the firearm or in extreme circumstances cause injury or death to the user. It should be noted that the AK-47 is a very forgiving weapon regarding ammunition in comparison with many other types of small arms. With due care cottage industry based ammunition production would probably be deemed acceptable in reliability, particularly as it pertains to hardened organized criminal elements, terrorist groups and small determined guerrilla bands. In any event, such groups would likely have the financial resources and network to obtain quality ammunition through other sources. Production of "hand loaded ammunition" particularly using "home made components" would be inadequate in scale and reliability to support anything other than very small scale operations and would be an unlikely source for what could be termed the "casual user".⁷⁹ Again, primer and propellant controls offer some attraction primarily because there are fewer manufacturers in terms of states and companies and they are essential for the production of quality ammunition.

The technical studies currently being undertaken with regards to marking ammunition, either by powder taggants, bullet markings or even cartridge case markings tend to focus on forensic identification to assist the police in successfully concluding an investigation. Its domestic application within the context of crime solving in advanced states is not an issue in this study. The question to ask is how pertinent is this to civil and ethnic wars in South and South-East Asia and Central Africa or large scale criminal gang activities in Latin America or Central America? Also, is this a solution with a realistic global application in which all ammunition producing states would be participants? This type of application would seem to be of minimal value within the context of conflict and post-conflict situations in developing countries. However, further study is warranted.

As with arms embargoes, any attempt to more rigidly control ammunition production and sales, enhance export/import controls, or restrict sales to certain groups or states would probably result in even greater ammunition production diffusion. Necessity has always been the mother of invention. This risk would have to be measured against the real success of such constraints. Is the perceived cure worse than the disease? In the end, it is a policy decision with political overtones -- the appearance of doing something constructive by signaling moral disapproval may be deemed as important as actual prevention of casualties.

⁷⁹ There are some exceptions. South African authorities have complained about "homemade weapons and ammunition" being a problem.

Agreements such as the OAS Convention address both the weapon and ammunition component. While the Convention is very specific on the markings of firearms no such requirement has been imposed on ammunition. More specific ammunition marking is an area that might show some modest promise to assist in determining where large quantities of ammunition came from. As noted previously, while boxes and cartons have lot number identifiers, cartridges do not. Ammunition can be easily re-packed in plain boxes, cartridges cannot easily be re-marked. The main attraction in identifying cartridges would be to aid in establishing the source -- it would not necessarily prevent the ammunition from being misused. As well, such agreements would probably contribute to more closely controlling the destinations of large quantities of ammunition.

Controlling diffused and expendable commodities such as ammunition and ammunition components is even more difficult when it comes to movement between and through states at a time of increased free trade and large container movement of goods. The "Model Regulations" that support the OAS Convention aids in keeping tabs on legal ammunition movements. Illicit ammunition and components can be broken down into small quantities for shipping and its periodic discovery will not necessarily cause significant financial problems to smuggling organizations. Enhanced intelligence and more rigorous inspections by all countries are required. Chemical detectors are expensive and slow in terms of monitoring large transit areas such as ports. This may change as the science improves. In the meantime other technologies such as X-ray devices should be considered. Again, any international agreement must ensure that adequate enforcement resources are applied to the problem. Such resource application may not be high on the priority list of many developing countries.

In the final analysis, if ammunition control within the context of limiting excessive and impact of destabilizing accumulations and transfers of small arms is pursued, it should focus on the large state producers and users of such ammunition. It is unlikely that Central African rebels, Southern African bandits, and South Asian guerrillas depend on a primary supply of ammunition from backyard ammunition factories, small commercial dealers or international criminal networks. If that were the case, ammunition usage rates would have to be severely controlled which in and of itself could serve to reduce casualties. While illicit trafficking within the context of criminal activities must be addressed, it is not the primary cause of casualties within the context of conflict and post-conflict situations. The fact remains that most of these casualties are caused by "legally" made and exported ammunition as seen in central Africa.

Future Study

The role that ammunition controls might play in providing a practical and productive solution to the misuse of small arms designed primarily for military use requires much more study. In particular such study must involve all agencies, organizations and companies in the sphere of producing and regulating ammunition. This would include political, legal, police, military, customs, shipping and port authorities, ammunition and ammunition component regulators, producers and distributors. Without this involvement, much time and money may be wasted

attempting to implement or actually implementing, ineffective procedures based on faulty and incomplete analysis. Such a study is best done under the sponsorship of a national or international organization with the financial resources and the authority to ensure full cooperation and participation. Its recommendations should satisfactorily address the concerns of those on all sides of the equation, particularly regarding the practical application of any recommendations insofar as achieving realistic results are concerned. There are several preliminary or ancillary studies that could be done to better capture the essence of any role that controls on ammunition might play. These are outlined below:

- A survey of current regions or states where conflict and post-conflict problems exist to determine which companies or states were or are the main suppliers of ammunition and whether the source was primary or secondary. Information on modes of delivery, age of ammunition, available quantities and quality, prices, replenishment sources including domestic and foreign, and types of ammunition in terms of popularity and availability is required. Such a study would serve to focus on the main problem areas and determine whether new ammunition supply was exacerbating the situation and what means might be most useful in stemming the flow. In this regard NGOs could provide valuable field information.⁸⁰
- A technical study of the utility of marking cartridge bases or other parts of the cartridge with a stamp or bar code, particularly on large production runs for major users such as military and police forces. If feasible cartridge ID might be enhanced by the addition of taggants. Such markings would indicate if such a sale had been diverted for one reason or another by the recipient. Problems might be perceived concerning disposal of surpluses to secondary legitimate buyers, the incrimination of a secondary source through reloading of spent cases, theft from original shipment portions, or deliberately manufacturing cartridges to indicate they came from a source that never purchased them. Good forensic analysis should address the second issue. In the third case it would encourage recipients of ammunition to take due care in accounting and security and to announce thefts. In the first and last case a proper paper trail as required in the OAS Convention would establish rightful ownership and/or soon expose a fraud. The real question to be asked is what meaningful sanctions would the international community put in place if ammunition was misdirected deliberately. If the answer is none, then such an effort may have little utility.
- Although perhaps difficult to implement due to the perceived "national security concerns", the UN should survey its members to ascertain which states produce small arms, ammunition and ammunition components. Without this information effective controls will be difficult to achieve.
- A survey of a few states and/or manufacturers that appear to have a history of supplying ammunition to actors (state and non-state) in areas of instability to: ascertain whether they

⁸⁰ See footnote 42 with reference to the excellent work done by Human Rights Watch.

were direct or indirect suppliers; establish the methods of export and shipping control; determine whether they frequently sold to independent third parties (arms dealers) or sold direct; determine what their selling criteria was, if any; and, make recommendations accordingly.

