

Surveying Europe's Production and Procurement of Small Arms and Light Weapons Ammunition

The Cases of Italy, France,
and the Russian Federation

Edited by Benjamin King



A Working Paper of the Small Arms Survey

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Benjamin King, May 2010

Abbreviations and acronyms

ATGW	anti-tank guided weapon
ATK	Alliant Techsystems
CHF	Swiss franc
Coeweb	Foreign Trade Statistics Database
DAPN	Direction de l'administration de la police nationale
DGA	Délégation générale pour l'armement
DGGN	Direction générale de la gendarmerie nationale
EADS	European Aeronautic Defence and Space Company
EDA	European Defence Agency
EUR	euro
EURENCO	European Energetics Corporation
GDOTS	General Dynamics Ordnance and Tactical Systems
ISTAT	Italian National Institute of Statistics
JorAmmo	Jordan Ammunition Manufacturing and Services Company
MANPADS	man-portable air defence system/s
NATO	North Atlantic Treaty Organization
NGO	non-governmental organization
OSCE	Organization for Security and Cooperation in Europe
R&D	research and development
RISTA-EW	reconnaissance information surveillance target acquisition— electronic warfare
RPG	rocket-propelled grenade
RUB	Russian rouble
SMS	subscribing member state
SNPE	Société nationale des poudres et d'explosifs
UK	United Kingdom
UN	United Nations
UNROCA	United Nations Register of Conventional Weapons
US	United States
USD	US dollar

Introduction

Benjamin King

Enumerating a state's demand and supply chains for small arms and light weapons ammunition remains a difficult undertaking. This is largely an outcome of many nations' reluctance to fully disclose information, together with poor accounting practices that hide the value of the data in aggregate totals. This working paper illustrates these challenges by detailing the most comprehensive picture possible of three countries' procurement, production, and exportation of ammunition for small arms and light weapons. Given the variety in transparency and disparate means of disclosure, each researcher took a unique approach towards fact finding. Comprehensive data on procurement, production, and exports was not uncovered in any of the cases, as none of these three countries compiles or publicizes such information. Instead, the best information available was gathered through a compilation of sources from each country.

In addition to contributing to the knowledge on ammunition production and procurement, another goal was to examine transparency in practice for large ammunition-producing countries. The Survey already evaluates transparency in *exports* through the annual Small Arms Survey's Transparency Barometer, which ranks 44 major small arms-export nations. In terms of *export transparency*, the nations studied include both the moderately transparent and one of the least transparent. Italy and France rank 11th and 12th, respectively, while the Russian Federation is among the most opaque, ranking 41st (Small Arms Survey, 2009, pp. 49–50).

The case studies only examine ammunition designed or destined for state security purposes. Therefore, all data applies to police and military purchases only. Civilian or illegally transferred ammunition is only briefly addressed.

Before moving to the case studies, the opening chapter provides a broad overview of Western small arms and light weapons ammunition production

and trade by examining some of the leading factors that drive the supply and demand affecting the industry. These are the dynamics within the global ammunition market as a whole that influence the three subsequent case studies.

Through case studies of three states—Italy, France, and the Russian Federation—we assess their respective practices in the production; procurement; export; and, when possible, consumption of ammunition. The resulting data not only provides a scale for the industry as a whole, but also reveals the realities of transparency and opaqueness in the ammunition market.

Some of the key findings of this publication include the following:

- The selling of industrial know-how is a common practice, giving many nations small arms ammunition production capacity. Sophisticated light weapons ammunition production, however, is limited to large industrial powers.
- The various editions of the European Defence Agency's *Electronic Bulletin Board on Defence Contract Opportunities* are a good source of past and future procurement transactions, although they do have some limitations.
- Ammunition allocation and consumption data shows that Italy and France both use the greatest quantity of ammunition stocks for training purposes.
- Export statistics often present aggregate ammunition data for importing country, exporting country, and by weight (kilograms) and monetary value. Often the quantity and type of ammunition are not recorded.
- Ammunition accounting is often grouped with other weapons-related items in a miscellaneous category, resulting in inexact totals for production and exports.
- The Russian Federation has a law preventing the disclosure of procurement information, for reasons of national security.

Production

The production of small arms and light weapons ammunition is a major industry and, unlike the production of the weapons themselves, is not limited to industrial powers. Because of the standardization of calibres of small arms ammunition, the relatively low technological requirements needed, and the industrial practice of selling ammunition-manufacturing know-how, much of

the ammunition can be produced by nations with little industrial capacity. Sophisticated forms of non-cartridge-based light weapons ammunition are the exception, however, as the advanced technological requirements limit production to large industrial powers. Each of the three countries examined here has a large small arms and light weapons ammunition industry, employing hundreds or thousands of people and contributing tens of millions of dollars to their economies. The ammunition market is confronting numerous political and economic realities, however. Confronting decreasing defence budgets and adjusting to trade agreements and conflicts are some of the multiple factors currently affecting the case countries.

Self-reliance in ammunition production is often viewed as an important aspect of a nation's overall defence and security strategy. Yet results from this publication suggest that this belief is less fervently felt. The Russian Federation appears to be one of the few remaining countries capable of producing all its ammunition needs. A more typical approach to ammunition acquisition includes large quantities of imports, as seen in Italy and France. Market competition is largely responsible for this shift. Competitive pricing on standardized-calibre ammunition and specialized new technologies have increased incentives to purchase from diverse providers. These forces have driven out small arms ammunition production in France entirely, while Italy relies on companies in neighbouring European countries to supply it with specialized light weapons ammunition.

Procurement

Procurement information can be found through a number of sources, including government procurement websites, national reports, and the media. The most useful and consistent information source used by the authors was the various editions of the Italian *Defence Contracts Bulletin*, which follows procurement transactions. This is similar in content to the *Electronic Bulletin Board on Defence Contract Opportunities* of the European Defence Agency (EDA). Ammunition type and quantities are given by country, with winning bid prices provided by the supplier. Overall, this is a transparent approach. The EDA

Electronic Bulletin Board is, however, voluntary and limited to EU countries. Additionally, a EUR 1 million barrier for reporting presumably eliminates many small arms ammunition transfers, as it would take orders in the millions of rounds for the majority of smaller calibres to reach that threshold.

Bulletin boards are, however, of little value in totalling the procurements obtained. Countries supporting domestic companies did not appear to report internal purchases in the cases studies examined. Italian procurement transactions posted on the Italian Ministry of Defence website, for instance, revealed no orders for ammunition filled by Italian producers, yet consumption information found the vast majority of such ammunition came from Italian manufacturers. The Russian Federation, by contrast, does not report procurement information. Some companies, however, did disclose percentages of ammunition sales that went to the state and for export.

Exports

Despite noted improvements by many nations, one of the principle findings throughout the case studies is the lack of specificity in detailing the ammunition trade. This is particularly true for national reporting on exports of ammunition. Two layers in the current trade practice hide important details of ammunition exports. Firstly, ammunition is compiled as one entity under current accounting practices. A category such as the Italian Ministry of Defence's 'Bombs, grenades, torpedoes, mines, missiles, cartridges and other ammunition and projectiles and parts thereof, including buckshot, shot and cartridge wads' combines the entire range of items, i.e. from shotgun shells to 120 mm mortar bombs and torpedoes. This restricts our ability to examine state versus civilian intended ammunition, anti-personnel versus anti-material ammunition, or even whether ammunition is designed for land- or sea-based applications. Further disguising the facts of ammunition exports is the fact that such exports are often recorded in an 'other' category, combined with miscellaneous defence-related items and parts. The Russian Federation, for instance, uses the category 'other' to encompass larger pieces of equipment. This provides little more than a maximum range of the ammunition exported.

The second layer of restrictions researchers often face is aggregate records of ammunition. Ammunition, like other commodities, is reported often by weight and/or total value. Typically, the total quantity of a particular type of ammunition is left out. Disregarding type and quantity severely limits the utility of the data by disguising the intended use of the ammunition.

Conclusion

The timing of this publication with the first Preparatory Committee meeting on a possible Arms Trade Treaty is not a coincidence. This Working Paper is intended to contribute to the discussion on state reporting practices, which will be a topic for negotiations. Certainly, it can be said that a great number of improvements have been made throughout the course of the past decade. Further steps can nevertheless be taken to increase transparency without harming national security.

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Chapter 1 **Small Arms and Light Weapons Ammunition: A Look at Western Producers and Their Markets**

Pierre Gobinet

Introduction

A host of academic and specialized publications have tackled the small arms and light weapons issue, either from a gun control and humanitarian perspective, or from a more technical, encyclopedic standpoint. Comparatively little market research exists on the ammunition these weapons use, although a simplistic saying has it that a firearm without ammunition is only an expensive club. If we look at an example, light weapons, for instance, have a high impact in the media and on public opinion (Small Arms Survey, 2008, pp. 8–12), mostly because of their ammunition's high lethality, which grants them a quasi-political dimension. Such weapons are extremely reliant on a proper supply of ammunition, either because they use modern, high-value ammunition or because their rate of fire is such that logistics have to be put in place to make sure there is a constant supply of ammunition for users in the field. It is safe to say, therefore, that ammunition availability governs the type of weapons used in most of the conflicts around the world.

Ammunition is, first and foremost, a commodity—a consumable good rather than a durable good. This definition implies characteristics that set ammunition apart from its intended recipients, the small arms and light weapons that are manufactured to fire it. Drawing on a range of sources, such as technical reviews, specialized academic papers, interviews with military and law enforcement personnel, and informal contacts with manufacturers, this chapter seeks to paint a general picture of the European and North American ammunition industry, thereby voluntarily limiting the scope of the research and findings to Western ammunition producers and their markets. The author thus hopes to introduce the reader to an array of major Western small

arms and light weapons ammunition producers and to their market environments. Since ammunition is the core product of the industry, the next part of this chapter starts by establishing an academically sound ammunition classification method that is required to adequately analyse ammunition markets and producers comparatively. The following part highlights a set of common, recurrent features that seem to be shared by most large Western ammunition manufacturers. The final part looks at the main characteristics of Western ammunition markets and ends with a brief rundown of the major cartridge makers in North America and Europe.

Classifying the products

The UN's 1997 *Report of the Panel of Governmental Experts on Small Arms* (UNGA, 1997) and the 1999 *Report of the Group of Experts on the Problem of Ammunition and Explosives* (UNGA, 1999) include small arms and light weapons ammunition as an intrinsic part of the small arms and light weapons category and recommends its specific study. According to these two documents, portable weapons can basically be categorized as either *small arms* or *light weapons*, as shown in Table 1.1.

Table 1.1
Standard basic classification of arms into small arms or light weapons

Small arms	Light weapons
Revolvers & self-loading pistols	Heavy machine guns and anti-materiel rifles (12.7–20 mm)
Rifles & carbines	Hand-held, under-barrel & mounted grenade launchers
Assault rifles	Portable anti-tank guns
Sub-machine guns	Portable anti-aircraft guns
Light machine guns	Recoilless rifles
	Portable launchers of anti-tank missiles & rocket systems
	Portable launchers of anti-aircraft missile systems
	Mortars of calibres less than 120 mm

As such, and notwithstanding the controversial issue of landmines, this categorization places portability as the factor distinguishing both small arms and light weapons. This is *not* appropriate, however, when studying ammunition. A weapon may be portable by a single soldier, but if its rate of fire is high, then it will require a tremendous amount of ammunition logistics to be operational in the field and will thus lose all the initial benefits of portability. Furthermore, focusing first on ammunition makes obvious sense when studying the arms-manufacturing business, as it will usually determine the blueprints of small arms and light weapons manufacturing in the long run. Weapons are made for a certain type of ammunition, whereas specific ammunition is rarely made for a weapon. According to Small Arms Survey research, the most practical distinction to make in terms of ammunition is to separate *cartridge-based* from *non-cartridge-based* ammunition. This then breaks down by calibre and guidance features. Given the sheer diversity of calibres, effects, ranges, and origin, however, this chapter does not pretend to be a detailed technical overview nor an exhaustive ballistics inventory of small arms and light weapons ammunition (refer instead to Courtney-Green, 1991; Allsop et al., 1997; Ness and Williams, 2007). Instead, based on collated data published by the Small Arms Survey (Pézard and Anders, 2006, pp. 24–25), the chapter focuses on projectiles most commonly used by Western countries, including NATO and former Warsaw Pact standard cartridge calibres.

Cartridge-based ammunition

Cartridges are self-contained units that share four basic components:

- cartridge case;
- primer;
- propellant/powder; and
- projectile/bullet.

A given calibre can be employed in many different types of weapons and will have various denominations according to the country of origin and manufacturer. The .50 projectile, for instance, which will be referred to as '12.7 mm' when using the metric system, is widely considered as the threshold between small arms and light weapons cartridge-based calibres.

Table 1.2
Distinguishing weapons by their ammunition calibres

Weapons using calibres under 12.7 mm	Weapons using calibres 12.7–20 mm
Shotguns	Anti-materiel rifles: US Barrett M82
Pistols	Heavy sniper rifles
Machine pistols	Heavy machine guns: US .50 Browning M-series (M2); Russian DShK
Sub-machine guns	Medium calibre cannons
Rifles	Objective crew-served weapons/objective individual combat weapons
Assault rifles	
Light sniper rifles	
Light machine guns	
General purpose machine guns	
Non-military weapons	

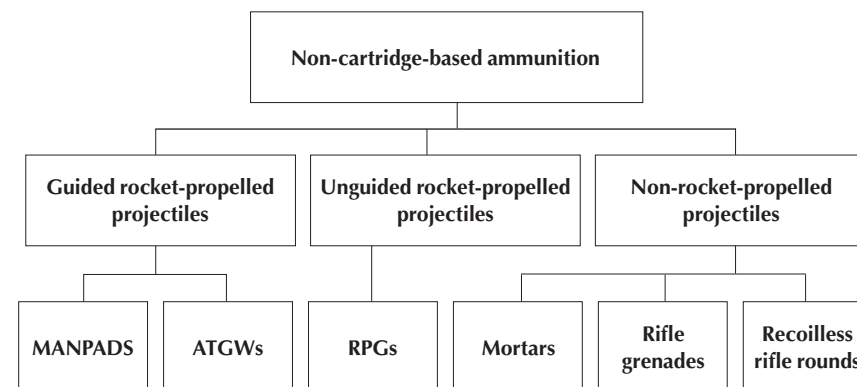
Non-cartridge-based, explosive ammunition

The more expensive and technologically sophisticated non-cartridge-based ammunition can be divided into three groups.

Guided rocket-propelled projectiles feature two-stage, solid-fuel rocket motors with high-explosive two-stage warheads and shaped charges and can be directed towards the target after launch while in flight. The trajectory can be altered in flight either by the operator or by an automated guidance control system, and the operator can make adjustments to compensate for the target's movements. These projectiles are designed to hit mobile targets such as tanks, light vehicles, and aircraft. There are a restricted number of producers because the number of customers and the quantities required are lower than for small arms ammunition, and there are considerable technological challenges in the production process. These projectiles are fired by man-portable air defence systems (MANPADS) and anti-tank guided weapons (ATGWs) systems.

Unguided rocket-propelled grenades (RPGs) follow the trajectory assigned by the firer and cannot be adjusted once fired. This is referred to as 'direct' or 'line of sight' fire. Ammunition is launched from the rocket launcher's unrifled tube,

Figure 1
Varieties of non-cartridge-based ammunition



Source: Pézard and Anders (2006, p. 24)

so the projectile does not spin. Fins are often added to the projectiles for stabilization. They all feature a warhead section and a propellant section and are used against light and armoured vehicles, bunkers, or buildings, and also as anti-personnel weapons.

The final category, *non-rocket-propelled projectiles*, can be further subdivided into three distinct ammunition groups: mortar rounds (indirect-fire weapons), rifle grenades (fired from hand-held, under-barrel, or automatic grenade launchers), and recoilless rifle rounds (not unlike conventional artillery shells).

Features shared by Western ammunition producers

Available production estimates

Despite the lack of existing and officially reliable information, researchers have tried to compile an acceptable estimate of the global annual volume of ammunition production, often with conflicting results. In 2005 Forecast International (2005) roughly estimated the global production of small arms ammunition produced for military forces at 13 billion rounds. In 2007, according to the same source, the combined outputs of European and Asian small arms ammunition manufacturers alone were believed to average around 15 billion rounds per year (Forecast International, 2008a; 2008b). This last figure sheds

little light on the extent of US production figures, and also highlights the difficulty of separating defence and civilian ammunition production statistics for proper comparative analysis. A recurrent figure places the global ammunition output between 10 and 14 billion rounds per year, which means an average of almost 33 million rounds manufactured every day (Oxfam International, 2006). The industrial manufacture of small arms and light weapons ammunition for military, security, and police forces, as well as for civilian customer use, supplies a modern, global market involving at least 76 countries, with *authorized international transfers* averaging an estimated USD 4.3 billion annually (Small Arms Survey, 2010, p. 7; Oxfam International, 2006).

Few ammunition producers provide adequate figures and, as discussed later in this study, a number of companies manufacture and export production equipment to an increasing number of developing countries, undoubtedly making these figures an underestimate. Europe and the Commonwealth of Independent States contain 36 per cent of small arms and light weapons ammunition-producing states (Small Arms Survey, 2005, p. 14). A substantial proportion of ammunition producers are also based in the United States, including the Lake City Army Ammunition Plant, which stands out as the world's largest producer of military ammunition.

A common argument in the academic community is that the global market for small arms and light weapons ammunition provides the backdrop for illicit ammunition transfers, which can potentially stem from the 'authorized' realms of production, transfers (through diversion, for instance), and official national stocks. Export data exists for only 17 per cent of the rounds on the market, leaving over 80 per cent (up to 10 billion rounds) of global supplies unaccounted for (Oxfam International, 2006, p. 1). The UK-based charity Oxfam issued a report in 2006 analysing ammunition availability in Baghdad's black market. It found that a great deal of the available ammunition was new and often of high quality, with production dates ranging from 1999 to 2004 and originating from factories in Eastern Europe and the Russian Federation. According to this report, the ammunition was either smuggled in across the border or diverted from imported supplies originally intended for the new Iraqi security forces (Oxfam International, 2006, p. 8). This suggested that at that stage newly imported ammunition was becoming widespread, as

opposed to earlier times in the conflict when, allegedly, ammunition originated predominantly from existing Iraqi stockpiles.

Mass manufacturing ammunition without licensing production

Most major actors share a number of features in the ammunition-manufacturing business. Industrialized mass manufacturing of ammunition has become the business of modern, profit-oriented companies and industrial plants actively competing for customers worldwide. Their goal is to rationalize and optimize a range of machinery to manufacture empty cartridge cases, bullets, and primers, as well as the propellant or explosive. The production process can therefore include various stages of large and small calibre assembly, and cartridge case and bullet manufacture. A given manufacturer might purchase its ammunition casings from one company and outsource other components such as powder, primers, and the propellants from other, separate companies. Then its plant will manufacture the projectile and assemble the finished cartridge using largely automated machinery to melt lead cores; shape bullet jackets; load primers and powder; and insert the completed rounds into racks, stripper clips, and eventually into sealed boxes. All the components are then assembled together on the basis of optimized cost-efficiency and tight quality control standards. Sub-contractors may otherwise be required to provide fully assembled cartridges, and some manufacturers select their sub-contractors and cartridge suppliers preferably in countries that use their ammunition, in order to promote offset and industrial balance (Berman, 2010).

The production capacity of a single production line is calculated on the basis of its maximum output; for a typical assembly line this may amount, for instance, to 130 rounds per minute, with a potential annual output calculated to be in the region of 7–12 million rounds (Pézard and Anders, 2006, p. 51). However, distinguishing what is possible from what is the norm is hazardous because comparative criteria are seldom applicable between various plants: Kenya's Ordnance Factories Corporation in Eldoret, which initially imported production equipment from Belgium in the late 1990s, was reported to have an estimated annual output of 20 million rounds of small arms ammunition (Stohl, 1998, p. 14). At the other end of the spectrum, Israel's main producer, Israel Military Industries, is reputed to be capable of producing 1.25 million

cartridges per day, or approximately 500 million per year (Oxfam International, 2006, p. 3). The capacity of a production line can be evaluated in terms of a maximum amount of rounds produced per shift (e.g. 15,000–20,000), but will also depend on the number and duration (e.g. eight hours) of the plant's weekly production shifts. Higher demand will dictate heightened levels of activity, but production will fluctuate in order to adapt to routine maintenance or compensate for overcapacity.

One of the challenges now faced by these companies and their subsidiaries is possible disruption in their supply chains, since they receive components from countries worldwide. Delays in the delivery of supplies can disrupt forecasts and the whole production chain. Thus, the market leaders have developed flexible production lines to switch to another product in case of delays and manage multiple-contract ammunition requirements issued by the police or army. For instance, although round specifications differ for Western military and police units, rounds are usually made from the same metals and machined in the same production lines.

One defining feature of this market is the acknowledged absence of licensed production agreements for small arms ammunition. Once an original calibre design has become widespread, mostly on the basis of NATO or former Warsaw Pact standardization agreements and practices, a large number of manufacturers around the globe can set up production facilities and start manufacturing the rounds based on the original design standards without contract or royalties being paid to the original manufacturer(s). The most famous example is the 5.56 x 45 mm NATO standard ammunition, originally manufactured by Belgium's FN Herstal, the designs for which were made public to allow production by other manufacturers. In spite of this standardization, many contractors have willingly oriented their marketing towards high-end, high-price niche markets to compensate for high fixed costs such as salaries and research and development (R&D). Several small arms ammunition manufacturers now focus their product range exclusively on advanced military and commercial variants of the 5.56 x 45/.223 Rem, 7.62 x 51/.308 Win., and 8.6 x 70/.338 Lapua Magnum. The production cost for a typical cartridge is generally divided as: 1/3 cartridge; 1/3 primed case plus propellant; and 1/3 loading, assembling, and packaging.¹ For a complex projectile such as Nammo's 12.7 mm multipur-

pose round, most of the factory costs cover the projectile, whereas its combined casing, propellant, and primer account for less than 50 per cent of the round's manufacturing expenses (Berman, 2010).

Ammunition machinery: marketing savoir-faire and exporting production potential

A number of companies have capitalized on the low technological entry barrier for small arms ammunition production and are exclusively dedicated to the production and marketing of ammunition machinery. This market literally provides ammunition production capacities to its clients and accounts for the widespread establishment of ammunition-manufacturing facilities around the world. The traditional market leaders in this sector are Germany's Fritz Werner/MAN Ferrostaal, France's Manurhin, and Belgium's New Lachaussée (Anders, 2005). According to a Groupe de recherche et d'information sur la paix et la sécurité study, a surprising 90 per cent of the world's NATO-compatible military ammunition manufacturing plants were apparently set up and tailored by German, French, and Belgian companies (Anders, 2005). For instance, Turkey reportedly signed a contract in 2000 for the establishment of a domestic production plant with suppliers from Germany, France, and Belgium and subsequently established itself as an important ammunition exporter (Amnesty International, 2004, p. 34). Other companies choose to extend their business opportunities by developing their own machinery export potential. For instance, Bulgaria's ARSENAL JSCompany Kazanlak, on top of being a major regional ammunition manufacturer, also boasts an engineering facility and 'is involved in the transfer of know-how to manufacture weapons and ammunition, installs workshops and tests equipment in [the] customer's country, performs quality control, trains its personnel and gives any technical assistance' (ARSENAL JSCompany, 2009).

The NATO standard: a business multiplier

The world's most distributed calibres belong to two main family groups, largely based on the geographical origin of manufacture during the cold war when the Eastern and Western blocs imposed competing ammunition standards on their allied and satellite countries. These calibres are now largely

standardized, but will still usually be referred to as either 'NATO' or 'Warsaw Pact' calibres.

The NATO family includes famous calibres such as:

- 5.56 x 45 mm NATO;
- 7.62 x 51 mm NATO;
- 9 x 19 mm Parabellum NATO or 'Luger';
- 12.7 x 99 mm or .50 BMG Browning.

The Warsaw Pact calibres are also well known:

- 5.45 x 39 mm Warsaw Pact;
- 7.62 x 39 mm Warsaw Pact;
- 7.62 x 54 mm Warsaw Pact;
- 9 x 17 mm Warsaw Pact;
- 7.62 x 25 mm Warsaw Pact;
- 12.7 x 107 mm or 12.7 x 108 mm Warsaw Pact;
- 14.5 x 114 mm Russian machine gun.

To indicate that their ammunition is produced according to NATO design and safety standards, Western manufacturers engrave a cross within a circle on the cartridge cases. This indicates that the ammunition was loaded in a NATO-approved facility and meets the NATO production specifications for that round (NATO, 2009). Standardized cartridges thus facilitate resupply, weapons design, and comparison, and ultimately lower ammunition manufacturing and storage costs. As a token of high quality for small arms ammunition, the symbol also becomes marketable.

Many emerging countries have arms-manufacturing plants that have been producing either indigenous or ex-Soviet design items, including ammunition, for a number of years. However, their export potential is low, as most industrialized countries, even ones that are not NATO members, have adopted NATO standards for their armies and now demand NATO-compatible goods and ammunition. Thus, manufacturers who do not standardize their ammunition production may ultimately end up restricting their business opportunities. Countries who do choose to start producing NATO standard ammunition also set up export promotion boards to entice state-owned

ordnance factories into restructuring, modernizing, and widening their range of products. Such was the drive initiated in 2006 by India to boost its rapidly decreasing defence exports. According to the country's parliamentary committee, failure to manufacture weapons up to NATO standards had badly hit ammunition sales. India's 40 government-owned ordnance factories responsible for its mainly indigenous defence production, which up to that point had only supplied regional and neighbouring markets, had to be adapted and modernized (Murphy, 2005).

Balancing national ammunition independence and market competitiveness

Historically, ammunition manufacturing has been a national prerogative that depended on small-scale, state-owned, and often subsidized production facilities exclusively oriented to meet the domestic demand of a nation's armed services. Production was thus tailored to the latter's needs and was neither profitable nor profit oriented. Similarly, new entries in the ammunition-manufacturing business will nowadays often be state sponsored and aimed exclusively towards the domestic armed forces market. New and emerging regional production companies often start out with plants that remain idle between orders of ammunition from their respective governments. Mzinga Corporation in Tanzania and Kenya's Ordnance Factories Corporation in Eldoret, for instance, were set up to produce various types of ammunition along these lines (Pézard and Anders, 2006, pp. 49, 56–57).

More recently, and in order to make the enterprise profitable in the long run and face market competitors, the inevitable trend for all small arms ammunition producers is to consolidate at the national level. This is most often accomplished via a mix of state sponsorship, progressive privatization, foreign investment, acquisitions, and joint ventures, with an eye on possible export potential. An excellent example is Jordan's recently established Jordan Ammunition Manufacturing and Services Company (JorAmmo), which was set up as a joint venture among Jordan's King Abdullah II Design and Development Bureau, Mecar of Belgium, and the US-based DMV Holdings. The new plant's infrastructure, comprising a modern ballistics laboratory in the

vicinity of Amman, should quickly give Jordan self-sufficiency in both R&D and the production of conventional ammunition. According to specialized media sources, this plant is expected to start fulfilling its first Jordanian armed forces USD 43 million contract by mid-October 2009 and deliver the first rounds (5.56 mm, 7.62 mm, and 9 mm) and mortar shells (60 mm and 120 mm) in 2010. JorAmmo will of course seek to extend and eventually export its product range to meet different user requirements (Foss, 2009).

Governments who fail to inject this proper business mix often risk losing their national small arms manufacturing capacity in its entirety. For instance, whereas in Italy all small calibre ammunition consumed by the Italian military forces is nationally produced by Italian contractors (see Chapter 2 of this study for more information), France now lacks a small arms ammunition-manufacturing apparatus and thus imports everything (France, 2007). Although the French government has kept an industrial manufacturing capacity for medium and large calibres in the form of Nexter munitions, it has chosen to purchase and import all of its small calibre ammunition from abroad (see Chapter 3 of this study for more information).

The monopoly of states over ammunition production and procurement has waned. The globalization of the ammunition market has undeniably altered the predominance of states in this business, to a point where they now act predominantly as clients rather than producers. This occurs despite the fact that many governments retain a sizeable number of shares in their country's arms-manufacturing companies. The contractors, on the other hand, have become the real actors of the weapons-manufacturing market. Companies now invest money by modernizing national and state-owned production facilities, allowing them to both guarantee national demand for ammunition and increase their capability to supply export markets.

Still, some of the largest contractors, despite their thrust and necessary presence on the international ammunition market, have kept their role as exclusive providers of their countries' armed forces' ammunition requirements. This allows clients to protect their ammunition supply base after privatization. It also enables them to take advantage of ceiling prices for a number of years, while benefitting from 'surge manufacture' to support demanding operational circumstances as they arise. For instance, the UK struggled

for years with its general munitions capabilities. When BAE Systems acquired the newly privatized Royal Ordnance operation in 1987, the latter employed 19,000 people and comprised 13 ageing munitions plants. While foreign manufacturers were openly invited to tender for UK ammunition programmes and requirements, the Royal Ordnance factories refused to bid abroad for fear of eventually becoming dependent on overseas suppliers, who could cut off some supplies in times of crisis. Today's Royal Ordnance capacity stands at three plants and barely 1,700 employees (Foss, 1993; Chuter, 2008). In 2008, BAE Systems sealed its contribution to the UK Ministry of Defence with the Munitions Acquisition Supply Solution deal to supply the nation's army with up to 80 per cent of its small arms (5.56 mm and 7.62 mm), mortar bombs (81 mm), medium calibre, tank (120 mm), artillery (105 mm and 155 mm), and naval gun ammunition over the next 15 years, a deal reportedly worth up to USD 5.6 billion (Chuter, 2008). Equally as important is BAE Systems' continued commitment to substantially upgrading, modernizing, and increasing the capacity of the Birtley, Glascoed, and Radway Green (the latter being the UK's only local source of military small arms ammunition) Royal Ordnance production facilities over the next five years, three sites that have heavily contributed to the UK's supply of ammunition for use in Afghanistan and Iraq. According to specialized sources, some of these improvements involve the purchase of new machinery, such as forges and robotic machining cells; the demolition of old facilities; and their replacement with energy-efficient plants (Cowan, 2008). These investments contribute significantly to the UK's ammunition independence and supply, but also drastically increase the company's overseas sales potential.

In North America, most ammunition is produced by government-owned contractor-operated manufacturing plants that are owned by the US government but allocated to and operated by a private company for a definite period. This allows both entities to look after their interests, while performing duties for which they are best suited. The government establishes requirements and retains its ammunition supply base for use in case of a national emergency. The contractors have to compete for the initial deal and then manage the facilities to implement ammunition production. The most famous example of this partnership is the Alliant Lake City Small Calibre Ammunition Company, a

subsidiary of US-based propulsion systems and munitions specialist Alliant Techsystems (ATK) Armament Systems, which began working with the US Army and Pentagon on the Lake City Plant in 2000. Over the years the facility has become the country's main source for military small calibre ammunition procurement and is reported to have increased its production to 1.4 billion rounds per year, including upgrades to 5.56 mm, 7.62 mm, and .50 calibres. In 2009 the US Army awarded ATK a USD 481 million contract to continue running the Lake City Plant until 2013 (Greene, Holt, and Wilkinson, 2005, p. 13; Osborn, 2009a).

Overview of Western ammunition markets

Company mergers and acquisitions: the lure and supremacy of the US defence market

Data regarding ammunition manufacturers is consistently aggregated with more general defence industry figures, making it difficult for researchers to distinguish conflicting or opposing trends. Furthermore, overall defence spending may not necessarily reflect ammunition expenditures. The global ammunition manufacturers industry is characterized by unending mergers and consolidations to ensure continued profitability and competitiveness, thus resulting in the progressive emergence of fewer but larger transnational producers. Available open-source information on the defence industry in general reflects the predominance of a tight circle of US and European industry actors fighting for corporate supremacy and strategic acquisitions to gain strong footholds in new and potentially promising defence markets. To sustain their manufacturing margins and profits, ammunition makers either invest in their own organic growth with in-country acquisitions or expand their presence in new key international markets through various acquisitions.

A recent *Jane's Industry Quarterly* report on the global defence industry's mergers and acquisitions for 2008 confirms the US defence market as the main arena for the acquisition of defence manufacturing assets, attracting more than half of global transactions (Jane's Information Group, 2009). Again, the ammunition manufacturers' actual contribution to these acquisition figures remains to be thoroughly quantified. Major ammunition producers, spe-

cifically UK firms such as BAE Systems or Chemring, are active players and aggressive US Department of Defense contractors, for instance, as BAE Systems' USD 4.53 billion takeover of Armor Holdings attests. The European market, on the other hand, suffers from intra-community export barriers, which may explain why acquisitions in the European defence sector remain mostly domestic: 66 per cent of acquisition funds invested in Europe by European companies remained within national borders in 2008 (Jane's Information Group, 2009). European cross-border activity is spearheaded by the Dusseldorf-based land systems and ammunition manufacturer Rheinmetall. In this regard, Rheinmetall's acquisition of 51 per cent of South Africa's Denel Munitions in 2008 is a good example. German firms also accounted for 31 per cent of deals in the European land systems sector in 2008 and clearly contribute to industry consolidation. While European defence companies are mainly rooted in the continent, this trend may change, since an increasing proportion of their revenues are derived from markets elsewhere, partly as a result of acquisitions activity in the US market. An interesting development mentioned by the report is that investments and acquisitions funds no longer flow evenly in both directions across the Atlantic, and the gulf between the flow of funds east and the flow west is rapidly widening. 'For every dollar invested by Europeans in the purchase of US defense assets in 2008, US firms spent just over two cents in the EU' (Jane's Information Group, 2009).

Armed conflicts and domestic ammunition markets

Ammunition procurement patterns ultimately reflect a country's political, geopolitical, and military activities. Similarly, current events such as wars, regional conflicts, political elections, or periods of economic uncertainty will inevitably cause ammunition manufacturers to adapt their production and prices accordingly. This will ultimately reflect on end-user rates. For instance, many authoritative field reports in 2006 documented the increase in the price of bullets in war-torn Somalia to a record USD 1.50 per round, mainly attributed to the local warlords stocking up on ammunition in anticipation of an upsurge in fighting and imminent armed clashes (Oxfam International, 2006, p. 1; BBC, 2006). Conflicts are, of course, known as market multipliers for the

ammunition industry, and figures such as these reveal just how much distributors and arms brokers can profit from them.

However, it is just as interesting to study how these factors may affect the market upstream, in the countries where this ammunition is originally made and marketed. Once again, most of the available open-source information portrays the market situation in the United States. For instance, a report published in January 2007 expected the US market for small arms and ammunition manufacturing to reach USD 6.5 billion by 2012 (Specialists in Business Information, 2007). However, despite a reported 10 per cent increase in the US small arms and ammunition market in 2007, the report summary predicted that civilian and military customer demand would subsequently lull in 2008 due to the country's economic crisis and stabilized theatres of operations in Iraq and Afghanistan. This trend would now need to be validated with actualized data. One important issue highlighted by distinct sources relates to the impact of the US military's heavy deployments of troops overseas, more specifically in Iraq and Afghanistan, which allegedly use up more than a billion rounds a year for both training needs and field operations (Thompson, 2007). Accordingly, ammunition producers increased their output significantly in the last three years to meet this demand. The national US ammunition production facilities in Lake City were driven to the limit and army procurement authorities purchased additional ammunition from the recreational industry (notably Olin Winchester and Israeli Military Industries) to provide live-fire training and combat rounds to regular troops, and combat service support, reserve, and National Guard units preparing for deployment in Afghanistan and Iraq (Galloway, 2004).