In closing it would appear that the best prospect for better control of small arms ammunition would be in developing agreements similar to the OAS Convention on regional or global bases. While such an agreement primarily deals with illicit transfers, it should be enhanced to make legal transfers more transparent outside of government. Such an agreement could be improved by the marking of cartridges to identify major end users. Agreements such as these should be underscored by similar agreements on "Codes of Conduct". As well the use of government controlled and internationally approved shipping organizations may help address the problems of loss and theft in transit and enhance transparency. An agreement would require a commensurate increase in the quality and quantity of enforcement, particular customs and law enforcement, and in the event of abuses, significant and meaningful sanctions by the world community. Attempts to focus only on supply-side regimes, such as the Wassenaar Arrangement, without the participation of would-be recipient countries, would probably be doomed to failure and may actually increase ammunition production diffusion. There are significant producers in developing countries and they will have to be part of any ammunition control regime. Ammunition, like the weapon itself, is just one component of a complex issue. There is no "key solution". It would appear that controls and constraints on weapons transfers and the destruction or non-dispersal of current un-required weapons stocks including ammunition, particularly within the context of disarmament and demobilization measures in post-conflict situations, may be a more promising field to pursue. However, anything less than a "holistic" approach to the problems at hand is likely to be more cosmetic than real in its ability to deal with this important facet of human security.

ANNEX A

SMALL ARMS AMMUNITION PRODUCTION COUNTRY LIST

The following table indicates the states that are known producers of military small arms ammunition primarily according to two sources: Forecast International/DMS Market Intelligence Report 1996 and Jane's Annual Report on Ammunition Employment, Manufacture and Identification 1996. Both of these sources contain comprehensive listings of states that have been identified as state or commercial ammunition producers for national defence forces and/or for authorized export. While they undoubtedly encompass the largest producers of ammunition, particularly as it pertains to the world's militaries, it should not be assumed that all producing companies or states are accounted for. The FMS/DMS reports are largely designed for producers and distributors looking for markets hence those countries with closed economies and not considered good sales sources are unlikely to be included. The two primary sources are therefore not necessarily complete.

Noted under cartridge type in the table are any of the following rounds: 5.56 mm x 45 mm; 7.62 x 39 mm; 7.62 x 51 mm and 9 mm produced in that country. This does not mean that is all they produce. In most cases where these rounds are produced it should be assumed that other small arms rounds can be or are being produced. As well, where ammunition other than the three types listed are being produced it is almost certain that the 9 mm/5.56 mm/7.62 mm rounds could also be manufactured.

*not noted in Jane's; **not noted in FMS/DMS; evidence incomplete ?

| Serial | Country | cartridge type | Source Observations |
|--------|-----------------------------|----------------|--|
| 1 | Abu Dhabi** | 2 | Listed in 1997-98 Janes. FMS/DMS referred to GCC collective armament production plans. |
| 2 | Algeria * | ? | Negotiating manufacturing. Probably 7.62 |
| 3 | Argentina | 3 | Significant exporter. Previous indications of illicit export. |
| 4 | Armenia ** | 2 | Listed in 1997-98 Janes |
| 5 | Australia | 3 | |
| 6 | Austria | 3 | |
| 7 | Bosnia- * ** Herzegovina | ? | Only source Part 2 Imports list Explosives Canada. Safety cartridges |
| 8 | Belgium | 3 | |
| 9 | Bolivia | 2 probably 3 | Source indicates Bolivia a nexus for illegal arms trade |
| 10 | Brazil | 3 | Significant exporter including explosives. |

| | | | |
|----|--------------------|--------------|--|
| 11 | Bulgaria | 2 | Significant exporter |
| 12 | Burkina Faso** | 1 | |
| 13 | Burma | 2 probably 3 | One source claims a German factory the other Chinese |
| 14 | Cambodia** | 2 | State factory, Czech sponsored. |
| 15 | Cameroon** | 2 | |
| 16 | Canada | 3 | |
| 17 | Chile | 3 | Significant exporter. Indications of weapons export scandals. |
| 18 | China | 3 | Major exporter |
| 19 | Colombia | 2 | No exports, alleged poor quality. Illegal production by insurgents. |
| 20 | Cuba | 3 | |
| 21 | Czech Republic | 2 probably 3 | Significant exporter |
| 22 | Denmark | 2 | |
| 23 | Dominican Republic | 3 | |
| 24 | Ecuador | 2 | Peru/Ecuador border tensions may encourage more self sufficiency |
| 25 | Egypt | 3 | Major exporter |
| 26 | Ethiopia** | ? | Ammo markings with Ethiopian stamp. Report of seeking Israeli assistance for an arms plant |
| 27 | Finland | 2 | Significant exporter |
| 28 | France | 3 | Major exporter |
| 29 | Germany | 3 | Major exporter |
| 30 | Greece | 2 | |
| 31 | Guatemala* | 2 | FMS/DMS states an ammo plant possibly supplied by Austria. Another source says the plant is located in Coban A.V. and run by the military who claim "it produces the best 5.56 mm ammo in the world" |
| 32 | Hungary | 2 | |
| 33 | India | 3 | |
| 34 | Indonesia | 3 | Off-sets and tech transfers important. |
| 35 | Iran | 2 | |
| 36 | Iraq | 2 | Under embargo. Do they make own primers and powder? Probably. |

| | | | |
|----|-------------------------|--------------|---|
| 37 | Israel | 3 | Major exporter |
| 38 | Italy | 2 probably 3 | |
| 39 | Japan | 2 probably 3 | |
| 40 | Jordan ** | 2? | No manufacturers listed. |
| 41 | Kenya* ** ⁸¹ | ? | |
| 42 | North Korea | at least one | Significant exporter |
| 43 | South Korea | 2 | Significant exporter |
| 44 | Lebanon ** | 2? | No manufacturers listed. Casings with Lebanese markings may be made elsewhere. |
| 45 | Libya ** | 2? | No manufacturers listed. |
| 46 | Malaysia | 3 | |
| 47 | Mexico | 2 probably 3 | |
| 48 | Morocco | 2 | |
| 49 | Netherlands | | Dutch source indicates that small arms ammunition no longer produced for military but larger calibers are being produced. |
| 50 | New Zealand | 3 | |
| 51 | Nicaragua | 3? | No manufacturers listed |
| 52 | Nigeria | 2 | |
| 53 | Norway | 2 | |
| 54 | Pakistan | 2 possibly 3 | Significant exporter. Light arms to over 30 countries. |
| 55 | Paraguay | 2 | Exports to Chile. Military SA smuggling noted to other states in area. |
| 56 | Peru | 3 | Assisted by North Korea and/or Italy |
| 57 | Philippines | 2 probably 3 | |
| 58 | Poland | 3 | |
| 59 | Portugal | 3 | |
| 60 | Russia ⁸² | 3 | Major exporter |

⁸¹ See BASIC Papers. *Africa: The Challenge of Light Weapons Destruction During Peacekeeping Operations*, No 23. December 1997. Paper can be found at <http://www.basicint.org/bpaper23.htm>. The author has also heard from other sources that an ammunition plant under licence was set up by a European country.

⁸² Based on discussions with several military analysts and government sources, it is almost certain that most former republics of the old USSR have an ammunition making capacity.

| | | | |
|----|----------------------------|--------------|--|
| 61 | Romania | 2 | |
| 62 | Saudi Arabia | 3 | |
| 63 | Singapore | 3 | Major exporter |
| 64 | Slovakia | 2 | |
| 65 | South Africa | 3 | Major exporter. |
| 66 | Spain | 2 | Significant exporter |
| 67 | Sudan ** | 2 | FMS/DMS uncertain |
| 68 | Sweden | 3 | Significant exporter |
| 69 | Switzerland | 2 | |
| 70 | Syria | 2 | |
| 71 | Taiwan | 3 | Significant |
| 72 | Thailand | 3 | |
| 73 | Turkey | 2 probably 3 | Significant exporter. |
| 74 | Uganda* ** | 1? | See footnote ⁸³ |
| 75 | UK | 3 | Major exporter |
| 76 | Ukraine | 2 | |
| 77 | Uruguay* | 3 | Military owns plants. New ammo reloading plant in 1995. |
| 78 | USA | 3 | Major exporter |
| 79 | Venezuela | 2 | |
| 80 | Vietnam** | 2? | No manufacturers noted. |
| 81 | FRY - Serbia Montenegro | 2 | Like the former USSR republics it is very probable that Croatia, Bosnia-Herzegovina and Slovenia produce ammunition. |
| 82 | Zimbabwe * | ? | FMS/DMS notes negotiating to produce. See footnote 80 |

Eleven countries are listed as probable (?) manufacturers because the open source references are not conclusive enough for this author. At least 71 countries are verified (more than one source or named manufacturers) as ammunition producers. It is the opinion of the author that well over 100 states are capable, technically and economically, of producing ammunition although many would require initial assistance. Examples would be most Middle East and North African

⁸³ Robert, Jarman "Defence Research and Analysis London" as quoted in Smith, Christopher. "A Global Survey of Stocks and Flows of Light Weapons in the international System and a Case Study of Light Weapons Proliferation in Southern Africa." A paper delivered to the U.N. Panel of Government Experts on Small Arms. United Nations, New York, June 26, 1996, 23

states, all states of the former USSR, Albania and several Asian states such as Bangladesh, Sri Lanka and Brunei not listed in the table. It would not be unreasonable to suggest that there are probably about 100 ammunition producing states of which 60 indulge in some exports with 30 being significant exporters. Some of the manufacturing countries listed commenced producing ammunition as a result of embargoes or other constraints placed on them. Once a manufacturing capacity was developed it then became economically expedient to pay for this additional expense by seeking an export market. Thus, there was short term gain for potential long term pain regarding efforts to constrain both weapons and ammunition diffusion and the actions of states. Significant ammunition producing countries that fall in to this category are: Argentina, Brazil, Chile, Egypt, Israel, Iran, Pakistan⁸⁴, Taiwan and South Africa.

⁸⁴ Author's discussion with Pakistani officials and military officers Pakistan Ordnance Factories, December 1977. Pakistani officials cited the arms embargo during the 1965 war as the incentive to become self sufficient, particularly in munitions.

ANNEX B

SURVEY INFORMATION

**TABLE ONE
COMPANIES AND ORGANIZATIONS CONTACTED**

| Company/Organization | Product | Date Sent | Response |
|--|------------------------------------|-----------------|--------------------|
| Winchester, USA | Firearms and ammunition | E-Mail 29/12/97 | Yes. No detail |
| Cascade Arms, USA | Ammunition | E-Mail 30/12/97 | No |
| Hornaday, USA | Ammunition | E-Mail 30/12/97 | Yes. Detailed |
| Alliant Powder, USA | Ammunition and Components | E-Mail 30/12/97 | No |
| Vihtavon Oy, Finland | Ammunition | E-Mail 31/12/97 | No |
| Blackhills Ammo, USA | Ammunition and components | E-Mail 30/12/97 | No |
| Century Arms, USA | Firearms and ammunition | E-Mail 30/12/97 | No |
| Eley, UK | Ammunition | E-Mail 30/12/97 | Yes. Detailed |
| Stackris Import, Sweden | Ammunition | E-Mail 30/12/97 | Yes. Detailed. |
| Wolf Bullets, Canada | Ammunition | E-Mail 30/12/97 | Yes. Detailed |
| CAI Technology Ordnance, Singapore | Weapons, ammunition | E-Mail 31/12/97 | No |
| Minmac, USA | Ammunition | E-Mail 31/12/97 | No |
| Hodgdon, USA | Ammunition and components | E-Mail 31/12/97 | Yes. No detail |
| MAST Technology, USA | Ammunition, components & factories | E-Mail 02/01/98 | No |
| Mullins Ammo USA | Ammunition | E-Mail 02/01/98 | Yes. Detailed |
| Sporting Arms and Ammunition Manufacturers' Institute, (SAAMI) USA | Sporting Ammunition Standards | E-Mail 30/12/97 | Yes. Very detailed |

*The term detail or no detail is relative. If the response did not answer any of the questions and merely dismissed the effort or suggested other sources for information it was listed as no detail. If several questions were answered it was listed as detailed.