The US Army's heavy demand for ammunition following the start of the Iraqi and Afghan conflicts coincided with police departments nationwide increasing their own training needs following the 11 September 2001 terrorist attacks. This surge in the nation's ammunition requirements also occurred at a time when the prices of commodity metals, like brass, copper, and lead, used to make ammunition were soaring due to high international demand from various industrial sectors. Consequently, many US police and sheriffs' departments encountered skyrocketing prices, ammunition shortages, and drastic procurement and distribution delays from commercial manufacturers. As a result, many were

forced to reduce their personnel's mandatory handgun and rifle shooting practice in order to save ammunition for operational needs. Police procurement officers now have to anticipate orders and negotiate long-term contracts to hold prices down. Against a backdrop of high demand, all this currently points to a significant shortage of ammunition in the United States for police departments, specifically the .223 rifle round (Thompson, 2007).

The US public's uncertain perception of their personal safety and security is one of the most influential factors that can lead new owners to buy weapons and entice current owners to add to their already existing private gun and ammunition arsenal. In this regard, the civilian ammunition market followed trends of its own, especially after the presidential election and unfounded apprehension that the new Democratic Party administration would conspire to implement new taxes and strengthen regulations on the purchasing of ammunition. Specialized gun shops, Internet sites, and recreational shooters' blogs clearly mention the 'Obama effect' to relate the way North American gun owners have been massively buying up bulk ammunition supplies, specifically .223, 5.56 NATO (used by the M16 rifle variants), and 7.62 x 39 mm ammunition. Consequently, this drained retailer stocks, regardless of their rates and of the current (2008–2010) recession (Johnson, 2009; Stewart and Burton, 2009). Prices, orders, and retailer backlogs have apparently gone off the charts for both the weapons and their respective ammunition. According to various retailers and gun shops, civilian retail prices have surged 20–150 per cent in the past several years, depending on the type of ammunition (Ullmer, 2008). Ironically, media reports rather hint that the election of a Democratic Party administration may ultimately have strengthened the firearms and ammunitions industry at a time when all the other sectors were plummeting.

Old stock purchases and hand loading

As in the car market, for instance, much of the worldwide civilian and military demand for ammunition is met by old stocks. In the case of military-grade ammunition, purchasing from old stocks has several distinct advantages. Troops in an overseas theatre of operations can be issued with ammuni-

tion purchased locally, thus saving precious logistical time, as well as manufacturing and shipping costs. Indigenous forces can also be provided with ammunition purchased from local or regional stockpiles, often the stockpiles of former Soviet bloc states.

On top of the previously mentioned advantages, many of these forces still use former Warsaw Pact weaponry and its corresponding ammunition, and thus cannot be issued NATO standard ammunition and supplies. For instance, most Afghan weaponry is Soviet-era-designed and thus compatible with Russian ammunition, rendering shipments from Western countries useless. Ironically, in 2006, at a time when most US law enforcement agencies were experiencing severe shortages of ammunition, the Bush administration reportedly sought to spend an estimated USD 400 million to purchase vast amounts of Russian stocks of ammunition from Rosobornexport to supply the Afghan National Army in the event that the next Democratic Party president would decide to pull US troops out of the country after the 2008 US presidential election. Sources mentioned 'a vast amount of ordnance, including more than 78 million rounds of AK47 ammunition, 100,000 rocket-propelled grenades and 12,000 tank shells' (Harding, 2006).

Furthermore, purchasing from old ammunition stockpiles can lead to controversial quality control, dubious traceability issues, and procurement fraud. For instance, the *New York Times* and Agence France-Presse reported that between March and December 2007 the US Army had placed orders for more than USD 223 million of munitions with AEY Inc., a hitherto unknown contractor operating out of Miami Beach, Florida, and headed by a 22-year-old president, Efraim Diveroli (Mannion, 2008). According to the contract, this ammunition was intended to supply Afghan security forces with ammunition originating from Hungarian stockpiles. On-site investigation in Afghanistan revealed that, under the cover of fake certificates, AEY was in fact providing Afghan forces with 40-year-old Chinese-made 7.62 rounds in decomposing packaging, and originating from Albania. The investigation showed that the contractor had been purchasing weapons and munitions for the Afghans in Bulgaria, Romania, the Czech Republic, and Slovakia for more than a decade. AEY was subsequently suspended from future contracting with US government

agencies, but this still raises the question of how this contractor was vetted by US authorities in the first place. Further media interest showed, for instance, that AEY was linked to a number of dubious ammunition transactions for the Afghan government with the Slovak companies ZVS Holding and Petina International, and that AEY's transactions had been investigated in Albania and Hungary (Nicholson, 2008).

The civilian ammunition market also benefits from cheaper, old stockpile ammunition. Going a step further, however, avid hunters, sportsmen, and shooting enthusiasts alike prefer to assemble their rounds at home with appropriate tools and materials. Self-assembly and 'hand loading' for sport and hunting purposes by resizing and refilling empty cartridges with primer, propellant, casings, and bullets is much cheaper than buying fully assembled ammunition in a shop. Sources estimate that for about USD 100, someone can buy enough supplies to make 1,000 'hand-loaded' home-made cartridges (CBC News, 2008). There are, however, no useful official statistics to determine the extent of reloading in the North American sport shooting community, and much less so worldwide.

Ammunition contracts

In the United States and Western Europe, potential ammunition contracts, in the form of public invitations to tender, are usually disclosed and advertised publicly by law, and are thereby accessible on most government websites and in specialized periodicals (see Box 1.1). Major procurement contracts usually involve substantial amounts of ammunition being produced and delivered over several years, and are usually included as part of an overarching arms procurement contract. For instance, a country's ministry of defence might invite 20 or more companies to bid for a range of small arms and mortar ammunition contracts covering a given procurement cycle of up to five years (Foss, 1993; Berman, 2010). Requirements will include various types of small arms ammunition adapted to the country's standard assault rifle (e.g. the French FAMAS or the British SA80). Contenders will apply for different parts of the contract requirements and advertise their production capacities to adjust to the client's design specifications. The agency issuing the invitation can order

Box 1.1

Intergovernmental regime to encourage competition in the European defence equipment market

The intergovernmental regime was launched on 1 July 2006 with the participation at that time of 22 of the 24 Member States of the European Defence Agency (today with the participation of 25 out of 26 Member States—all except Romania) plus Norway.

The voluntary intergovernmental regime is operated on the basis of the Code of Conduct on Defence Procurement (CoC), approved by Defence Ministers on 21 November 2005 to cover defence equipment purchases where the provisions of Article 346 of the TFEU are applicable. The Electronic Bulletin Board—Government Contracts, also launched on 1 July 2006, is a key element of the defence procurement regime and provides an historic opportunity for suppliers across Europe to bid for defence contracts advertised by subscribing Member States. The CoC is underpinned by a robust reporting and monitoring system to help ensure the guiding principles of mutual transparency and mutual accountability among subscribing Member States are being maintained in order to gain the confidence that the regime is working as intended.

Working alongside the CoC is the Code of Best Practice in the Supply Chain (CoBPSC) which was approved ... on 15 May 2005[.] The CoBPSC extends the benefits of greater competition through the supply chain, especially [to] lower tier companies and SMEs [small and medium-sized enterprises] who may not be able to bid for contracts directly but could act as sub-contractors. Its supporting electronic tool[,] the Electronic Bulletin Board—Industry Contracts (IC)[,] was launched on 29 March 2007 in the common interface for the Defence Contract Opportunities set in the Defence Agency's website to enable Prime Contractors and commercial buyers to advertise sub-contract opportunities.

On 20 September 2006, the EDA Steering Board also agreed important new elements to support the development of a truly European Defence Equipment Market, by enhancing Security of Supply and Security of Information across national borders. Member States subscribing to the regime have committed themselves to endeavour to meet requests from fellow Member States for goods and services during an emergency, crisis or armed conflict, including from their own stocks if necessary. Agreed also were rules governing the security of classified and commercially sensitive information relating to defence procurement.

Source: Quoted in its entirety from EDA (2008)

one or two hundred thousand dollars' worth of 'test lots' with small preliminary contracts in order to evaluate various sets of small arms calibre ammunition available on the market. Once the definitive tenders are selected, deliveries can be expected to start the following month or shortly thereafter (Foss, 1993) (see Box 1.2).

The cost of such huge contracts explains why most of the contractors' client base is made up of wealthy, established states, defence ministries, and their respective procurement agencies. Dealing with newly formed, struggling—or, worse still—illegitimate governments can ultimately jeopardize multi-year contracts with unsolvable debt issues. For instance, in 2007, under intense secessionist pressure from the Liberation Tigers of Tamil Eelam, the Sri Lankan United National Front authorities broke a military ammunition supply agreement with China North Industries Corporation that had been signed in 1992, and signed a new USD 37.6 million ammunition (mostly for mortar and cannon shells) procurement deal with the Chinese conglomerate Poly Technologies instead, leaving over USD 200 million in debt from the original 1992 agreement (Karniol, 2007).

Box 1.2

Ensuring fair and equal treatment of suppliers as a key principle of the Code of Conduct on Defence Procurement

New defence procurement opportunities offered by subscribing member states are notified on one single portal that deals with 'invitations to tender'. Each invitation to tender briefly describes the requirements, the procedures, the timescales for the competition and the award criteria, and links to national websites or provides other directions to where full documentation can be obtained. A standard format announcement is also posted when a contract is awarded. In the conduct of the competition itself, fair and equal treatment will be assured in:

- **selection criteria.** All companies will be evaluated on the basis of transparent and objective standards, such as possession of security clearance, required know-how and previous experience;
- **specifications and statements of requirements.** These will be formulated as far as possible in terms of function and performance. International standards will, wherever possible, be included in the technical specifications rather than national ones or detailed and specific company-linked requirements;
- **award criteria.** These will be made clear from the outset. The fundamental criteria for the selection of the contractor will be the most economically advantageous solution for the particular requirement, taking into account considerations of costs (both acquisition and life cycle), compliance, quality and security of supply and offsets;
- **debriefing.** All unsuccessful bidders who so request will be given feed-back after the contract is awarded.

Source: EDA (2005)

The major players in North America and Europe

Some of the world's largest ammunition producers are located in North America. A recurrent heavyweight actor in the US ammunition market is the Minneapolis-based propulsion systems and munitions specialist Alliant Techsystems (ATK), which manufactures guns in Mesa (Arizona), as well as small arms and medium calibre ammunition in Lake City (Missouri) and Radford (Virginia). As such, the government-owned, contractor-operated Lake City Army Ammunition Plant located in Independence, Jackson County, Missouri, is the world's largest producer of military ammunition with a quasi-monopoly on the US and international ammunition market. Currently comprising more than 400 buildings and over 2,550 employees, the plant opened in 1941 and was successively run by Remington Arms Company and Olin Corporation. Since 1941 its activities were only interrupted for a five-year period between the end of the Second World War and the beginning of the Korean conflict. ATK now operates the plant, which achieved a record annual output of 1.3–1.4 billion rounds (mostly 5.56 mm, 7.62 mm, .50, and 20 mm cartridges) in 2005, thereby quadrupling its 2001 production rate to meet increased demand (ATK, 2005). Earlier reports placed the plant's maximum capacity at four million rounds a day, 'three eight-hour shifts a day, six days a week' to meet the increased demand for ammunition since the 11 September 2001 attacks and the US involvement in Afghanistan and Iraq (Galloway, 2004). Production of .50 rounds has increased twelvefold since the United States invaded Iraq in early 2003 (Hindo, 2008).

The successive contracts awarded to ATK usually comprise both ammunition production and facility refurbishment or maintenance. For instance, in early 2007, the US Army Sustainment Command in Rock Island, Illinois signed a USD 284 million small calibre ammunition contract with ATK and awarded an additional USD 46 million for plant modernization (Daly, 2007). In May 2008 ATK Armament Systems secured a series of small calibre ammunition contracts with the US Army totalling USD 252 million, with USD 205.8 million of this amount assigned to finance the production of 522 million rounds of 5.56 mm, 7.62 mm, and .50 ammunition for the US Army, to be completed at the Lake City plant by 30 September 2009 (Lindley, 2008; McFarlane, 2008). In January 2009 ATK received an additional USD 49 million installment from the US Army Sustainment

Command to modernize, upgrade, and computerize the plant's production facilities in order to improve efficiency (Associated Press, 2009). On 7 August 2008 ATK's Armament Systems Division reported a 32 per cent increase in sales for the last quarter, to USD 442 million, while profits jumped 53 per cent, to USD 44 million. The value of ATK shares doubled in the period 2004–08 to around USD 106 per share (Hindo, 2008). Following a series of domestic and international procurement contracts totalling USD 88.5 million in November 2008, the company announced a sales increase of 11 per cent to USD 2.2 billion during the first six months of 2008 (Wagstaff-Smith, 2008), reflecting the high demand for medium calibre and military small arms ammunition. In early 2009 the US Army also contracted ATK to produce USD 87 million worth of non-standard 7.62 mm ammunition, .50 ammunition, mortars, and small rockets to be shipped to the Afghan National Army in the same year (Osborn, 2009b). Despite the fact that military sales make up most of the revenues of ATK's Armament Systems Division, the company is also active on the civilian ammunition market and invests substantial amounts in marketing to entice police officers and sport hunters. This effort to cater to civilian clients may prove useful to balance an inevitable reduction in the division's military sales if the numbers of US troops are reduced in Iraq and Afghanistan. According to specialized sources, ATK produced more than five billion rounds for hunting and police use in 2006 (Thompson, 2007). Since 2000 the company has used its stakes in the Lake City plant to enter the highly competitive civilian ammunition consumer market with premium-grade rounds and brightly coloured boxes.

Despite the rising costs of raw materials, the repercussions on ammunition prices, and the recurrent reports that the hunting market is dwindling, ATK still retails its Federal Premium ammunition for as much as USD 70 for a box of 20 and manages to outsell Winchester and Remington (Hindo, 2008). The rest of the US military's small calibre ammunition is reportedly produced, via various sub-contractors, by ATK's main ammunition competitor, General Dynamics Ordnance and Tactical Systems (GDOTS), based in Falls Church, Virginia, a division of General Dynamics Corporation. A number of contracts highlight the national stakes at play in the fight for ammunition production supremacy, and also point to the will of the US Army's Field Support Command to keep two separate contractors at hand to diversify its

ammunition sources and not depend solely on ATK's Lake City ammunition factory. In August 2005 GDOTS won a USD 1.2 billion small arms ammunition army contract to serve as a secondary source, able to produce 500 million rounds annually (General Dynamics, 2005). In August 2006 GDOTS won a USD 188 million US Army contract covering the production of a variety of small arms ammunition such as 5.56 mm, 7.62 mm, and .50 rounds, to be completed and delivered a year later (General Dynamics, 2006). In 2007 GDOTS won a USD 44 million US Army Field Support Command contract to supply 5.56 mm, 7.62 mm, and .50 ammunition for training purposes and operations in Afghanistan and Iraq (General Dynamics, 2007).

Düsseldorf-based Rheinmetall is one of Europe's largest suppliers of land forces technology (Newdick, 2008a). Its 21-square-mile weapons and munitions production plant employs about 1,100 workers based in Unterlüss in north-western Germany, in the vicinity of three major NATO training areas. The group reported more than EUR 4 billion (USD 5.4 billion) in net sales for 2007, and expanded its international market range by purchasing majority shares in South Africa's Denel Munitions in 2008. The company also enjoys a strong presence in the United States, as attested by the USD 259 million US Marine Corps contract signed in June 2008 to supply 40 mm rounds (Newdick, 2008a). In fact, Rheinmetall places particular market emphasis on 40 mm ammunition, with four million rounds sold worldwide in 2008.

Norway's Nordic Ammunition Company (Nammo), with more than 1,900 employees spread over 18 production sites in 7 countries, can also be considered a major European small arms and light weapons ammunition manufacturer. With an active presence in Norway (Nammo Raufoss AS), Sweden (Nammo Sweden AB), Finland (Nammo Lapua Oy), Switzerland (MTH SA), Germany, and the United States, Nammo registered a 14 per cent growth rate in revenues in 2008, increasing its sales to USD 474.2 million (up from USD 416 million in 2007) (Nammo, 2009; O'dwyer, 2009). In 2008 roughly a third of Nammo's sales were attributed to the domestic Nordic market, another third to other European markets, and the rest to the United States and Canada. A USD 94 million Finnish multi-year ammunition contract signed in early 2009 confirms the importance of regional sales for the company. However, the recent acquisition of Arizona-based Talley Defence Systems also shows the company's willingness to tackle

the North American ammunition and weapons market (O'dwyer, 2009). Moreover, Nammo has found a niche to ride out the 2008–10 economic crisis and gain new customers in the process: following the signature of the Convention on Cluster Munitions on 3 December 2008 in Oslo, the company signed cluster weapon demilitarization contracts with Norway, Germany, and the NATO Maintenance and Supply Agency and now dedicates one of its five core operating divisions to the task. This may prove to be an interesting perspective for ammunition manufacturers wishing to diversify their service portfolio.

Switzerland's RUAG Ammotec represents a third important actor in the Western European ammunition manufacturing industry. Headquartered in Bern, with production facilities in Germany, Sweden, and Switzerland, RUAG has three divisions: Aviation and Space, Defence and Security, and Ammunition and Products. With a workforce of 6,050 employees, the RUAG group recorded sales of CHF 1.41 billion (USD 1.22 billion) in 2007 (Newdick, 2008b). In December 2008 the company's acquisition activity was boosted by the takeover of the Hungarian company MFS 2000, a supplier of small calibre ammunition.