Questions Asked

Below is a synopsis of the questions asked of the ammunition and ammunition component manufacturers listed at TABLE ONE

1. What paper controls (both government enforced and self-imposed) do you have on the ammunition you ship or sell, either domestically or internationally?

2. What security do you have or are you aware of on ammunition that is shipped internationally?
3. In your opinion, how difficult would it be for a revolutionary or guerrilla group to set up their own ammunition factory and how effective would it be?
4. Is it practical and would state ammunition users (military, etc) accept it, if a shelf life was built into ammunition cartridges? i.e. some form of timed disintegration of powder or primer.
5. Is it practical to put identifiers on cartridge casings - base, that would identify major recipients?
6. What in your view is the critical control element in the cartridge manufacture - powder, primer, casing, bullet, crimping etc. How many manufacturers of primers and powder components are there and how easy is it to obtain? Is it possible for an illegal organization to try and produce their own primers and powder, and if so how good would it be?
7. Other than Jane's and DMS Foreign Market Sales, is there a list of commercial and state ammunition producers that is global in nature and includes all producers in places like Asia, Latin America and Africa?
8. I would also appreciate any additional comments that you might believe useful on this subject either in terms of additional information or on your views (negative or positive) concerning the issue of ammunition control in the context of conflict and post-conflict problems with light weapons in developing countries.

Summary of Responses

1. All companies stated that they followed government procedures for sales and shipping. One company stated they must be registered with the State Department and individual licences are required for each individual sale. It should be noted that domestic sales and delivery in the USA by mail, for most companies, requires as a minimum a signature and statement saying the buyer is 18 or older usually supported by a valid ID such as a drivers licence.. UPS appears to be the mail delivery company of choice. When UPS was contacted they said all deliveries were done by certified hazardous material shippers and that they do not ship hazardous materials internationally. In Canada, at least in the province of Ontario, it was noted that an ammunition buyer must provide name, birth date, photo ID which is recorded along with the date and time of the purchase - a signature is required.
2. Some opinions were ventured regarding the potential security problems with container shipping and the suggestion that secure all ammo ships would be far too expensive a proposition. Free trade, increased container traffic and fewer not more customs officials mean only a small percentage of containers are inspected and then only the front portion. Ammunition being a low value product (\$2,000 for 10,000 rounds), the risk of discovery is not catastrophic. Another

respondent noted that ammunition is shipped in generic packages and the only thing that might give it away was a "Hazardous Material" marking. Another dealer stressed that they would ensure that the carrier was "bona fide" in all aspects regarding security and safety. No one professed knowledge of thefts regarding their ammunition shipments. One respondent noted that theft involving legal shipments was less likely than theft from clandestine or illicit shipments, primarily because theft from legal shipments would be reported to authorities while the other would not. SAAMI indicated that quantities lost were small, at least within the USA.

3. Opinion was divided on how easy it was to set up a clandestine ammunition factory. Some said it would be relatively easy while others stressed the difficulty in obtaining or producing components and thus quality ammunition. One producer said a small basement/hut operation with one individual could produce 5,000 rounds of 9 mm or 1,000 rounds of 7.62 mm in a 24 hour period. Others emphasized that assuming mobility was required, large scale production was out of the question and in any event would be very expensive. The consensus appeared to be that a small scale operation was quite feasible for producing an inferior but probably adequate grade of ammunition assuming there was no access to quality components. One respondent said that there was no reason to set up a clandestine ammunition production facility because relatively cheap, good quality ammunition was readily available from many sources.

4. All respondents said that introducing a short shelf-life on ammunition was a non-starter. At the same time all noted that ammunition has a very long life - examples were given of ammunition that was 50 to 80 years old still firing with reliability. It was also noted that ammunition was and can be manufactured to withstand specific extremes of the tropics. It was observed that military and police forces would not accept a shelf life for many reasons: too expensive in terms of war reserves; unreliability; and, danger to the user. Even civilian users might be exposed to injury or death due to the unstable element in the propellant or primer and the lack of exactitude in decomposition - deterioration at varying rates depending on storage conditions etc. What about liability, if a native hunter was injured or killed because he had no idea what the cartridge life was or that it had been effected by unstable storage conditions? One producer said it had been tried and the cartridge was very unstable. There was also a question of universal application, i.e. all producers in the world.

5. There was some support for cartridge ID with qualifications. First it was suggested that unless all major manufacturers on a global basis were involved it would have limited value. Second, it was noted that for wide distribution to police forces and civilians it was not practical. If a company produces one million rounds which are sold to five dealers which are distributed to 30 sales outlets which are sold to 300 individuals, how is the casing marked? Large lot sales to single buyers, i.e. government to government or commercial company to large customer - a major police force or military force, might be feasible. One producer suggested bar codes. Another said it would be very expensive and time consuming and then pointed out the problems with re-loads and erasing old stamps. Two respondents thought that government or commercial producers could falsify stamps to incriminate others or confuse those trying to establish the source of the ammunition. As for taggants, some thought they had merit if safe, while others thought they

would merely create confusion and would be too easily manipulated.

6. The question of critical components received varied responses. Some thought that brass casings were the most difficult element as it required heavier equipment to produce. This was also the view of a Canadian explosives expert and SAAMI. Others thought that primers and propellant were the key, largely on the basis of safety and quality. One respondent said that quality re-loading tools and a local metal industry could easily manufacture cases and bullets. It was also noted that brass casings were reusable many times over while the other components were not. An observation was made that a scare over a proposed shelf life on primers in 1994 drove the price from US\$12 to \$30 per thousand. A similar scare regarding primer availability was also noted on a "Michigan Militia" Internet site.