The Russian Federation traditionally boasts major ammunition production plants. The Barnaul Machine-Tool Plant is, for instance, one of the leading historical producers of industrial goods and ammunition in the country. The company website states that its main activity is the manufacturing of sporting and hunting cartridges for rifles and shotguns and claims to be one of the largest suppliers of cartridges in the Russian Federation, with a growing export market in the United States, Europe, and Asia (Barnaul Machine-Tool Plant, 2000). The Tula Cartridge Works is equally famous and has been manufacturing all types of ammunition for over 100 years. The plant is the original producer of the WOLF ammunition brand (Cushman, 2007b), which has been available in the United States for years.

Conclusion

Acquiring data on small arms and light weapons ammunition is a justifiable goal in the long run, but may turn out to be problematic and unrealistic if the small arms and light weapons-manufacturing lobby is not first addressed

and studied academically using a corporate, business-minded approach. Studying the arms industry in general is impossible without reliable, constructive relationships being developed between researchers and industry actors, outside of the traditional and critical approach habitually taken by the media and advocacy communities. This chapter provides no more than a snapshot of the Western ammunition industry with its major producers, cost issues, and market actors. In researching and writing the chapter, the author deliberately used a diversity of sources to corroborate the views of academic scholars, media reporters, and industry and market actors alike.

The first section clarified specific classification issues that need to be addressed prior to undertaking any comparative research into ammunition production and markets. Given the sheer diversity of calibres, effects, ranges, guidance features, and origins, ammunition should not be studied using the traditional small arms/light weapons dichotomy based on portability, but rather using the cartridge-based/non-cartridge-based distinction. The second section revealed a number of common features shared by most Western ammunition producers, which could provide benchmarks to initiate further research. Accurate production figures are still extremely difficult to obtain from governments and manufacturers alike, and ammunition data often comes down to little more than estimation and conjecture. In the United States and Western Europe, the modern, industrialized mass manufacturing of ammunition is now done by profit-oriented companies and industrial plants actively competing for customers worldwide. These large manufacturers produce NATO-compatible ammunition, and some have diversified their production portfolio by marketing and selling ammunition-producing machinery. Finally, they maintain tight bonds with their respective governments' procurement agencies to uphold a win-win situation from which both parties evidently benefit. The final section sketched the Western ammunition market and highlighted the lure of the US market for defence industry actors generally, and for ammunition manufacturers specifically, although their weight in the overall context is difficult to quantify. This section also mentions the influence of current events and worldwide conflicts on ammunition procurement, and explains why subsequent cost issues may develop, thereby lending credit

to the purchase and use of old existing ammunition stocks. The section ended by briefly outlining the blueprints and stakes of most large-scale, multi-year ammunition contracts, and by naming the major Western manufacturers who compete for them.

This short study has deliberately focused on the Western ammunition industry. Length restrictions, obvious language constraints, and a glaring lack of authoritative sources and contacts explain the absence of any reference to the Asian ammunition industry. A similar chapter could probably be solely dedicated to Asian manufacturers and their impact on the worldwide ammunition procurement business. The Asian ammunition market would surely deserve substantial academic attention, although reliable specialized data sources on the subject are difficult to find without proper industry contacts. Another area of market research that lacks proper academic coverage is primers: there are fewer producers of primers than of cartridge cases and bullets. As such, they could probably become a possible bottleneck for production and transfer control in the near future. In this regard, a detailed study of primer production and market distribution would undoubtedly be worthwhile. ■

Endnotes

1. Email received from representative of ammunition manufacturer, 23 April 2010.

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Chapter 2

Italian Procurement, Exports, and Consumption of Small- and Large-calibre Ammunition and Munitions

Giacomo Persi Paoli

Introduction

This study explores Italian procurement, exports, and consumption of small- and large-calibre ammunition. It begins by providing background information on the Italian defence budget and military expenditure in order to set the general framework within which the analysis of ammunition procurement and consumption is made. Information regarding the procurement of ammunition came through an analysis of all the *Defence Contracts Bulletins* published since 2005 by the Italian General Secretariat of Defence and the National Armament Directorate. This analysis reveals that the majority of large calibre ammunition is received through single-source, non-competitive contracts due to the nature of industrial patents. Austria, France, and Germany dominated Italy's large calibre ammunition supply. Consumption was assessed through the breakdown of ammunition allocated for training purposes by the major Italian light infantry brigade and a special force unit. In addition to scaling the quantities of ammunition used annually by the Italian military, this analysis also filled in some gaps in our understanding of the procurement of small calibre ammunition, which is largely domestically produced, with a few exceptions of specialized ammunition imported from Finland and Switzerland. Italian exports are explored through an analysis of the Foreign Trade Statistics Database (Coeweb) of the Italian National Institute of Statistics (ISTAT). Export data has limited value as it is presented in an aggregate form, which conceals the variety of ammunition sent to each nation. However, the data does identify the main recipients of Italian ammunition, which for the

period 2005–March 2009 was topped by Europe, followed by Americas, Asia, Africa, and Oceania.

Background

The analysis of small- and large-calibre ammunition acquisition and consumption patterns and trends needs to be contextualized in the broader trends of the Italian defence budget, which has been heavily affected by cuts in public (including military) expenditure in recent years.

Firstly, to understand how budget cuts have affected these trends, it is important to understand where the resources for the acquisition of ammunition come from. In the framework of public spending, the defence budget is divided into function-specific budgets, i.e. defence function, public security function, external function, and interim pensions. The defence function budget, which provides funds for developing and accomplishing army, navy, and air force institutional duties, includes three main sectors: personnel budget, operating budget, and investment budget. The operating budget provides the resources required to ensure the efficiency and effectiveness of military activities, and thus includes the resources needed for the acquisition of ammunition (Italy. MoD, 2009, pp. 125–28). From 2002 to 2008 the operating budget dropped significantly (about 65 per cent) from EUR 1,150 million (USD 1,233 million) in 2002 to EUR 406 million (USD 550 million) in 2008 (Italy. MoD, 2009, p. 131).

While the operating budget has dropped during the period of this study, military costs have risen. In particular, the end of compulsory military service in 2005 resulted in the transformation of the armed forces into a fully professional force. This transition dramatically increased personnel costs, which, due to the defence budget ceiling, resulted in a reduction of operating and investment expenditures. In addition, more and more frequently the financial resources used to cover costs for missions abroad are drawn from the armed forces' ordinary budgets, which are intended to cover their functioning, training, and maintenance costs (Italy. MoD, 2009, pp. 125–38).

Limiting the resources available for operations, training, and logistics has had consequences in various domains, affecting the scope of both the acquisition and consumption of ammunition. These consequences included:

- the restriction of pre-deployment preparation and training only to the units earmarked for deployment abroad within a particular year;
- the cancellation of almost all exercises taking place abroad (with negative effects on joint and combined integration of army units with those of partner nations);
- the cancellation of many national field training activities, which resulted in limitations on the operational capabilities of headquarters and units; and
- a significant reduction in the acquisition of materiel and spare parts, including ammunition (Italy. MoD, 2009, pp. 134–37).

The combined impact of these consequences has resulted in an overall decrease in consumption and procurement, as illustrated by the datasets presented in this study.

Procurement

Introduction to defence procurement

Italy is a participating member state of the European Defence Agency (EDA), which has identified progress towards the creation of an internationally competitive European defence equipment market as a key means to strengthen the European defence industry. Consequently, participating member states established a voluntary, non-binding intergovernmental regime aimed at encouraging competition in defence procurement, on a reciprocal basis, among those subscribing to the regime (see Chapter 1, Box 1.1 for further details on this regime).

According to the regime, subscribing member states (SMSs) are called upon to open all defence procurement opportunities valued at more than EUR 1 million (with the exception of the procurement of research and technology, collaborative procurements, and the procurement of nuclear weapons and nuclear propulsion systems; chemical, bacteriological, and radiological goods and services; and cryptographic equipment).¹

The key principles on which the above described mechanism is based are the following (EDA, 2005):

- **‘A voluntary, non-binding approach.** No legal commitment is involved or implied.’ SMSs are allowed to cancel their participation at any time and, ‘in all cases, the final authority for contract award remains with SMS national authorities’.
- **‘Fair and equal treatment of suppliers.’** To ‘maximize opportunities for all suppliers’ it is necessary to guarantee maximum ‘transparency and equality of information’ (see Chapter 1, Box 1.2 for further details).
- **‘Mutual transparency and accountability.** Each SMS will wish regularly to review comprehensive data which demonstrates how the regime is impacting defence procurement practices and outcomes.’ The EDA, through its monitoring and reporting mechanisms, seeks to achieve mutual transparency and accountability.
- **‘Mutual support.** The privilege of improved opportunity’ for a nation’s defence manufacturers to expand into another’s defence market ‘implies a reciprocal obligation’ among SMSs. Therefore, ‘consistent with national legislation and international obligations’, SMS governments are called on ‘to assist and expedite each others’ contracted defence requirements, particularly in urgent operational circumstances’.
- **‘Mutual benefit.** ... the expansion of opportunities for small- and medium-sized companies from across Europe to sell to a continental-wide market’ represents a major benefit for all SMSs. In addition, because ‘[i]n defence procurement, the customers for such companies may be a prime contractor rather than the end-user’, it is fundamental to ensure that ‘fair competition and the benefits of the regime are driven down the supply-chain’, including possible sub-contractors selected ‘on a fair and equitable basis’.

Methodology and preliminary observations on procurement

Despite Italy’s status as a member of the EDA, the *EDA Electronic Bulletin Board on Defence Contract Opportunities* was not used in this study. One reason was that it did not come into effect until 2006. Additionally, since the bulletin’s establishment, Italy has not posted a bid for small arms or light weapons

ammunition, and does not appear to have used it consistently. The study instead used a separate, reliable source of small- and large-calibre ammunition procurement patterns, the *Italian Defence Contracts Bulletins* for the period 2005–09 (Italy, 2005–09). This bulletin is issued monthly by the Italian General Secretariat of Defence and the National Armament Directorate, in cooperation with the Armed Forces General Staff, the Carabinieri, and Guardia di Finanza headquarters. The bulletin is meant for all European companies working in the defence technology sector and promotes competition through the wider participation of competitive tenders. Although competitive contracts seem to be the norm for small calibre ammunition procurement (e.g. see the 7.62 mm rounds listed as a possible future purchase in 2005, as shown in Table 2.1), competition for large calibre ammunition procurement appears limited. This is primarily due to the fact that the majority of large calibre ammunition used by the Italian armed forces is subject to industrial patents due to its high level of sophistication. For this reason, the majority of procurement contracts are single source and are carried out through direct negotiations with companies in possession of the relevant industrial patents.

Minor national orders might not be included in the bulletin, since listing orders valued at less than EUR 1 million remains at the discretion of each nation. The scope of the procurement that falls below this threshold is unknown. Some specialized units, for instance, are allowed to engage in negotiations for the acquisition of ammunition (and material in general) independently, without necessarily having to go through the central authority.² For this reason, information on these procurement contracts is not included in the following analysis. Nevertheless, the bulletin provides sufficient information to identify procurement trends, especially those related to light weapons ammunition.

Data

In 2005 Italy invested about EUR 17 million (USD 21 million) in the acquisition of light weapon ammunition, 43 per cent of which was spent in Germany for the acquisition of Panzerfaust weapon systems, a single-use anti-tank grenade launcher (Italy, March 2005, p. 6), 28 per cent domestically for 25 mm rounds (Italy, February 2005, pp. 8, 9), 15 per cent in Austria for 60 mm mortar

bombs (Italy, August–September 2005, p. 3), and 14 per cent in South Korea for 120 mm cartridges (Italy, February 2005, p. 9) (see Table 2.1).

Useful information regarding short-term demand for small- and large-calibre ammunition by the Italian armed forces can be obtained from the national orders listed as ‘possible future purchase’. This list in 2005 (with an estimated procurement date in 2006) included small calibre ammunition to be acquired through competitive bids (Italy, May 2005, p. 4) and large calibre ammunition to be procured through a single source contract. Of roughly 120,000 40 mm grenades, 56 per cent are listed as a possible future purchase intended to be procured from a German company, with the remaining 44 per cent procured from an Austrian company (Italy, October 2005, pp. 2–3). All 5,000 of the 60 mm mortar bombs were to be supplied by an Austrian company (Italy, July 2005, p. 2) (see Table 2.1).

Despite the high quantity of small- and large-calibre ammunition listed in 2005 as possible future purchases, no contracts were listed as awarded in 2006. A possible explanation could be found in the major budget cut that followed the professionalization of the Italian armed forces. Although some of the 2005 entries were postponed to 2007, the overall quantities listed as possible future purchases suffered significant drops, with Germany and Austria identified as the sole suppliers of 58,450 40 mm grenades (Italy, October 2006, pp. 2–3) and 8,450 60 mm bombs (Italy, July 2006, p. 4), respectively. Competitive bids for small calibre ammunition were also included (Italy, October 2006, p. 3) (see Table 2.2).

In 2007 only one contract was listed as awarded (Italy, April 2007, p. 2), going to an Austrian company for a EUR 2 million (USD 3 million) supply of about 5,880 60 mm bombs (see Table 2.3).

Regarding possible future purchases listed in 2007 (Italy, August–September 2007, pp. 1–4; November 2007, pp. 1–2), 58,000 25 mm cartridges were requested from Rheinmetall in Germany, 39,000 40 mm grenades were divided between Germany (78 per cent) and Italy (22 per cent), 9,200 60 mm mortar bombs were planned to be acquired from an Austrian company, and 8,000 120 mm munitions were equally divided between France and Germany (see Table 2.3)

Table 2.1

Confirmed transactions in 2005 and possible future purchases with an estimated procurement date in 2006

Year	Calibre	Model/Type	Quantity	Total cost (EUR)	Type of contract	Awarded to	Country	
Confirmed transactions								
2005	25 mm	Cartridges/APFSDS-T WK PMB 090	24,000	2,832,000	Single source	Simmel Difesa	Italy	
	25 mm	Cartridges/HEI-T WK PMB 050	17,970	1,877,685.30	Single source	Simmel Difesa	Italy	
	60 mm	Bombs/HE 84 LD	3,260	2,499,958.20	Single source	Hirtenberger Defence Systems	Austria	
	60 mm	Bombs/AWP smoke 84 LD	2,900					
	60 mm	Bombs/practice 84 LD	8,490					
	120 mm	Cartridges/TP-T	2,500	2,320,000	Competitive	Poongsan Corp.	South Korea	
		Panzerfaust3 (PZF3-T) weapon system with tandem warhead	2,210	7,357,500	Single source	Dynamit Nobel	Germany	
	Listed as 'possible future purchases' for 2006							
		7.62 mm	Cartridges/NATO	700,000	—	Competitive	—	—
		7.62 mm	Cartridges/NATO tracer	93,600	—	Competitive	—	—
	12 mm	Cartridges/PIT M20 (armour piercing, incendiary, and tracer)	200,000	—	Competitive	—	—	
	40 mm	Grenades/DP92	52,200	—	Single source	Arges	Austria	
	40 mm	Grenades/self-destruction	900	—				
	40 mm	Grenades/HE PFF-T DM111	17,120	—	Single source	Diehl	Germany	

2005	40 mm	Grenades/sound flash	2,700	—	Single source	NICO Feuerwerk GmbH	Germany
	40 mm	Grenades/40 x 46 impact signature	4,000	—			
	40 mm	Grenades/40 x 46 IR	1,500	—			
	40 mm	Grenades/40 x 53 MK281	40,700	—			
	40 mm	Grenades/40 x 46 illuminating	1,850	—			
	40 mm	Grenades/40 x 46 white phosphorus	500	—			
	60 mm	Bombs/MK2 (illuminating bombs)	5,000	—	Single source	Hirtenberger Defence Systems	Austria
		Panzerfaust3 (PZF3-T) weapon system with tandem warhead	7,100	—	Single source	Dynamit Nobel	Germany

Source: Italy (January–December 2005)

Table 2.2

Confirmed transactions in 2006 and possible future purchases with an estimated procurement date in 2007

Year	Calibre	Model/Type	Quantity	Total cost (EUR)	Type of contract	Awarded to	Country
2006	Confirmed transactions						
	—	—	—	—	—	—	—
	Listed as 'possible future purchases' for 2007						
	.338	Cartridges	55,000	—	Competitive	—	—
	7.62 mm	Cartridges/NATO	646,000	—	Competitive	—	—
	40 mm	Grenades/HE DM12	41,300	—	Single source	Rheinmetall	Germany
	40 mm	Grenades/sound flash	1,700	—	Single source	NICO Feuerwerk GmbH	Germany
	40 mm	Grenades/40 x 46 impact signature	3,000	—			
	40 mm	Grenades/40 x 46 IR	1,000	—			
	40 mm	Grenades/40 x 53 MK281	5,700	—			
	40 mm	Grenades/40 x 46 illuminating	5,750	—			
	60 mm	Bombs/HE 84 LD	5,250	—	Single source	Hirtenberger Defence Systems	Austria
	60 mm	Bombs/III MK2 (illuminating)	2,000	—			
	60 mm	Bombs/WVP smoke	1,200	—			

Source: Italy (January–December, 2006)

Table 2.3

Confirmed transactions in 2007 and possible future purchases with an estimated procurement date in 2008