7. No respondent seemed to be aware of any sources that gave the lists of states and commercial producers on a global basis. One said that Jane's was not that good while most had never heard of DMS. SAAMI noted that Forensic Ammunition Service, 4512 Nakoma Drive Okemo, Missouri had headstamp guides that might indicate the scope of ammunition production.

8. Several other observations and comments were supplied that are worthwhile noting. Most believed that the technology and capability was so diffused that very little could be done to control it on a global basis, particularly concerning north-south differences. Several respondents thought there were already enough onerous controls on producers and distributors. If there were illicit activities conducted using their products it was the fault of the state and not their fault. Governments should put more effort into dealing with illegal, not legal activities. One respondent noted how easy it is to smuggle and that there are far too few resources devoted to it. One provided the following anecdote:

"Israel, 1948: Faced with embargos against the shipment of ammunition to Israel (then under British rule, but about to become independent and be invaded by Arab armies from every direction), made the smuggling of ammunition into Israel a major priority for the Jewish government that was waiting for the British to leave. One of the most successful gambits was buying ammunition openly in the US, and warehousing it there. Then they bought huge, used electrical transformers that had been discarded by power line companies. They opened the transformers, and gutted them internally. Then they cleaned only the INTERIOR and filled it with cartridges. When shipped to Israel (consigned to the Jewish electrical power corporation), no Customs officer wanted anything to do with huge, filthy, oily metal boxes with chopped-off wires dangling randomly from broken fittings. No doubt other gambits were as successful, but that one I happen to know about.

I invite you to speculate on whether or not a similar gambit would work with today's Customs officer in his neat blue suit."

ANNEX C

EXTRACTS FROM CANADIAN REGULATIONS FOR PROPELLANT EXPLOSIVES AND SPORTING AMMUNITION¹

GENERAL

1. The *Explosives Act and Regulations* govern the manufacture, sale, storage and importation of explosives including the various propellants, percussion caps (primers) and ammunition for shooters and collectors. For the foreseeable future, jurisdiction of road transport will be split between the *Explosives Regulations* and the *Transportation of Dangerous Goods Regulations (TDG)*, the latter having come into force on July 1, 1985 and having been adopted at later dates by the provinces and territories

2. The following summary of the requirements of these two regulations which apply to shooters, collectors, hand-loaders, and to the suppliers of sporting ammunition and explosive components used in handloading. The *Explosives Act (R.S., c.E-15)* and the *Explosives Regulations (C.R.C., c.599)* as amended, the *Transportation of Dangerous Goods Act (S.C. 29 Elizabeth II c.36)* and the *Transportation of Dangerous Goods Regulations (P.C. 1985-147; SOR:85-77)* as amended, should be consulted if a legal interpretation is required.

3. This revision became necessary due to:

- a) the introduction of a new international classification system for dangerous goods based on recommendations of the United Nations (UN);
- b) the increase in fees for importation permits; and
- c) new criteria for assessing the hazards of propellants in storage based on international standards.

CLASSIFICATION AND HAZARDS

4. All explosives legally available for sale in Canada are evaluated to ensure that they conform to established safety and performance standards. At the same time, the ability of their packages to withstand the rigours of handling and transportation is assessed, as well as the conformance of the labelling or other markings on these packages to both the *Consumer Packaging and Labelling Regulations* and the *Explosives Regulations*, including mandatory warnings as applicable. Those explosives which pass the test are declared "Authorized Explosives" and assigned to an explosives class and a classification code in accordance with the

¹ For a complete version of the regulations see - <http://www.nrcan.gc.ca/mms/explosif>. These regulations should be read in conjunction with other acts and regulations such as Bill C-68, Export and Import Permits Act and the National Defence Act to understand ammunition controls in all its dimensions.

specifications laid down in the *Explosives Regulations* and the *Transportation of Dangerous Goods Regulations (TDG)*.

The classification and hazards of explosives related to sporting ammunition and handloading are as follows:

PROPELLANT EXPLOSIVES

5. Propellant explosives are essentially low explosives and differ widely as to the rate at which they deliver their energy.

6. **BLACK POWDER** - Class 1.1. This material is also known as GUNPOWDER and is an intimate mixture of potassium nitrate, sulphur and charcoal. This composition is extremely sensitive to spark and friction, particularly under dry conditions. It is one of the fastest burning propellants and burns essentially at the same rate whether confined (as in a gun) or unconfined. (TDG: UN 0027 BLACK POWDER, 1.1D).

7. **SMOKELESS POWDER** - Class 3.1 and 3.2. These materials may be either double-based (3.1) or single-based (3.2), and consist of colloidized nitrocellulose which in the double-base product contains some nitroglycerine. The colloidal compounds are extremely flammable as well as capable of detonation under extreme confinement and powerful stimulus. Their burning speed is greatly increased when confined. The term "smokeless" powder was originally used to distinguish it from "smoking" black powder. (TDG: UN 0161 POWDER, SMOKELESS, 1.3C).

8. Propellants require no oxygen from the air for combustion, and are ignited when heated above their ignition temperature (about 160°C) by such things as the flame of a match, hot cigarette ash, flash from a percussion cap, a static or other electrical spark, spark from grinding or by fire directed against or near a closed container even if the powder itself is not exposed to the flame.

PERCUSSION CAPS (PRIMERS)

9. **PERCUSSION CAPS** - Class 6.1 (safety class). Caps are given this classification if they are of such strength and design that ignition of one cap will not ignite other like caps in the same package. Fragments of a cap accidentally ignited may be projected over short distances and would be a hazard mainly to the eyes and exposed flesh. (TDG: UN 0044 PRIMERS, CAP TYPE, 1.4S).

10. **PERCUSSION CAPS** - Class 6.3. Caps are given this classification if they fail to meet the non-communication requirements of Class 6.1. Caps of Class 6.3 are subject to mass explosion or communication within a sub-package if the package is involved in a fire or one cap is accidentally ignited by impact. (TDG: UN 0377 PRIMERS, CAP TYPE, 1.1B or UN 0378, PRIMERS, CAP TYPE, 1.4B).

SPORTING AMMUNITION (Safety Cartridges)

11. AMMUNITION - Class 6.1 . Cartridges for any shotgun, gun, rifle, pistol, revolver and industrial gun, the case of which can be extracted after firing and that is so closed as to prevent any explosion in one cartridge being communicated to another cartridge but does not include tracer, incendiary, high explosive or other similar military-type cartridges. Though ammunition fires are noisy as a result of the individual explosion of percussion caps, missile hazard is minimal and protection may be provided by face masks and a covering over other exposed portions of the body. (TDG: UN 0012 CARTRIDGES, SMALL ARMS, 1.4S or UN 0014 CARTRIDGES, SMALL ARMS, BLANK, 1.4S).

REPACKING OF PROPELLANTS

12. It is unlawful to repack for sale any propellants except under the terms of a licence for an explosives factory or magazine or by special permission of the Chief Inspector. However, it is permitted for an individual to repack for personal use or to prepare black powder charges for muzzle loaders or cannon.

IMPORTATION

13. Only those explosives of which the composition and properties have been considered by the Explosives Branch and which have been declared "Authorized" may be imported into Canada. Laboratory testing may be conducted on any explosive for which authorization is sought. Applications for an Explosives Importation Permit should be submitted well in advance of any proposed importation to:

16. Any person may import for personal use and definitely not for resale, without an importation permit, the following maximum quantities:

- | | |
|---|------|
| 1. Safety cartridges, except hollow point handgun ammunition..... | 5000 |
| 2. Percussion caps (primers) for safety cartridges..... | 5000 |
| 3. Empty primed cartridge cases..... | 5000 |
| 4. Gunpowder (black powder) in canisters of 500 g or less and smokeless powder in canisters of 4000 g or less..... | 8 kg |
| 5. Model rocket engines..... | 6 |
| 6. Pyrotechnic distress signals and life saving devices. Any quantity necessary for the safe operation of the aircraft, train, vessel or vehicle in which they are transported, or for the safety of the occupants. | |

REQUIREMENTS RELATIVE TO THE STORAGE AND POSSESSION OF PROPELLANT POWDERS

POSSESSION AND PERSONAL USE

17. Propellants not exceeding 10 kg in their approved canisters, caddies and kegs may be stored on residential property, providing they are in a locked substantial magazine which is kept clean and used **exclusively** for propellants. No federal licence or possession permit is required for this type of storage. The outside of the magazine must be marked with the word "EXPLOSIVES". **No flammable or highly combustible material may be stored in or near the magazine.**

18. Propellants not exceeding 75 kg in their approved canisters, caddies and kegs must be kept in a locked magazine located at safe distances from living quarters and dwellings, and from public thoroughfares such as streets and alleys. No federal licence or possession permit is required for this type of storage. The magazine, either a building or receptacle, must be marked on the outside with the word "EXPLOSIVES" in letters of appropriate size in a manner that does not attract undue attention. **No flammable or highly combustible materials may be stored in or near the magazine.**

19. Propellants in excess of 75 kg may only be stored in licensed magazines under the terms and conditions stipulated in the licence. **Application for such licences must be made on the approved forms to the Explosives Branch, Ottawa.**

SALE - UNLICENSED

20. Propellants not exceeding 12 kg may be kept in a retail establishment in a suitable receptacle not accessible to the public, provided individual packages do not exceed 500 g capacity. It is recommended that the propellants on display should not include more than one 500 g container of black powder. Shelving not accessible to the public and out of reach of children is deemed to constitute a suitable receptacle. **No federal licence or possession permit is required.**

SALE - LICENCED

21. Total quantities of propellant stored for sale in excess of 12 kg, even in multiple locations or only overnight, must be licensed by the Explosives Branch. If the magazine(s) is located within a secure building, it need only be locked with a suitable padlock. In the case of several magazines in a secure building, no one magazine shall store more than 125 kg of smokeless powder and must be separated from all other magazines by at least 10 m to prevent direct propagation of an explosion.

Containers must not exceed 12 kg capacity. If black powder is to be stored, the maximum quantity in any one magazine is 25 kg in 500 g containers. If black powder is stored with smokeless powder, the total quantity of the two together must not exceed 25 kg. Individual

magazines must be separated from vulnerable points in accordance with Table 1. If any magazine stores not more than 25 kg of propellants in individual canisters of 500 g capacity or less and there is some degree of fire resistance between magazines, then the normal distance requirements may be modified by an inspector. Storage in built-up areas will generally be restricted to a maximum quantity of 500 kg suitably dispersed. Fire protection within the storage area must conform to provincial or municipal fire codes or by-laws.

PERCUSSION CAPS (PRIMERS): STORAGE AND POSSESSION

PERSONAL POSSESSION FOR OWN USE

23. A reasonable number of percussion caps (primers) for one's own use, and not for sale, may be kept on residential or other property, out of reach of children away from heat and substances of a flammable nature. Such storage must be separated from propellant storage in a locked container or receptacle marked "EXPLOSIVES". No federal licence or permit to possess is required for such storage.

SALE

24. No licence to store 10,000 percussion caps (primers) or less for sale is required. This quantity may be stored in any retail establishment showcase, cupboard or on a shelf inaccessible to the public. Such storage must be in a separate location to any propellant display or storage areas (see paragraph 20). No possession permit is required.

25. Storage for sale of quantities in excess of 10,000 percussion caps (primers) must be covered by a licence. The main storage must be in a locked cupboard, container, room or structure away from the sale areas and other areas to which the public has access, and in a location separate from propellant display or storage areas (see paragraph 21 and 22). A maximum of 10,000 caps may be stored for display in the sale areas under the same licence in the manner outlined in paragraph 24. This quantity may be increased to 40,000 caps if the caps are in Class 6.1 (UN hazard Class 1.4S). Application forms for the required licence may be obtained from the Explosives Branch.

RECORDS OF SALES

26. All licensed vendors of propellants must maintain the following information records regarding sales:

- a) the name and address of the purchaser
- b) the date of the sale(s) transaction
- c) the brand of propellant
- d) the size of container(s), and

- e) the quantity of propellant sold.