Year	Calibre	Model/Type	Quantity	Total cost (EUR)	Type of contract	Awarded to	Country
2007	Confirmed transactions						
	60 mm	Bombs/HE 84 LD	3,880	2,082,854.20	Single source	Hirtenberger Defence Systems GmbH & Co. KG	Austria
	60 mm	Bombs/III MK2 (illuminating)	2,000	—			
	Listed as 'possible future purchases' for 2008						
	25 mm	Cartridges/APFSDS-TWK PMB 090	24,000	—	Single source	Rheinmetall	Germany
	25 mm	Cartridges/MP-T SD MK2 (Multipurpose)	34,000	—	Single source	Rheinmetall	Germany
	40 mm	Grenades/40 x 46 illuminating	2,500	—	Single source	Rheinmetall	Germany
	40 mm	Grenades/40 x 46 DP92	7,500	—			
	40 mm	Grenades/40 x 53 MK281	3,700	—			
	40 mm	Grenades/sound flash	1,700	—			
	40 mm	Grenades/DM118A2	4,000	—			
	40 mm	Grenades/M40/SIMAD-T	7,500	—	Single source	SIMAD SpA	Italy
	40 mm	Grenades/M40/SIMAD-CS	1,000	—			
	40 mm	Grenades/HE PFF-T DM111	11,200	—	Single source	Diehl	Germany
	60 mm	Bombs/HE 84 LD	5,600	—	Single source	Hirtenberger Defence Systems	Austria
60 mm	Bombs/III MK2 (illuminating)	2,400	—				
60 mm	Bombs/WVP smoke 84 LD	1,200	—				
120 mm	Bombs/PR14 (HE)	4,000	—	Single source	TDA Armements SAS	France	
120 mm	Cartridges/DM18A4	4,000	—	Single source	Rheinmetall	Germany	

Source: Italy (January–December 2007)

Table 2.4

Confirmed transactions in 2008 and possible future purchases with an estimated procurement date in 2009

Year	Calibre	Model/Type	Quantity	Total cost (EUR)	Type of contract	Awarded to	Country
Confirmed transactions							
	40 mm	Grenades/M40/SIMAD-T	7,150	174,708.56	Single source	SIMAD SpA	Italy
	40 mm	Grenades/M40/SIMAD-CS	1,000				
	60 mm	Bombs/HE 84 LD	6,000	2,915,760	Single source	Hirtenberger Defence Systems	Austria
	60 mm	Bombs/WP smoke 84 LD	2,400				
	60 mm	Bombs/III MK2 (illuminating)	1,400				
	120 mm	Bombs/PR14 (HE)	4,000	3,344,950	Single source	TDA Armements SAS	France
Listed as 'possible future purchases' for 2009							
2008	25 mm	Cartridges/APFSDS-T WK PMB 090	38,000	—	Single source	Rheinmetall	Germany
	25 mm	Cartridges/MP-T SD MK2 (multipurpose)	35,300	—	Single source	RWM Schweiz AG	Switzerland
	40 mm	Grenades/HE PFF-T DM111	29,040	—	Single source	Diehl	Germany
	40 mm	Grenades/HE/DP	30,000	—	Single source	Rheinmetall	Germany
	40 mm	Grenades/HE/frag	4,400	—			
	40 mm	Grenades/illuminating	5,000	—			
		Grenades/flash bang opv NIKO	200	—			
	60 mm	Bombs/HE 84 LD	6,500	—	Single source	Hirtenberger Defence Systems	Austria
	60 mm	Bombs/III MK2 (illuminating)	2,000	—			

2008	60 mm	Bombs/III MK2 (illuminating)	2,000	—			
	60 mm	Bombs/WP smoke 84 LD	4,500	—			
	60 mm	Bombs/practice 84 LD	5,300	—			
	120 mm	Bombs/PR14 (HE)	4,000	—	Single source	TDA Armements SAS	France
	120 mm	Bombs/illuminating	1,000	—			
	120 mm	Bombs/PR14-PLPN	2,000	—			
		Panzerfaust3 (PZF3-T) weapon system with tandem warhead	5,100	—	Single source	Dynamit Nobel	Germany
		Firing devices	1,000	—			
		PZF3 sub-calibre devices, 18 mm, with firing unit	150	—			
	18 mm	18 x 86 tracer	8,000	—			
		Light anti-tank weapon system LAW M72A5	60	—	Single source	Nammo Raufoss	Norway
		M72A5 AWA5, 21 mm, sub-calibre training weapons	5	—			
	21 mm	M72 LAW A5, training rockets	200	—			

Source: Italy (January–September 2008)

Table 2.5

Confirmed transactions in 2009 and possible future purchases with an estimated procurement date in 2010

Year	Calibre	Model/Type	Quantity	Total cost (EUR)	Type of contract	Awarded to	Country	
2009	Confirmed transactions							
	40 mm	Grenades/HE/DP	30,000	2,779,086	Single source	Rheinmetall Waiffe Munition GmbH Arges	Germany	
	40 mm	Grenades/HE/frag	4,400					
	40 mm	Grenades/illuminating	5,000					
			Grenades/flash bang opv NIKO	200				
	60 mm	Bombs/HE 84 LD	25,400	8,192,318	Single source	Hirtenberger Defence Systems	Austria	
	60 mm	Bombs/WWP smoke 84 LD	4,500					
	60 mm	Bombs/ill MK2 (illuminating)	2,000					
	120 mm	Bombs/PR14 (HE)	10,436	13,554,538.12	Single source	TDA Armements SAS	France	
	120 mm	Bombs/(illuminating)	2,226					
			Light anti-tank weapon system LAW M72A5	60	101,304	Single source	Nammo Raufoss	Norway
		M72A5 AWA5, 21 mm, sub-calibre training weapons	5					
	21 mm	M72 LAWA5, training rockets	200					
	Listed as 'possible future purchases' for 2010							

Source: Italy (February 2009)

In 2008 a total of about EUR 6.5 million (USD 9 million) was invested in the acquisition of large calibre ammunition. In particular, 52 per cent went to France for the acquisition of 120 mm rifled mortar bombs (Italy, March 2008, p. 1), 45 per cent went to Austria for the acquisition of 60 mm mortar bombs (Italy, March 2008, pp. 1–2), and 3 per cent went to Italy for the acquisition of 40 mm grenades (Italy, February 2008, p. 1) (see Table 2.4). With respect to possible future purchases, Germany, Austria, and France were identified as sole suppliers of about 70,000 40 mm, 18,000 60 mm, and 7,000 120 mm grenades/cartridges/bombs, respectively, and Germany and Switzerland were listed as suppliers (about 50 per cent each) for 25 mm cartridges (Italy, July 2008, pp. 1–3). In addition, Germany was also listed as the supplier of 5,100 Panzerfaust weapons systems with 8,000 18 mm rockets (Italy, September 2008, p. 1), while 60 light anti-tank weapon systems with 200 21 mm training rockets were to be acquired from Norway (Italy, June 2008, p. 1) (see Table 2.4).

In 2009 the only bulletin that had been published by the end of the research period was the February issue. Nevertheless, relevant information can be obtained from its analysis. By the end of February 2009 about EUR 24.5 million (USD 35 million) had been invested thus far in the acquisition of large calibre ammunition, a considerable increase over the entire 2008 total, with 55 per cent of the early 2009 purchases going to France for the acquisition of 120 mm rifled mortar bombs, 33 per cent to Austria for 60 mm mortar bombs, and the remaining 12 per cent to Germany for the acquisition of 40 mm grenades. In addition, about EUR 100,000 (USD 142,000) was invested in the acquisition of light anti-tank weapon systems and related munitions from the Norwegian producer Nammo Raufoss (see Table 2.5).

Analysis

The contraction of the operating budget sector of the Italian defence function budget in recent years is one of the elements generating discrepancies between possible future purchases and confirmed transactions each year. The most evident example is the absence of a confirmed transaction in 2006, despite the long list of possible future purchases given in 2005. Further evidence can be found in the fluctuating quantity of ammunition procured against

'possible future purchase' in the previous year (e.g. see the procurement pattern of HE 84 LD bombs in 2006, 2007, and 2008). Possible reasons for these discrepancies may include budget cuts or budget administration, varied operative needs, or ad hoc agreements with the producer.

According to the *Defence Contracts Bulletins*, the supply of small- and large-calibre ammunition follows two different systems. The few procurement contracts listed for small calibre ammunition are intended to be awarded on a competitive basis, while all procurement contracts for large calibre ammunition are single source, with the sole exception of 2,500 120 mm cartridges acquired through a competitive contract allocated to South Korea in 2005.

Most of the large calibre ammunition acquired by the Italian Ministry of Defence is subject to industrial patents. This limits the competitiveness of the market by creating de facto monopolistic sub-markets for the majority of large calibre ammunition and heavily affects the ratio between imported and domestically produced ammunition. From the analysis of the bulletins, it is possible to identify two different ways in which industrial patents affect the market.

1. Considering, for example, the 2009 procurement of 60 mm bombs for the Commando mortar from an Austrian company,³ the procurement had to be carried out through direct negotiations with the company, which was, quoting the bulletin, 'the only company that can provide the subject items, qualified with the abovementioned mortar, being in possession of the industrial patent'.
2. Considering, for example, the 2009 procurement of 40 mm grenades from Germany,⁴ the procurement had to be carried out through direct negotiations with the company, which, quoting the bulletin, 'holds an industrial patent-right on this specific ammunition'.

In example 1, Italy's weapon system choice forced it to deal with the Austrian company manufacturing compatible bombs. In example 2, the production of the ammunition itself is regulated by an industrial patent. In other words, the first example highlights the case of an obligatory choice of the ammunition supplier dictated by the specificity of the implementing tool—in this example the mortar—while the second example highlights the case of an obligatory choice of supplier dictated by the type of ammunition itself.

When focusing on specific calibres, according to the bulletin, all 60 mm mortar bombs and 120 mm rifled mortar bombs imported after 2005 came from Austria and France, respectively. About 80 per cent of the 40 mm grenades were imported from Germany, with the remaining 20 per cent domestically produced. This gap is even more evident when analysing the budget for these purchases, as 94 per cent of the amount allocated to the purchase of 40 mm grenades went to Germany and only 6 per cent to Italy.

According to the bulletins, only one contract for 25 mm ammunition was awarded after 2005, with an Italian company as sole beneficiary. Nevertheless, through an analysis of possible future purchases of 25 mm ammunition, it is possible to identify three additional suppliers for this calibre in Germany, Norway, and Switzerland.

While unable to confirm purchases of small arms ammunition through *Defence Contract Bulletins*, relevant information was obtained from the data on consumption, detailed in the next section. A probable reason for the exclusion of small calibre ammunition from the bulletins can be found in the possibility that the procurement contracts of such ammunition fall below the EUR 1 million threshold.

Consumption

Methodology

Access to the entire military consumption of ammunition was not granted. Therefore, the figures included in the following tables are based only on those for the largest light infantry brigade and on a highly specialized unit of the Italian Army. The data presented was provided by internal sources in the Italian Army. The extrapolation of the trends illustrated to the entire army included in this section is for illustrative purpose only and it is not meant to provide statistically accurate figures.⁵

Data

Table 2.6 illustrates data on the allocation and consumption of ammunition and munitions intended for training purposes during the period 2005–08 for the largest brigade (4,500–5,000 soldiers) in the Italian Army.⁶ The table shows that all small calibre ammunition consumed was produced in Italy, while

France supplied 120 mm PR14 (HE) rifled mortar bombs. The allocated amount of ammunition and munitions for training purposes varied depending on whether or not the brigade was deployed in operations. The 2006 allocated quantities of ammunition for training purposes were higher than in other years, as the brigade was not deployed out of area in that year.

Table 2.7 illustrates data on ammunition acquisition and consumption in the period 2007–08 of a highly specialized unit of the Italian Army. The data refers to an operative group of around 30 soldiers who train in Italy for 6 months and are deployed into high-intensity theatres for 6 months. The very unique and delicate nature of the activities conducted by such highly specialized units requires a much more intense training prior to deployment than the traditional light infantry forces. For this reason, consumption of small calibre ammunition is significantly greater than that of the brigade.

In addition, the highly specialized unit makes use of weapons that require specific types of ammunition not always available from Italian producers. In particular, .308 and .338 long-range/sniper cartridges are imported from Finland and Switzerland, 12.7 mm cartridges are imported from the United States, and all the 40 mm grenades are imported from Germany.

Analysis

The National Armament Directorate is the central authority responsible for the allocation of ordinary ammunition, munitions, and explosive devices to all Italian armed forces units and determines the quantities to be used for training purposes and operations. Yearly allocations for training purposes can vary from year to year for one or more of the following main reasons:

- economic constraints (e.g. budget reduction);
- special operative necessities out of area; and
- limitations on the available ammunition.

For illustrative purposes only, the data on the average allocation for training purposes of the considered brigade (see Table 2.6) could be used to obtain an approximation of the average personal allocation for each soldier. This figure cannot be considered accurate, as soldiers in different roles will receive and

consume different amounts of ammunition (e.g. logistics personnel will consume less than operative personnel). So, assuming that the data presented in Table 2.6 refers to 5,000 soldiers and that all soldiers receive the same amount of ammunition, each soldier would receive each year approximately:

- 103 5.56 mm cartridges of various types;
- 20 7.62 mm NATO cartridges;
- 25 9 mm cartridges; and
- 5 12.7 mm cartridges.

Again for illustrative purposes only, if we approximate the 30,000 soldiers composing the 117 brigades of the Italian Army that utilize small arms as primary weapons, and therefore are the major consumers of small calibre ammunition, and if we assume that each brigade received the same allocation of ammunition, we could obtain an approximated figure for the annual average amount of ammunition allocated for training purposes:

- 3,090,000 5.56 mm cartridges of various types;
- 590,000 7.62 mm NATO cartridges;
- 750,000 9 mm cartridges; and
- 150,000 12.7 mm cartridges.

The aggregated consumption of small calibre ammunition related to the remaining six support brigades,⁸ which train their personnel in the use of small arms as weapons for individual, asset, and site protection, can be reasonably estimated as an additional 25 per cent of the abovementioned average quantities.

Once more, as these figures are based on the assumption that all soldiers receive the same allocation of ammunition, they can be considered only for illustrative purposes and not as a precise statistical extrapolation.

This section provided an instructive and reliable example of the allocation and consumption of small- and large-calibre ammunition for a light infantry brigade and for a highly specialized unit of the Italian Army. Data has shown that consumed small calibre ordinary ammunition is mostly domestically produced⁹ with a few exceptions, including long-range/sniper cartridges that are usually imported from Finland, Switzerland, and the United States.

Table 2.6

Allocation and consumption for training purposes of ammunition and munitions of the largest brigade in the Italian Army, containing 4,500–5,000 soldiers, 2005–08

Year	Calibre	Model/Type	Quantity allocated	Quantity consumed	Country of production
2005	5.56 mm	Cartridges for portable firearm	127,848	582,420	Italy
	5.56 mm	Cartridges/tracer for portable firearm	1,000	66,200	Italy
	5.56 mm	Cartridges for mounted firearm	88,550	243,400	Italy
	7.62 mm	Cartridges/NATO for MG 42/59	88,550	143,750	Italy
	9 mm	Cartridges/9 mm Parabellum	94,764	118,500	Italy
	12.7 mm	Cartridges/PIT M20 (armour piercing, incendiary, and tracer)	6,900	16,505	Italy
	120 mm	Mortar bombs/light anti-tank	21	21	Italy
	120 mm	Mortar bombs/anti-tank PEPA	48	108	Italy
	5.56 mm	Cartridges for portable firearm	478,400	474,206	Italy
	5.56 mm	Cartridges/tracer for portable firearm	34,700	7,840	Italy
2006	5.56 mm	Cartridges for mounted firearm	347,520	301,400	Italy
	7.62 mm	Cartridges/NATO for MG 42/59	123,217	90,000	Italy
	9 mm	Cartridges/9 mm Parabellum	192,900	181,350	Italy
	12.7 mm	Cartridges/PIT M20 (armour piercing, incendiary, and tracer)	13,200	5,000	Italy
	120 mm	Mortar bombs/light anti-tank	140	80	Italy
	120 mm	Mortar bombs/anti-tank PEPA	56	0	Italy

2007	5.56 mm	Cartridges for portable firearm	219,228	193,356	Italy
	5.56 mm	Cartridges for mounted firearm	166,758	151,800	Italy
	7.62 mm	Cartridges/NATO for MG 42/59	95,231	82,000	Italy
	9 mm	Cartridges/9 mm Parabellum	22,233	9,800	Italy
	12.7 mm	Cartridges/PIT M20 (armour piercing, incendiary, and tracer)	22,233	9,800	Italy
	120 mm	Mortar bombs/light anti-tank	49	48	Italy
	5.56 mm	Cartridges for portable firearm	222,477	212,440	Italy
	5.56 mm	Cartridges for mounted firearm	373,870	288,200	Italy
	7.62 mm	Cartridges/NATO for MG 42/59	86,707	48,450	Italy
	9 mm	Cartridges/9 mm Parabellum	191,664	174,450	Italy
2008	12.7 mm	Cartridges/PIT M20 (armour piercing, incendiary, and tracer)	58,394	45,400	Italy
	120 mm	Mortar bombs/light anti-tank	163	47	Italy
	120 mm	Mortar bombs/anti-tank PEPA	76	76	Italy
	120 mm	Mortar bombs/PR14HE	223	68	France
	5.56 mm	Cartridges/variou types	515,088	630,316	Italy
	7.62 mm	Cartridges/NATO for MG 42/59	98,426	91,050	Italy
	9 mm	Cartridges/9 mm Parabellum	125,390	121,025	Italy
	12.7 mm	Cartridges/PIT M20 (armour piercing, incendiary, and tracer)	25,182	19,176	Italy
	120 mm	Mortar bombs/variou types	194	112	Italy/France

Table 2.7

Ammunition acquisition and consumption of a highly specialized unit of the Italian Army, 2007–08*

Type	Calibre	Model	Quantity acquired	Quantity consumed, 2007	Quantity consumed, 2008	Stock expiry date	Country of production
Small calibre cartridges	9 mm	Parabellum	590,000	280,000	310,000	—	Italy
	5.56 mm	Ordnance	1,030,000	610,000	520,000	—	Italy
	.308	Subsonic	6,600	1,000	4,500	2019	Finland
	.308	Scenar 167 grs (Lapua)	4,900	0	1,600	2019	Finland
	.308	Scenar 167 grs (RUAG)	4,500	0	3,750	2019	Switzerland
	.308	Scenar 175 grs (RUAG)	2,900	720	550	2019	Switzerland
	.338	Lock base (Lapua)	3,000	1,455	1,250	2010	Finland
	.338	Ball (RUAG)	1,100	0	75	2015	Switzerland
	.338	Armour piercing (RUAG)	1,000	540	100	2016	Switzerland
	.338	Scenar (Lapua)	3,000	1,720	770	2010	Finland
	12.7 mm	Barrett	800	410	700	2016	US
	12.7 mm	Armour piercing-incendiary-tracer for Browning	5,500	100 (belts)	130 (belts)	2012	US
	12-gauge	Anti-riot	3,400	120	368	—	Italy
	12-gauge	Door-breaching buckshot	850	0	90	—	Italy
12-gauge	Slug round	9,000	260	1,164	—	Italy	

Grenades	40 mm	40 x 46 DP92	1,000	228	313	2011	Germany
	40 mm	40 x 46 smoke	1,000	42	0	2011	Germany
	40 mm	40 x 53 high explosive dual purpose	500	0	385	2015	Germany
	40 mm	40 x 53 impact signature	520	0	500	2011	Germany
	40 mm	40 x 46 CS gas	1,200	0	10	2011	Germany
	40 mm	40 x 46 training practice tracer DM 118 A2	1,500	475	1,582	2009	Germany

* Data refers to an operative group of around 30 soldiers who train in Italy for 6 months and are deployed to high-intensity operating theatres for 6 months. Highly specialized units are not required to go through the central procurement authority and are able to acquire and consume ammunition and munitions according to their specific needs and weapons.

In this section, we also derived some approximated figures, for illustrative purposes only, describing the estimated annual ammunition allocation per soldier and the estimated aggregate annual ammunition allocation of the 17 brigades of the Italian Army.

Exports

Methodology

This section presents the export data for ammunition and munitions from January 2005 through December 2008.

All export data came from Coeweb, the Foreign Trade Statistics Database of ISTAT,¹⁰ which was accessed in June 2009. All ammunition export data is generically categorized in the group 'Bombs, grenades, torpedoes, mines, missiles, cartridges and other ammunition and projectiles and parts thereof, incl. buckshot, shot and cartridge wads, n.e.s.' The data includes trade interchange both in value (given in euros) and in quantity (in weight by kilograms), by area, and by country.¹¹ Information about the quantity and quality of available data is very limited. In particular, it is impossible to cross-check data on exported products to each of the recipient countries.

Aggregated data on exports of ammunition for military purposes could be obtained through analysis of the annual report of the Italian prime minister to parliament that deals with exports, imports, and the transit of armaments and related materials (Italy. Presidenza del Consiglio dei Ministri, 2005–08). However, such information has not been included, since once again the data is not sufficiently disaggregated. The annual report specifies the total value of the exports to a specific country along with a comprehensive list of all the items purchased from Italy, but does not specify how much was spent on each particular item on the list, including ammunition. The annual report gives a list of countries that imported ammunition from Italy, but does not determine how much they spent specifically on ammunition. In addition, the report includes only a generic category entitled 'ammunition' and does not discriminate between small- and large-calibre ammunition.

Analysis of exports, 2005–08

From 2005 to 2008 Italy exported an average of about EUR 127 million (USD 172 million) per year (about 23,000 tonnes) of bombs, grenades, torpedoes, mines, missiles, cartridges, and other ammunition and projectiles and parts thereof, including buckshot, shot, and cartridge wads. After a significant drop in 2006 (to EUR 104 million (USD 137 million)), exports increased, reaching a maximum in 2008 of about EUR 140 million (USD 190 million). On average, the main recipient of Italian exports is Europe (70 per cent), followed by the Americas (14 per cent), Asia (7 per cent), Africa (5 per cent), and Oceania (4 per cent). Particularly significant is the fact that the constant growth of the Asian and European market share since 2005 (from 6 per cent to 9 per cent and from 65 per cent to 76 per cent, respectively) contrasts with the reduction of the Americas' share from 22 per cent in 2005 to 6 per cent in 2008 (see Table 2.8).

By using a sub-regional breakdown, it is possible to obtain a more detailed picture of the recipients of exports. In Africa, in terms of the value in euros, an average 62 per cent of the imported ammunition in the period 2005–08 went to North African countries (Algeria, Egypt, Morocco, and Tunisia), with the remaining 38 per cent divided among other African countries. This gap reached its maximum in 2007, when a major export to Egypt (EUR 7.5 million (USD 11 million)) brought the North African share to 84 per cent (see Table 2.9).

In the Americas, while North American countries (the United States and Canada) have imported about 75 per cent of the average quantity of ammunition by weight traded per year, Central and South American countries are the main recipients when considering the average value of the traded ammunition, with a share of 53 per cent, against the 47 per cent of North American countries (see Table 2.10).

In Europe, the wide majority (82 per cent on average) of Italian exports globally in 2005–08 were directed to countries within the EU27,¹² although purchases by non-European countries have nevertheless increased significantly, from 11 per cent in 2005 to 24 per cent in 2008 (see Table 2.12).

As indicated above, in Coeweb all Italian ammunition export data is generically categorized in the group 'Bombs, grenades, torpedoes, mines, missiles, cartridges and other ammunition and projectiles and parts thereof, incl. buckshot, shot and cartridge wads, n.e.s.', and this is the category reflected in Tables 2.8–2.12.

Table 2.8

Regional analysis, in value and quantity, of Italian ammunition exports, 2005–08*

	Exports, 2005			Exports, 2006			Exports, 2007			Exports, 2008			Average exports, 2005–08		
	Net weight (kg)	Value (EUR)	%	Net weight (kg)	Value (EUR)	%	Net weight (kg)	Value (EUR)	%	Net weight (kg)	Value (EUR)	%	Net weight (kg)	Value (EUR)	%
Africa	868,682	4,722,500	4	1,020,856	3,515,489	3	899,337	10,508,339	8	1,113,747	4,361,201	3	975,656	5,776,882	5
Americas	1,940,666	30,000,145	22	2,051,752	19,706,431	19	2,393,523	10,221,105	8	1,847,103	8,858,260	6	2,058,261	17,196,485	14
Asia	1,726,886	7,794,073	6	1,913,632	7,211,006	7	1,914,607	8,868,040	7	1,604,400	12,289,188	9	1,789,881	9,040,577	7
Europe	18,353,421	88,019,834	65	17,052,086	66,646,278	64	17,968,108	95,971,896	75	17,321,025	106,210,584	76	17,673,660	89,212,148	70
Oceania and other countries	940,718	3,933,956	3	735,338	7,210,782	7	498,263	2,378,776	2	531,625	8,131,758	6	676,486	5,413,818	4
World	23,830,373	134,470,508	100	22,773,664	104,289,986	100	23,673,838	127,948,156	100	22,417,900	139,850,991	100	23,173,944	126,639,910	100

* The area in dark grey shows the average data over the considered period.

Source: ISTAT (n.d.)

Table 2.9

Regional analysis, in value and quantity, of Italian ammunition exports to Africa, 2005–08*

	Exports, 2005			Exports, 2006			Exports, 2007			Exports, 2008			Average exports, 2005–08		
	Net weight (kg)	Value (EUR)	%	Net weight (kg)	Value (EUR)	%	Net weight (kg)	Value (EUR)	%	Net weight (kg)	Value (EUR)	%	Net weight (kg)	Value (EUR)	%
North Africa	546,119	1,684,219	36	456,683	1,349,682	38	484,555	8,836,560	84	646,724	2,382,566	55	533,520	3,563,257	62
Other African countries	322,563	3,038,281	64	564,173	2,165,807	62	414,782	1,671,779	16	467,023	1,978,635	45	442,135	2,213,626	38
Africa	868,682	4,722,500	100	1,020,856	3,515,489	100	899,337	10,508,339	100	1,113,747	4,361,201	100	975,656	5,776,882	100

* The area in dark grey shows the average data over the considered period.

Source: ISTAT (n.d.)

Table 2.10

Regional analysis, in value and quantity, of Italian ammunition exports to the Americas, 2005–08*

	Exports, 2005			Exports, 2006			Exports, 2007			Exports, 2008			Average exports, 2005–08		
	Net weight (kg)	Value (EUR)	%	Net weight (kg)	Value (EUR)	%	Net weight (kg)	Value (EUR)	%	Net weight (kg)	Value (EUR)	%	Net weight (kg)	Value (EUR)	%
Central and South America	523,490	17,728,065	59	536,745	14,967,363	76	417,260	1,739,198	17	315,096	2,112,191	24	448,148	9,136,704	53
North America	1,417,176	12,272,080	41	1,515,007	4,739,068	24	1,976,263	8,481,907	83	1,532,007	6,746,069	76	1,610,113	8,059,781	47
Americas	1,940,666	30,000,145	100	2,051,752	19,706,431	100	2,393,523	10,221,105	100	1,847,103	8,858,260	100	2,058,261	17,196,485	100

* The area in dark grey shows the average data over the considered period.

Source: ISTAT (n.d.)

Table 2.11
Regional analysis, in value and quantity, of Italian ammunition exports to Asia, 2005–08*

	Exports, 2005			Exports, 2006			Exports, 2007			Exports, 2008			Average exports, 2005–08		
	Net weight (kg)	Value (EUR)	%	Net weight (kg)	Value (EUR)	%	Net weight (kg)	Value (EUR)	%	Net weight (kg)	Value (EUR)	%	Net weight (kg)	Value (EUR)	%
Central Asia	62,580	351,227	5	79,639	820,907	11	111,543	840,951	9	90,702	111,543	1	86,116	531,157	6
Eastern Asia	1,296,374	5,243,860	67	1,367,073	4,761,636	66	1,119,829	5,225,576	59	1,234,196	5,575,702	47	1,254,368	5,201,694	58
Middle Eastern countries	367,932	2,198,986	28	466,920	1,628,463	23	683,235	2,801,513	32	279,502	6,266,196	52	449,397	3,223,790	36
Asia	1,726,886	7,794,073	100	1,913,632	7,211,006	100	1,914,607	8,868,040	100	1,604,400	11,953,441	100	1,789,881	8,956,640	100

*The area in dark grey shows the average data over the considered period.
Source: ISTAT (n.d.)

Table 2.12
Regional analysis, in value and quantity, of Italian ammunition exports to Europe, 2005–08*

	Exports, 2005			Exports, 2006			Exports, 2007			Exports, 2008			Average exports, 2005–08		
	Net weight (kg)	Value (EUR)	%	Net weight (kg)	Value (EUR)	%	Net weight (kg)	Value (EUR)	%	Net weight (kg)	Value (EUR)	%	Net weight (kg)	Value (EUR)	%
EU27	15,490,582	78,418,262	89	13,763,495	53,059,613	80	14,709,163	79,594,714	83	12,629,333	80,892,404	76	14,148,143	72,991,248	82
Non-EU European countries	2,862,839	9,601,572	11	3,288,591	13,586,665	20	3,258,945	16,377,182	17	4,691,692	25,318,180	24	3,525,517	16,220,900	18
Europe	18,353,421	88,019,834	100	17,052,086	66,646,278	100	17,968,108	95,971,896	100	17,321,025	106,210,584	100	17,673,660	89,212,148	100

*The area in dark grey shows the average data over the considered period.
Source: ISTAT (n.d.)

Conclusion

This study has explored the issue of small- and large-calibre ammunition as it affects Italy through the perspectives of procurement, consumption, and exports. The scarcity of available data prevented a comprehensive picture of national ammunition consumption by the Italian military and law enforcement agencies. Consequently, consumption figures included in this chapter, while certainly useful in providing indications of the scale of the phenomenon, cannot be considered as statistically accurate extrapolations. As for exports, statistics neither from the annual armaments report of the Italian prime minister to parliament nor from Coeweb allow the public to clearly identify who imported what.

Over the years studied, the Italian Army has faced numerous changes such as budget cuts and internal restructuring towards an all-professional military. During this time, significant steps have been taken towards achieving greater transparency and accountability defence procurement. The most significant step in this direction is the establishment of a voluntary inter-governmental regime, operated on the basis of the EDA Code of Conduct on Defence Procurement, approved by European defence ministers in 2005. The ultimate goal of this regime, of which Italy is an SMS, is to promote fair competition, transparency, accountability, and mutual support.

Despite the main challenges described above, the analysis included in this chapter has led to relevant findings. By examining the combination of procurement, consumption, and export data, it is possible to piece together an accurate assessment of Italian ammunition. The study has revealed that while the majority of small calibre ammunition is produced nationally, the majority of large calibre ammunition and munitions appears to be imported, with a prevalence of European suppliers. According to the *Defence Contracts Bulletins*, the presence of industrial patents for the production of the majority of large calibre ammunition used by the Italian armed forces clearly limits competition in the market by forcing the use of single-source contracts and heavily affects the ratio between nationally produced and imported ammunition. The study has also shown that the major contraction of the resources available for operations, training, and logistics has had consequences for the Italian armed

forces in various areas, including a significant reduction in the acquisition and consumption of large calibre ammunition.

Regarding small calibre ammunition, despite the regular consumption in recent years, as highlighted by the data, there is no record of awarded contracts in *Defence Contracts Bulletins*. Two possible explanations for this discrepancy can be identified. Firstly, as ordinary ammunition usually expires after several years, the rounds consumed in the period 2005–08 could have been procured through one or more contracts before January 2005 and, therefore, did not emerge from the bulletins analysed in this study. The second reason could be the amount of ammunition procured with each contract: if the resulting value falls below the EUR 1 million threshold, publication in the bulletins, with the resulting competition, would not be required.

While recognizing the Italian government's desire to protect the industrial privacy of Italian ammunition producers, more disaggregated data would certainly be desirable. This is particularly true when examining Italian ammunition exports. The current data allows for destination country identification only, leaving a large gap in our knowledge of the specific types of ammunition exported. From the data available, it is nevertheless possible to determine that the majority of exported Italian ammunition remains within the European Union area. ■

Endnotes

- 1 SMSs are allowed other exceptions in terms of specific procurements without competition, such as in cases of pressing operational urgency, for follow-on work or supplementary goods and services, or for extraordinary and compelling reasons of national security. In such exceptional cases, SMSs will, once the procurement route has been confirmed, provide an explanation to the EDA, in its capacity as monitor of the regime on behalf of SMSs. Data will also be provided to the EDA on collaborative procurements (EDA, 2005).
- 2 Author interview with internal sources in the Italian Army, Livorno, June 2009.
- 3 Italy (July 2008, sec. 1, p. 1, contract no. 1434/303) and listed as awarded in Italy (February 2009, sec. 3, p. 1).
- 4 Italy (July 2008, sec. 1, p. 1, contract no. 1429/303) and listed as awarded in Italy (February 2009, sec. 3, p. 2).
- 5 The information provided in the descriptive paragraphs is based on the interviews conducted by the author with internal sources of the Italian Army.

- 6 The Italian Army contains 17 operative brigades: 5 light infantry brigades, 2 mountain troops brigades, 1 parachute brigade, 1 airborne brigade, 1 armoured brigade, 1 cavalry brigade, 1 helicopter brigade, 1 artillery brigade, 1 anti-air artillery brigade, 1 signals brigade, 1 engineering brigade, and 1 reconnaissance information surveillance target acquisition—electronic warfare (RISTA-EW) brigade. The 16 brigades not considered in this paper consist of around 2,500–2,800 soldiers each.
- 7 5 light infantry brigades, 2 mountain troops brigades, 1 parachute brigade, 1 airborne brigade, 1 armoured brigade, 1 cavalry brigade.
- 8 1 helicopter brigade, 1 artillery brigade, 1 anti-aircraft artillery brigade, 1 signals brigade, 1 engineering brigade, 1 RISTA-EW brigade.
- 9 The major Italian supplier is the Fiocchi company, which provides all conventional small calibre ammunition to the Italian armed forces.
- 10 Coeweb is the online information system dedicated to foreign trade statistics, providing on a monthly basis a wealth of information on trade flows between Italy and the rest of the world. This information is derived from the single administrative document and from Intrastat forms acquired by the customs agency as regards extra-EU and intra-EU flows, respectively. The data collected and received by ISTAT is first processed in compliance with European Community regulations applying to statistics on foreign trade, and subsequently revised and validated by reviewers. The data processing procedure also provides statistical data on operators and businesses, as well as time series by index links (ISTAT, n.d.).
- 11 Harmonized System, ch. 93, 'Arms and ammunition; parts and accessories thereof', heading 06.
- 12 The EU27 are Austria, Belgium, Bulgaria, the Czech Republic, Cyprus, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, and United Kingdom.

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Chapter 3

An Initial Survey of Small Arms and Light Weapons Ammunition Production, Procurement, Allocation, Exports, and Transfers by the French Law Enforcement and Military Services

Pierre Gobinet

Introduction

The initial aim of this working paper was to determine procurement and consumption patterns for small arms and light weapons ammunition by the French gendarmerie, police, and armed forces. The term 'ammunition' refers in this context to both small (<12.7 mm) and large calibre ammunition (>12.7 mm), and includes mortars (50–120 mm), grenade launchers, recoilless rifles, rocket launchers (firing rockets 120 mm or smaller), and cartridges for anti-materiel and sniper rifles and heavy machine guns.