Additional shipping documentation and records may be required under the TDG Regulations for shipments made by common carrier.

SPORTING AMMUNITION: STORAGE AND POSSESSION

27. A person may keep on residential or other property for private use, and not for sale, such quantity of sporting ammunition as he may reasonably require for a rifle, revolver or shotgun or as part of a collection. He must take reasonable precautions against accidents, such as keeping the cartridges out of reach of children, away from flammables and he should store the cartridges separate from the weapons in which they may be used.

28. No practical quantity limitation is imposed on the storage for sale of sporting ammunition (and industrial cartridges) in retail stores, warehouses and other general occupancies except those imposed by storage space and safe handling practices. Storage must be separated from substances of a flammable or highly combustible nature and kept out of reach of children. (Though the Explosives Regulations impose a limit of 225 kg net explosives quantity per unlicensed ammunition store-house, few storehouses are large enough to contain the amount of ammunition this quantity entails and none have ever been licensed in Canada except as part of a factory).

HANDLOADING

PERSONAL

29. Sporting ammunition cartridges may be filled or refilled on residential premises for non-commercial use subject to the following conditions:

- a) The place at which the filling takes place shall be separated from the magazine in which the propellant is kept. "Place" means a bench or area of work and not necessarily an enclosed space.
- b) In addition to that contained in the cartridges already made, there shall be no more than 2 kg of propellant at the place.
- c) No other work shall be undertaken at the place while filling is in progress.
- d) No fire, heater or artificial light (except a light which is of such construction, position and character that it will not cause any danger of fire or explosion) shall be allowed where the filling takes place (and this includes "NO SMOKING").
- e) When operations have ceased, the place shall be cleaned to ensure that all spills, loose

percussion caps, etc. are cleaned up and destroyed. Remaining propellant and caps should be returned to their respective packages and then to the magazines.

SALE

30. Safety cartridges may be loaded for sale at a place other than a licensed factory subject to the following conditions:

- a) Samples of the loaded safety cartridges must have been tested by our laboratory and declared "Authorized" by the Chief Inspector. The authorization is subject to continuing satisfactory test results on subsequent sampling of the ammunition.
- b) The outer package in which the loaded safety cartridges are to be sold, displayed or distributed is conspicuously marked with the name and address of the person or firm who reloaded them and with the words "RELOADED CARTRIDGES".
- c) The operational procedures used have been approved by the Chief Inspector.
- d) Quality control designed to eliminate defective safety cartridges and to ensure proper workmanship has been instituted and approved by the Chief Inspector.
- e) The person has submitted a general arrangement drawing to the Chief Inspector and has obtained his approval of the place that shows:
 - i) the area where the loading of the safety cartridges is to be carried out.
 - ii) the storage areas for propellant, primers and finished ammunition.
 - iii) the general arrangement of the equipment to be used.
- f) The person has given the Chief Inspector a statement setting out the maximum quantity of primers, propellant and finished ammunition to be kept at any time in their respective storage area and obtained approval for these quantities.
- g) The operating area is separate from the magazines in which the primers and propellant used are kept or stored.
- h) If lighting, other than natural lighting, is required in the reloading area, it must be of such construction and character and located in such a manner as not to cause any danger of fire or explosion.
- i) No person shall smoke or have matches or other fire producing devices in their possession in this area.

- j) No other work shall be undertaken in the loading area while filling is in progress.
- k) No member of the public is allowed in the area when the loading is being carried out.

TRANSPORTATION

37. On July 1, 1985, the first phase of the new Transportation of Dangerous Goods Regulations (TDG Regs) came into force. Explosives under the purview of the Explosives Regulations (EX Regs) are dangerous goods of Class 1 and hence subject to the TDG Regs. Currently, the provisions of the TDG Regs now in force supersede those provisions of the Ex Regs that deal with classification for transport, labelling, marking, placarding, driver training and documentation.
38. The regulations, whether new or old, are designed to guard against fire or the spread of fire in the event of an accident, and to establish an appropriate emergency response to be followed should the need ever arise. Propellants and ammunition of primary concern to shooters are therefore classified for transport as:

| Product Identification No. No d'identification du produit | Proper Shipping Name Appelation règlementaire | Classification Code Code de classement |
|--|---|---|
| UN / ONU 0027 | Black Powder / Poudre noire | 1.1D |
| UN / ONU 0161 | Powder Smokeless / Poudre sans fumée | 1.3C |
| UN / ONU 0477 | Sustance, explosive n.o.s. Matières explosives, n.s.a. | 1.3C (Pyrodex) |
| UN / ONU 0377 | Primers, cap type / Amorces à percussion | 1.1B |
| UN / ONU 0378 | Primers, cap type / Amorces à percussion | 1.4B |
| UN / ONU 0044 | Primers, cap type / Amorces à percussion | 1.4S |
| UN / ONU 0012 | Cartridges, small arms Cartouches pour armes de petit calibre | 1.4S |
| UN / ONU 0014 | Cartridges, small arms blank / Cartouches à blanc pour armes de petit calibre | 1.4S Starter pistol Pistolet de starter, etc. |
| UN / ONU 0323 | Cartridges, power devices / Cartouches pour pyromécanismes | 1.4S Power loads Lance-attache, etc |

The manufacturer must ensure that this information is marked on the outer package with the Classification Code appearing on the orange label. It must also appear on the documents accompanying a shipment.

39. When transporting propellants, the cargo area must be enclosed and locked, free from sources of fire or of loose objects that could strike the explosives. The vehicle must be in sound mechanical condition, particular attention being paid to the exhaust system, electrical wiring, fuel tank, fuel lines, brakes, steering and tires. It must not be overloaded. Smoking on or near the vehicle is not allowed.

When laden with more than 25 kg Net Explosives Quantity (NEQ) of propellants, the vehicle must display the appropriate orange placard (1.1D or 1.3C) on all four sides and a 5-B:C fire extinguisher must be carried.

Permits for Equivalent Level of Safety have been issued by Transport Canada which allows transportation of up to 50kg without placards (for further information consult a TDG Inspector).