Due to time constraints, and to an obvious reticence on the part of the respective French procurement authorities to provide detailed figures on all of these categories, the author selected the most popular and widely standardized calibres in order to address the issue comparatively and attempt a national compilation. To the extent possible, the author initially requested data going back several years, and sought to differentiate quantities and percentages of imported ammunition from that manufactured in France. The end goal was to account for variances and patterns in procurement and consumption. In addition, the author sought to determine the existence and extent of any recorded ammunition transfers performed 'in-house' by the armed services themselves to countries that traditionally receive French military assistance.

The first section introduces the methodology used in this study. A combination of open-source materials and either face-to-face or telephone interviews with French procurement agencies and officials allowed the author to

obtain data regarding the manufacturing and procurement of ammunition by the French forces. A number of useful points of contact were solicited and kindly contributed preliminary data and background information regarding basic procurement and allocation figures. However, the issue of ammunition transfers remains problematic and controversial: data, if recorded, is fragmented within each administration and the few officials who are rigorous enough to compile it do not have the authority to divulge it.

The second section is devoted to French ammunition-manufacturing capacity and starts out by placing it within the wider scheme of the French weapons industry. This helps to understand the priorities (or lack thereof) given to ammunition manufacturing. Research findings show that small calibre, cartridge-based manufacturing is no longer nationalized and that the French administration resorts to imports and tender invitations to supply its law enforcement and armed services with 9 mm and 5.56 mm rounds. Medium and large calibre ammunition is still produced in France by one consortium, which caters for French forces and exports a substantial amount of its production abroad. The European Energetics Corporation (EURENCO) is used in this instance as a company case study to illustrate the contradictions of the French administration in the field of ammunition manufacturing.

The third section delves into the subject of ammunition allocation to French law enforcement and army units. Figures are clearer for law enforcement units due to better contacts with gendarmerie and police headquarters. All other figures were kindly contributed by the Délégation générale pour l'armement (DGA). Overall, most sources highlight a lack of budget and consideration of internal planning for ammunition allocation in the armed forces. Ammunition is a convenient, easily modifiable variable in a budget's administration, which may explain the difficulty in obtaining any definitive yearly figures. The trend points towards not enough ammunition rather than too much, and this is exemplified by open-source parliamentary reports on domestic and overseas theatres of operations such as Afghanistan. In this alleged context of deprivation, the extent of ammunition transfers carried out unilaterally by individual French law enforcement or military units abroad can be questioned.

Methodology

Basic preliminary Internet searches focused exclusively on French language results. This method revealed an interesting array of official parliamentary reports and plenary session transcripts made accessible to the public via the websites of the National Assembly and the Ministry of Defence. A substantial amount of information regarding generic trends and non-quantitative data can thus be acquired via the Internet. Although these reports do not provide recent statistics or quantitative data, they refer to recent and actual trends in French ammunition manufacturing and procurement and pave the way for further avenues of research. Once these sources were exploited, the author ascertained whether this topic was already covered by existing research carried out by French think tanks and NGOs. Results were discouraging. According to the Lyon-based Observatoire des armements, compiling accurate ammunition purchasing data in France is not feasible, since there are no centralized ammunition records bridging the demands of the various ministries (defence, the interior, finance, etc.).¹ Combined ammunition allocation data has never been published by or submitted to parliament, and public documents pertaining to weapons manufacturing and exports seldom disaggregate ammunition statistics.

The author then sought to identify the most adequate sources and points of contact within the French administration that were likely to provide up-to-date, consolidated information on French ammunition procurement. There are several difficulties inherent to pinpointing these individuals and acquiring this type of data:

- **Finding the appropriate service involved:** France has two major national law enforcement services (the civilian Police nationale or national police and the military Gendarmerie nationale or national gendarmerie), three military corps (army, air force, and navy), a customs authority, a penitentiary administration, and an enormous administrative apparatus tasked with coordinating their respective procurement and logistics. Furthermore, logistical prerogatives involving ammunition management are often decentralized down to regional command level, thus making general statistics difficult to compile.

- **The nature of the data required:** Each administration keeps its own records, and, even though it may agree to divulge these records, there is currently no common, centralized set of records referring to the procurement and allocation of ammunition. Often the data has yet to be compiled within each service and officials will not bother compiling it for the benefit of a foreign project they are not yet familiar with.

Once the appropriate point of contact was identified, preliminary telephone contact was made and a tailored letter of request was sent by the author in order to explain the nature of the survey and allow time for the contact person to gather all the elements required. Aside from the gendarmerie point of contact, finding the rest of the individuals was largely the result of a trial-and-error process. All the contacts and interviews were initiated between the end of April and the beginning of July 2009. The requested data was often available but unprocessed, and the officials requested clearance and hierarchical authorization before divulging any figures. No official documents were handed over, and access to the special forces, which usually have their own decentralized ammunition procurement scheme, was not granted.

French ammunition-manufacturing capacity

Although this study focuses mainly on the procurement and consumption patterns of small- and large-calibre ammunition by the French gendarmerie, national police, and armed forces, the author sought to frame the data within the general background of French weapons production and procurement for comparative purposes. Two main categories of open sources were initially used to acquire recent figures, trends, and reliable statistics on France's current arms and ammunition production capacity: the latest 2006 and 2007 annual arms exports reports to parliament (France. Ministère de la Défense, 2007b; 2008) and a number of parliamentary discussions, comments, and debates regarding the Ministry of Defence's latest annual budget allocations given in the budgets for 2008 and 2009.

Background figures on the French defence industry

Available open sources such as the ones previously given provide a fairly accurate picture of the state of the French defence industry and its importance in the country's overall economy over the past six years (France. Assemblée nationale, 2003, para. 1). The main characteristics of the industry are:

- an estimated 4,000 companies and several large industrial groups;
- an average annual turnover of approximately EUR 14 billion (USD 15.8 billion in 2003), EUR 4.5 billion (USD 5.09 billion in 2003) of which is generated by exports; and
- more than 170,000 jobs directly involved, 50,000 of which could be directly linked to arms exports (France. Ministère de la Défense, 2009, p. 5), resulting in the arms-manufacturing industry being thus considered an important employment sector.

The French government's 2008 annual arms exports report to parliament (France. Ministère de la Défense, 2009, p. 11) shows that France roughly ranks as the world's fourth largest weapons exporter (7.7 per cent of worldwide sales), behind the United States (52.3 per cent), UK (13.7 per cent), and Russian Federation (8.2 per cent), and is closely followed by Israel (5 per cent). Orders and purchases of French weapons increased from EUR 5.66 billion (USD 7.75 billion) in 2007 to EUR 6.58 billion (USD 9.67 billion) in 2008 (France. Ministère de la Défense, 2009, p. 16). According to the French NGO Observatoire des armements, France logically seeks to boost its arms sales and face the ever-strengthening competition (Collin, 2008). To this end, successive reports to parliament, originally intended as control tools to monitor French arms exports, have progressively been turned into semi-promotional brochures to market French military equipment. They are, however, useful to understand and decipher France's current arms production and trade capacity. The government's stated objective for overall registered orders in 2008 was EUR 6 billion (USD 8.82 billion), and this target was set at EUR 7 billion (USD 9.54 billion) for 2010. France thus hopes to eventually increase its share of the global arms market to 13 per cent, roughly the same as that of the UK (Collin, 2008).

Current trends

The worldwide weapons business is extremely competitive and most manufacturers rely on massive export contracts to sustain their margins and profits. For the French government, salvation for its national weapons industry lobby lies in cross-border, pan-European consolidation to safeguard the EU's industrial defence base. The French government still holds substantial stakes in Thales (27 per cent), Safran (31 per cent), DCNS (75 per cent), Nexter (100 per cent), and Société nationale des poudres et d'explosifs (SNPE) (100 per cent), which are all heavily reliant on the domestic market (Jane's Information Group, 2009). France is, however, in a position where it can no longer afford to purchase arms exclusively from its own national industry, therefore the more arms can be sold abroad, the more production costs for this equipment will decrease, and this in turn is expected to facilitate arms purchases and equipment procurement for French forces. Ironically, therefore, exports reduce production costs, making the weapons cheaper for French forces to buy domestically.

The French government has always been tightly involved in the permanent restructuring process of both the French and the European defence industries, e.g. with the creation of large conglomerates such as EADS (European Aeronautic Defence and Space Company) or Thales. This state-sponsored economic rationalization is not unique to France and applies to most Western European countries. France considers that its national defence industry is a token of national autonomy and decision-making freedom on the international agenda. This approach, once again, is shared by a number of EU countries and efforts have been made to unite production endeavours and cut production costs. The complexity of arms systems led to the appearance and progressive supremacy of European and international industrial groups that could meet the R&D costs and assume the risks of large-scale weapons-manufacturing programmes.

Accordingly, French authorities sought to compartmentalize their military equipment requirements into three distinct categories, which are clearly delineated in the national military programme outline covering the years 2009–14 (France. Assemblée nationale, 2008d, s. 4.1; 2009e):

- equipment that pertains exclusively to the realm of French national sovereignty and autonomous defence potential, including nuclear capacity and deterrence;

- military equipment that could obviously benefit from European cooperation—this initiative was kick-started in 1997 by France, the UK, and Germany, who sought to consolidate their respective defence industries. Some examples are the creation of EADS, Thales initiating a successful multinational strategy, and the launch of integrated arms programmes such as the Airbus A 400 M freight aircraft; and
- military equipment that is already produced, often worldwide, on a large scale to reduce manufacturing costs, and which can therefore be purchased cheaper abroad—in the present case, small calibre ammunition.

Dire straits for French ammunition-manufacturing capacity

French ammunition manufacturing had until recently been mainly carried out by GIAT Industries, Manuharin, or Anthena. However, it failed to remain affordable in a European arms production scheme dominated by unrelenting competition. In times of economic hardship and budget restraints, the competitiveness of manufacturing companies was a prerequisite if they wanted to obtain contracts and meet business deadlines and requirements. GIAT Industries was often deemed too expensive in this regard. It progressively subcontracted and transferred its small arms and light weapons ammunition manufacturing portfolio to small companies that could produce cheaper rounds. An arms legislation proposal dated 18 July 2007 states that: 'as regards small arms and ammunition, all calibres included, France is undergoing massive deindustrialization. Land-based armament, represented by GIAT Industries, does not fare well' (France. Assemblée nationale, 2007c).

The restructuring of GIAT Industries into Nexter in 2006 allowed the group's ammunition-manufacturing capacity to be substantially updated within the Nexter Munitions subsidiary. Nexter successfully carried on with the GIAT 2006 business plan, which originally called for a five-year, EUR 85 million (USD 106.76 million) medium calibre ammunition procurement plan initiated in 2004. To this end, Nexter Munitions invested in a new plant in La Chapelle St Ursin, Bourges. However, this facility is highly dependent on the stability and continuity of government orders and purchases (France. Assemblée nationale, 2009a).

Nexter Munitions is currently France's only company with the technical and industrial know-how to manufacture medium and large calibre ammunition intended mainly for cannon weapon systems (20–25–30 mm). Along with its subsidiaries, Nexter exports a range of products, such as the Caesar artillery system. Large calibre ammunition for mortars (81 mm for infantry and 120 mm for artillery) is still manufactured and exported by TDA Armement in La Ferté St Aubin, a Thales subsidiary. Grenade launchers (*basse vitesse létalité réduite*) are still manufactured by ALSETEX, a subsidiary of the LACROIX group. Rocket launcher ammunition is reportedly no longer manufactured in France.

However, although France has kept an industrial ammunition-manufacturing capacity for medium and large calibres with Nexter Munitions, it purchases and imports all of its small calibre ammunition from abroad.² According to DGA, the last French company to manufacture small arms calibre ammunition, Athena, ceased its activities in 2007.³

The case of SNPE's EURENCO provides an appropriate example. An April 2009 parliamentary report mentions the expected and controversial privatization of SNPE, France's only ammunition powder manufacturer (France. Assemblée nationale, 2009d). SNPE's current turnover is estimated at approximately EUR 640 million (USD 869 million). The French government has intended to privatize SNPE for a while, believing that the group had to undergo substantial changes if it were to survive (France. Assemblée nationale, 2009c). Some personnel cuts were announced on 7 January 2009 (France. Assemblée nationale, 2009b).

SNPE's subsidiary responsible for ammunition component production, EURENCO, is in very poor financial condition (France. Assemblée nationale, 2009b) and would doubtless benefit from close cooperation with Nexter. This could transfer the debate to the European level and still leave room for national sovereignty concerns. Created in January 2004, EURENCO is an independent subsidiary of SNPE matériaux énergétiques, and mainly manufactures powder and explosives intended for ammunition, shells, and small missiles. It is jointly owned by SNPE matériaux énergétiques (60.2 per cent), Sweden's Saab (19.9 per cent), and Patria (19.9 per cent), a Finnish company. EURENCO has an annual turnover exceeding EUR 140 million (USD 191 million), with more than 800 employees (with EURENCO France representing less than 400 employees)

and five industrial plants located in Belgium (Clermont), Finland (Vihtavuori), France (Sorgues, Bergerac), and Sweden (Karlskoga) (EURENCO, 2010). According to the Eurosatory arms show Internet site, EURENCO has an Explosive Charges and Additives Business Unit and a Propellants and Propelling Charges Business Unit, the latter being responsible for:

single and multi base propellants, spherical powders (manufactured by the Belgian subsidiary PB Clermont), nitrocellulose and double base premix paste for military small, medium and large caliber ammunition in addition to reloading powders for civil cartridges and ignition powders for medium and large caliber ammunition (EURENCO, 2010).

This privatization process, which is very unlikely to start earlier than 2011, is strongly criticized by French politicians as lacking strong industrial goals and possibly jeopardizing French ammunition autonomy. The plant in Sorgues is considered to be France's only remaining explosives manufacturing plant thus, according to DGA, the company still holds strategic potential.⁴ It is able to produce ammunition for the French armed forces and should thus maintain the bulk of its manufacturing capacity in France. This is a contradictory stand because so far the state seems never to have either invested enough in the company or ordered enough ammunition to keep the production facility going healthily. EURENCO's difficulties are due to delays in the placing and processing of state orders. Meeting both ends—strategic relevance and industrial competitiveness—will doubtless prove to be a difficult task. The most likely solution mentioned in the reports is cooperation in this field with Nexter (Jane's Information Group, 2009).

However, France *has* maintained industrial capacity in the field of ammunition-manufacturing equipment. According to Groupe de recherche et d'information sur la paix et la sécurité (GRIP), Manurhin Equipment is one of the biggest producers of small arms and light weapons ammunition-manufacturing equipment, along with Belgium's New Lachaussée, EDB Engineering, and Germany's Fritz Werner. According to the GRIP study, a surprising 90 per cent of the world's modern (meaning NATO-compatible) military ammunition-manufacturing plants were apparently set up and tailored by German, French, or Belgian companies (Anders, 2005, para. 3).

Research findings

Allocation to law enforcement services

In May 2003 the French Interior Ministry signed a contract with J. P. Sauer & Sohn's French partner Rivolier SA for the provision of 250,000 SIG Sauer SP2022 pistols destined for gendarmerie, national police, customs, and penitentiary administration field units (SIG Sauer, 2008). This joint procurement contract was intended to lead to substantial maintenance and procurement savings and would logically imply that ammunition procurement is now standardized throughout the French law enforcement services (France. Assemblée nationale, 2007a). So far the author has, however, been unable to pinpoint the administration tasked with ammunition procurement for all law enforcement services and in fact doubts its existence. Each service seems to publish unilateral tender invitations for ammunition bids and manages its own ammunition requirements separately.

Table 3.1

Gendarmerie average annual ammunition procurement and allocation figures

	9 mm	Browning 12-gauge shotgun	5.56 mm	7.62 mm	Tear gas grenades 56 mm	Flash-ball 44 x 83 mm	TASER pistol cartridges
Number of rounds purchased annually	10 million	No purchases: procurement from national stockpiles	800,000	220,000	10,000	15,400	13,500
Number of rounds allocated to units annually	11 million	1.49 million	3.6 million ^a	160,000	7,800	15,000	1,000
Recent in-house exports/cessions	0	10,000 ^b	0	0	0	0	0

Notes:

^aMuch fewer are purchased (around 800,000 in 2009); the bulk are transferred or most likely sold to the gendarmerie by the French Army.

^bTransferred or sold to the French Navy.

Source: Figures provided by Equipment Procurement Division, Direction générale de la gendarmerie nationale (DGGN), Bureau des matériels

National gendarmerie

In-house ammunition management practices also differ with each service. For instance, the national gendarmerie separates 'practice' ammunition from 'service' ammunition (carried by officers on duty in the field). The bulk of the purchased ammunition is made up of 9 x 19 mm Parabellum cartridges for the recently issued SIG Sauer SP2022, and 5.56 x 45 mm NATO for the French Army's FAMAS standard assault rifle. According to the Gendarmerie Equipment Procurement Division, the average annual ammunition purchase and allocation figures for gendarmerie units are as shown in Table 3.1.⁵

Eighty per cent of the small arms and light weapons ammunition purchased by the gendarmerie (Table 3.1) is allocated to the units as 'practice' ammunition. The rest is labelled as 'service' ammunition and is estimated at a constant four million 9 mm cartridges circulating in use by gendarmerie units in the field throughout France. This 'service' ammunition is decategorized after four years (to make sure service ammunition is renewed) and transferred within each unit to the 'practice' ammunition stocks. As in most law enforcement organizations throughout Europe, the tasks and duties attributed to officers have expanded tenfold, leaving very little time for shooting practice. Commanding officers therefore make a point of spending their respective units' entire yearly ammunition allocation. Gendarmerie units thus do not 'pile up' surplus ammunition on a yearly basis and each unit fires the year's allocation of 'drill' ammunition according to a rigorous, decentralized shooting practice agenda. The gendarmerie's equipment budget is tight, ammunition is not wasted, and is bought in just the right quantity based on the previous year's needs. As a consequence, gendarmerie headquarters do not report any substantial or systematic ammunition transfers, whether paid or gratuitous, to any foreign country. Inter-agency transfers do occur, however, on a regular basis.