A maximum of 75kg may be carried in a private passenger vehicle. The trunk is acceptable. For small quantities, the glove compartment may be used. Under no circumstances may propellants be taken onto or shipped by public passenger vehicle.

40. No quantity limitations are imposed on the transportation of sporting ammunition, primers and power device cartridges when classified 1.4S. For the purposes of retail sales for consumption by individuals, these articles have been designated a "consumer commodity" and are hence exempted from many provisions of the TDG Regulations

BIBLIOGRAPHY AND INTERNET WEB-SITES

Publications

Anthony, Ian. *Evolving Approaches to Control the Spread of Small, Light and Other Similar Weapons*. A Presentation to the Panel of Governmental Experts To Study the Global Trade in Small Arms, UN, New York, 26 June, 1997.

Canada, Department of Foreign Affairs and International Trade. *Light Weapons and Micro-Disarmament*. Ottawa, January 1997.

Canada, Department of Foreign Affairs and International Trade. *Small Arms and Light Weapons: An Annotated Bibliography*. Ottawa, November 1996.

Canada, Department of Foreign Affairs and International Trade. *A Guide to Canada's Export Controls*. September, 1996.

Canada, Department of Foreign Affairs and International Trade. A Draft Copy of *Model Regulations for the Control of The international Movement of Firearms, Their Parts and Components and Ammunition*. September 15, 1977 as developed by the Inter-American Drug Abuse Control Commission.

Canada, Department of Justice. *A Review of Firearm Statistics and Regulations in Selected Countries*. Research, Statistics and Evaluation Directorate Draft Technical Report, 25 April 1995.

Forecast International Inc/DMS. *Foreign Military Markets (Various) 1996/97*. 22 Commerce Road, Newton, CT, USA.

Gander, Terry J and Hogg, Ivan V (ed). *Jane's Ammunition Handbook 1997-98*. Jane's Information Group, Coulsdon, Surrey, UK.

Goldring, Natalie, Project on Light Weapons, *Links Between Domestic Laws and International Light Weapons Control*, 11-12 Dec 1997.

Kartha, Tara. "Ammunition as a Tool for Conflict Control." A Paper Presented at the BASIC Conference on Light Weapons. London: June 30 - July 2, 1996.

Louise, Christopher. 1995. *The Social Impact of Light Weapons Availability and Proliferation: Discussion Paper 59*. United Nations Research Institute for Social Development, Geneva: U.N., March 1995.

Renner, Michael. *Small Arms, Big Impact: The Next Challenge of Disarmament*. WorldWatch Paper 137., October, 1997.

Siddiq-Agha, Ayesha. *Light Weapons Manufacture in the Public and Private Sectors: A View From Pakistan*. London: British American Security Information Council, February 1996.

Smith, Christopher. "A Global Survey of Stocks and Flows of Light Weapons in the International System and a Case Study of Light Weapons Proliferation in Southern Africa." A paper delivered to the *U.N. Panel of Government Experts on Small Arms*. United Nations, New_York, June 26, 1996.

Towards Collaborative Peace, TCP Project News 1, *Institute for Defence Policy*, September, 1996.

Traister, John and Robert. *Complete Reloading Guide*, Stoeger Publishing Company 1996.

United Nations. *Report of The Panel of Governmental Experts on Small Arms.A/52/298*, New York, 27 August 1997.

Internet (URLs and Web Sites)

The URL list is preceded by the information obtained. In most cases much more information than is indicated is available at a given URL/web site

Ammunition, homemade - <http://www.crw.com/~xbook/w5.htm> +
<http://www.dodgenet.com/~kwantam/ac/198.doc>

Ammunition, machinery - <http://www.bellammo.com/machine.html> +
<http://www.huntingtons.com/>

Ammunition, marking - <http://members.aol.com/NRubenstei/gcontrol.htm>

Ammunition, prices and availability - <http://www.Centuryarms.com/ammo.htm> and
<http://www.randomc.com/~atligator/>

Ammunition Primer - Http://users.aol.com/vaquero760/a_index.htm +
<http://home.cdsnet.net/~martin13/primers.htm> +
http://www3.10pht.com/pub/tezcat/Martial_Law/Feds-Stocking-Ammo.txt

Ammunition, sources - <http://www.heritage.org/heritage/library/categories/forpol/log1060.html>

Ammunition, Technical background - http://users.aol.com/vaquero760/a_index.htm

Ammunition, thefts/losses - <http://sshs.mit.edu/tnt/news/guardian> +
<http://www.yahoo.com/headlines/special/albania/albania.97.html> +
<http://www.clark.net/fas/faspir/pir0797.htm>

British American Security Information Council (BASIC). Several articles on the Light Weapons Issue used in this paper - <http://www.basicint.org> ([/bpaper23.htm](#) and [/aaas97.htm](#))

Canadian Explosive Regulation - <http://www.nrcan.gc.ca/mms/explosifs> +
<http://cistri.nrc.ca/programs/indcan/fedlabs/text/91.html>.

Canadian Export Regulation - <http://www.dfait-maeci.gc.ca/eicb/cdaexp-e.htm>
Code of Conduct - <http://www.gn.apc.org/sworld/code.html>

Canadian Firearms Centre (firearms regulation) - <http://canada.justice.gc.ca/Oreintation/CCAF>

Explosive Detectors - <http://www.thesite.com/o896w/life> + <http://www.Westergaard.com:8080/secrime/magsf2.html> +
http://www/pbs.org/newshour/bb/transportation/jul96/security_7.25a.html.

Firearms Regulation - <http://www.amfire.com/recordbook/book.html>

General Accounting Office (GAO) - <http://www.gao.gov> USA NSIAD-96-129

List of Gunmakers - <http://www.shooters.com/cgi-bin/shotpage2?gunmakers>

Preparatory Committee for a Global Campaign on Small Arms and Light Weapons at
<http://www.prepcom.org/text/pc4/pc4a> Provided " Notes on Small/Light Arms Campaign Meeting." 10 Dec 1997

US Military Ammunition Factories - <http://www.pica.army.mil/ardec/advocate/aaps.htm>

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addressing excessive and
destabilizing accumulations of
small arms. --

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