Since France does not have a small calibre ammunition manufacturer, there are three main sources of ammunition procurement for the gendarmerie:

- cessions from the army (mainly 5.56 mm NATO);
- NATO's Maintenance and Supply Agency; and
- public invitations to tender. In this last instance, the invitation is publicly advertised in the *Bulletin officiel des annonces des marches publics*⁶ and the EDA's *Electronic Bulletin Board on Defence Contract Opportunities*.⁷ This option

is least favoured by procurement officers, because the tender selection process is tedious and painstakingly long (at least a year from the time the invitation is published). However, such contracts are typically issued for a duration of four years and will include, depending on yearly budget allocations, a minimum and maximum quantity of ammunition to be manufactured and delivered by the tender to the four law enforcement administrations. Among the most common and recurrent tenderers that line up proposals for these contracts are: RUAG (Switzerland), FN Herstal (Belgium), Metallwerk Elisenhütte Nassau (Germany), Companhia Brasileira de Cartuchos (Brazil), Israel Military Industries (Israel), BAE (UK), General Dynamics Ordnance and Tactical Systems (Canada), General Dynamics Santa Barbara Sistemas (Spain), and ADCOM (United Arab Emirates). Procurement and importation will likely involve distribution through one of France's importers such as Sidam, Rivolier (Fiocchi), or Humbert.⁸

National police

The national police employ similar ammunition management methods. Ammunition is acquired via public invitations to tender, although it is unclear whether these are now jointly issued by the gendarmerie, the national police, the penitentiary administration, and customs, which now all use the SIG Sauer SP2022. The Direction de l'administration de la police nationale (DAPN), the administrative police headquarters, allegedly centralize their invitations to tender at the Bureau de l'armement et des matériels techniques, which caters for all territorial units, including French overseas departments and colonies. Individual police units then purchase the ammunition using their own budget allocations. There are very few surplus stocks, since purchases are tailored to training and operational use. The only exception to this occurred when the police's .357 Mg Manurhin revolvers and 7.65 Unique automatic pistols were recently replaced by the 9 mm SIG Sauer SP2022. The respective surplus ammunition was centralized and is allegedly undergoing destruction. Similarly, ammunition is not exported or transferred abroad under the auspices of police cooperation agreements.

Table 3.2
National police purchases, 2004–09

Calibre	2004	2005	2006	2007	2008	2009
5.56 mm	Amount Price (EUR) 320,000 74,630	620,000 144,714	807,000 246,308	160,000 51,165	—	30,000 optimized 40,544 630,000 234,995
9 mm	Amount Price (EUR) 5,290,000 695,952	24,900,000 3,744,628	15,100,000 1,935,606	11,800,000 1,660,231	12,100,000 2,149,117	18,140,000 practice 2,933,070 8,400,000 operational 2,242,356
.38 SP	Amount Price (EUR) 3,500,000 638,365	—	—	—	—	—
7.65 mm	Amount Price (EUR) 1,500,000 278,140	—	—	—	—	—

Source: Figures provided by DAPN, Bureau de l'armement et des matériels techniques

Since the French national police have roughly 30 per cent more personnel than the gendarmerie, one would expect the ammunition procurement figures for the police to be estimated accordingly. Figures provided by DAPN contradict this assumption, however, by showing an obvious absence of a year-to-year procurement pattern. Although police headquarters did not provide allocation data, purchase data was kindly provided for the period 2004–09.⁹

Army units

Data pertaining to the French armed forces' ammunition allocation can only be obtained via official sources. The author initiated a search by using documents produced by the Joint Staff Headquarters in 2007 (France. Ministère de la Défense, 2007a). According to this document, joint ammunition procurement for the three armed services, and formerly to some extent for the gendarmerie, is planned and implemented by a commission, which gathers twice a year and is headed by the general commanding officer of the Joint Logistics Division. This commission covers procurement and acquisitions, NATO identification and referencing, and maintenance and surplus management. Its important role was confirmed by the senior DGA official's interview in May 2009, making it an obvious point of contact. Several unsuccessful written requests were sent to army logistics. Further research allowed the author to pinpoint a staff officer at Army Staff Headquarters who explicitly declared, by telephone, that his hierarchy categorically refused to contribute any data to the project.

Parliamentary reports commenting on defence budget allocations for 2008 and 2009, respectively, tend to confirm that ammunition procurement has been of relatively low concern compared to heavier, higher-value military equipment. The 2008 defence budget allocation foresaw obvious cuts in operational appropriations that would inevitably end up hindering ammunition procurement for the army. In a French parliamentary report dated October 2007 regarding the 2008 defence budget allocation plan, the army was portrayed as 'a consumer who purchases the latest, state-of-the-art personal computer but does not have enough cash to buy the printer, the Internet connection or the ink cartridges' (France. Assemblée nationale, 2007b; author's translation). More disturbing, the report stated that French Army soldiers in Afghanistan would not have enough ammunition to operate efficiently in high-intensity conflict

zones. Operational units had been repeatedly reporting substantial constraints regarding both drill (blank) and live ammunition, and additional budget cuts would have negative consequences for the operational potential and safety of troops and personnel stationed abroad (France. Assemblée nationale, 2007b). The lack of blank ammunition hindered platoon drill practice, and staff officers were asked to resort to dubious field simulations.

Stock surplus also required attention, since some munitions had reached the end of their lives yet had not been properly recycled. The report called for a general reflection on ammunition procurement, since the army apparently had trouble selecting a small calibre ammunition manufacturer as well as managing its ammunition depots. The 2007 parliamentary report was preoccupied with the disappearance of French industrial savoir-faire in terms of ammunition making, and clearly stated that the French Army bought its small calibre ammunition supplies from foreign companies (France. Assemblée nationale, 2007b). A year later, the parliamentary report on the 2009 defence budget allocation plan stated that France had 2,400 soldiers posted in Afghanistan, two-thirds of whom were ground troops with field combat capacity. Additional equipment allocation of EUR 9 million (USD 13.23 million) was distributed in 2008, including 900 tons of ammunition (specifics and calibres were not stated in the report), which equalled roughly half a ton of ammunition per soldier in the field. Ammunition priority was thus given to troops stationed in Afghanistan, thereby depleting the ammunition stocks in France and forcing French regiments to use lower-quality ammunition for shooting practice (France. Assemblée nationale, 2008a).

Table 3.3

Average army procurement

	9 mm	5.56 mm	7.62 mm	Mortar shells, 81 mm	Infantry rockets, AT4CS	Medium calibre: 20, 25, and 30 mm
Average amount purchased annually	6 million	50 million	6 million	20,000	3,000	25,000
Cost (EUR million)	1.5	15.0	3.0	8.0	6.0	No data

Source: Figures provided by DGA

The government also planned to allocate EUR 61.7 million (USD 90.7 million), labelled as payment credit, to ammunition procurement in 2009 (France. Assemblée nationale, 2008a). According to the parliamentary report, this would be just enough to cover standard operational needs, but would prove inadequate to anticipate stock/surplus evolution, as well as an immediate, emergency procurement requirement. If, for instance, the army were to deploy the 30,000 troops required by its original operational contract, the existing army stocks would prove largely insufficient to provide all of them with proper ammunition levels. This seems to be a recurrent theme in parliamentary reports, which state that France relies on foreign-based companies for ammunition procurement. This, of course, creates a form of dependence on these foreign manufacturing companies that is incompatible with the principle of an autonomous, self-reliant national defence capacity. More disturbing is the fact that the subject of ammunition availability lacks the allure to be properly discussed in parliamentary debates. In some sessions the subject is seemingly omitted and the minister of defence simply skips over the subject (France. Assemblée nationale, 2008b).

According to DGA, about 50 million 5.56 mm NATO cartridges are ordered each year for the three services combined—army, air force, and navy—with the army being, of course, the main recipient. The average purchase price is EUR 250–300 (USD 341–409) per 1,000 cartridges. Small calibre ammunition expenditure and budgets are on the increase annually, with an average annual spending of EUR 20–30 million (USD 27.3–40.9).¹⁰ The author requested a cleared copy of the business contract between DGA and Army Staff Headquarters, without success.

Ammunition is considered a convenient adjustable variant for the defence budget, because cuts or increases can be implemented quickly without tedious preliminary allocation planning. Furthermore, ammunition management is, surprisingly, not given high priority within the armed forces. One interesting avenue of research is whether or not the increase in ammunition budgets reported by DGA could also be partly attributed to a new shooting practice doctrine called IST-C or *instruction sur le tir de combat*, modelled after the US and Israeli armies, which is supposed to simulate/duplicate combat shooting

as closely as possible and thus hand over the overall responsibility of the drill to the shooter himself. Several unofficial forums declare, however, that this policy has loosened control over the use of ammunition by army personnel and that it is often very easy to obtain live, unaccounted-for ammunition in an army regiment (de Granvil, 2008).

Estimated combined annual purchase figures for 2009

Table 3.4 compiles the annual purchase estimates provided by the three administrations for the main ammunition categories for 2009. Again, the police figures shown above show major year-to-year discrepancies in the purchase amounts and account for various ammunition procurement adaptations and alterations. Purchase amounts for the gendarmerie and the army should also be expected to differ substantially from year to year.

Table 3.4
French defence and security forces allocation, 2009

	9 mm	5.56 mm	7.62 mm	Mortar shells 50–120 mm	Rockets <120mm	Medium calibre for heavy ma- chine guns, anti-materiel, and anti- personnel
Annual gendarmerie purchase	10 million	800,000	220,000	N/A	N/A	N/A
Annual police purchase	26.54 million	660,000	?	N/A	N/A	N/A
Annual Ministry of Defence purchase	6 million	50 million	6 million	20,000	3,000	25,000 (medium cal.)
Total amount purchased annually	42.54 million	51.46 million	6.22 million	20,000	3,000	25,000 (medium cal.)

Commercial exports and transfers of ammunition

Arms sales are generally a good indicator of any country's geopolitical and oil interests. In Africa, for instance, Chad recently joined the list of countries buying French weapons, joining a host of other oil-producing countries such as Angola and Nigeria (France. Ministère de la Défense, 2007b; 2008). It is reasonable to believe that ammunition transfers follow this trend. An October 2006 GRIP report estimates that more than 90 per cent (USD 26.4 million) of all *declared* small arms and light weapons ammunition imports to African states originate from non-African states, with the United States, Spain, and France figuring as the top three exporters of declared ammunition to Africa (Anders, 2006).

The current French arms export procedure is very meticulous: several ministries examine an order before it obtains the green light. In order to boost arms exports, administrative control procedures and intermediaries are undergoing simplification under the auspices of the Commission interministérielle pour l'étude des exportations de matériel de guerre. Thus, the French administration has recently sought to streamline its administrative arms export procedures to avoid repetition. According to the report to parliament for 2007 (France. Ministère de la Défense, 2008, annex 7), as a result of smoother administrative measures and a reduction in production delays and export authorization periods, French arms deliveries to sub-Saharan African countries more than doubled during that year, increasing from EUR 16.5 million (USD 22.6 million) to EUR 39.8 million (USD 54.5 million). Comparatively, Table 4.1 in the 2006 GRIP report estimates that France's annual small arms and light weapons *ammunition* exports to Africa over the period 2000–04 amounted to an average of USD 4 million (Anders, 2006).

Due to the lack of an adequate response from the appropriate contacts, this area was, however, not properly covered by the present study. First of all, it is difficult to determine exactly what kind of ammunition France exports, because the French Defence Ministry's annual reports to parliament (France. Ministère de la Défense, 2007b; 2008) do not specify or disaggregate what equipment falls under the various categories. Telephone interviews with French Customs Headquarters and Délégation aux affaires stratégiques did

not yield any conclusive qualitative figures on the state of ammunition transfers between France and its political partners.¹¹ According to the customs official, this type of information is detained by the Direction de la protection et de la sécurité de la défense, the military intelligence service, and is largely inaccessible to a foreign-based, civilian research project.

Conclusion

This chapter serves as a preliminary look into the patterns of procurement and consumption of small- and large-calibre ammunition by the French gendarmerie, police, and armed forces. One of the main challenges was to come up with contacts within the French administration concerned with ammunition procurement on behalf of their own agencies. All sources considered, data concerning ammunition procurement and allocation proved easier to collect than ammunition transfers data. Official open sources show that small calibre manufacturing is no longer nationalized and that the French administration resorts to imports and tender invitations to supply its law enforcement and armed services. The general impression is that ammunition is a convenient, easily modifiable variable in a budget's administration and that the tendency is rather to top up existing ammunition levels in times of emergency rather than to buy too much and keep it stored for prolonged (and costly) periods of time. In other words, the trend points towards not enough ammunition in the armed forces rather than too much.

The initial assumption was that each administration was eventually likely to 'sign off' some hardware to a former colony's army or law enforcement service after a prolonged period of use in France. Whether large amounts of ammunition are concerned in these amiable cessions is, however, doubtful: in this alleged context of deprivation, the extent of official, recorded ammunition transfers abroad performed by the law enforcement and armed services themselves can be questioned. This should, of course, be considered separately from authorized, commercial sales and exports of medium and large calibre ammunition manufactured by French companies, which could be the focus of an altogether different study. ■

Endnotes

- 1 Written communication from Patrice Bouveret, Observatoire des armements, Lyon, 3 June 2009.
- 2 Author interview with senior DGA official, May 2009.
- 3 Author interview with senior DGA official, May 2009.
- 4 Author interview with senior DGA official, May 2009.
- 5 Author interview with senior official, DGGN, Bureau des matériels, May 2009.
- 6 <<http://www.boamp.fr>>.
- 7 <<http://www.eda.europa.eu/ebbweb/Default.aspx>>.
- 8 Author interview with commanding officer of Equipment Procurement Division, DGGN, Bureau des matériels, Malakoff, 15 May 2009.
- 9 Author interview with head of Bureau de l'armement et des matériels techniques, DAPN, 12 June 2009.
- 10 Author interview with infantry weapons and ammunition manager, DGA, Bagneux, 15 May 2009.
- 11 Author telephone interviews with senior officials of Bureau E2, Direction générale des douanes, and Délégation aux affaires stratégiques, May and July 2009, respectively.

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Chapter 4

Russian Small Arms and Light Weapons Ammunition Production, Procurement, and Exports

Maxim Pyadushkin

Introduction

The Russian Federation has significant capacities for producing small arms and light weapons ammunition, which were inherited from the Soviet defence industry. Although in the 1990s and early 2000s this sector faced serious reductions in domestic procurement orders, the ammunition industry is still capable of satisfying the demand for small arms and light weapons ammunition from the national armed forces and paramilitary agencies. Moreover, over the past decade Russian manufacturers increased the output of civilian firearms ammunition sold both on the domestic market and for export, and this area became the major source of revenues for the industry. In the last few years the small arms and light weapons ammunition industry saw the rise of domestic military purchases due to the overall growth of the Russian military procurement budget.

Nevertheless, the analysis of small arms and light weapons ammunition production, procurement, and exports in the Russian Federation is a very difficult task due to the lack of information available from government bodies, manufacturers, and media. This can be explained both by security restrictions and by the fact that the ammunition industry represents a rather insignificant share in the country's large defence industry.

Methodology and sources

Estimating the total production, procurement, and export of ammunition for small arms and light weapons in the Russian Federation is difficult due to the

lack of detailed information on the subject. The information on the production, domestic procurement, and export of such ammunition is kept classified under national legislation. The 1993 Federal Law on State Secrets states that state secrets include information regarding volumes of domestic defence procurement plans, volumes of production and deliveries (in both numbers and values) of weapons and other defence products, defence production capacities, designers and manufacturers of weapons and other military products, and their cooperation ties (Russian Federation, 1993). The law does, however, allow government officials to declassify this information due to the international obligations on information exchange accepted by the Russian Federation or if the further protection of this information becomes unreasonable.

But the opportunity for declassification does not always mean that information becomes available inside the country. A good example is the Russian Federation's participation in the information exchange under the Organization for Security and Cooperation in Europe (OSCE) Document on Small Arms and Light Weapons. In 2001 the Russian government allowed the Foreign Ministry annually to collect and send to the OSCE the information about the numbers of exported, imported, seized, and disposed of small arms and light weapons, but with the condition that this data should remain classified inside the country (Russian Federation, 2001).

Other Russian reports under international obligations like United Nations Register of Conventional Arms (UNROCA) reports or UN reports on military expenditures do not provide the needed information on small arms and light weapons procurement or exports and thus were not used in this research. Russian reports to UNROCA (including background information) do not contain any data about small arms and light weapons ammunition that was the subject of this research. Reports on military expenditures contain information regarding the procurement of ammunition, but they do not separate large calibre ammunition from that for small arms and light weapons, so they cannot be used to estimate the volume or dynamics of the Russia Federation's small arms and light weapons ammunition procurement.

Public control over defence issues in general and small arms and light weapons issues in particular is very limited in the Russian Federation. It

includes sporadic reporting by the Defence Ministry or other related offices to closed sessions of the State Duma. These reports also remain unavailable outside parliament, and NGOs are excluded from this process.

So the available data on small arms and light weapons ammunition in the Russian Federation is made up of tiny pieces of declassified information collected from various sources. For the purposes of the research, this information was collected from three types of sources: government bodies and agencies, small arms and light weapons ammunition manufacturers, and the media.

As far as the government is concerned, the small arms and light weapons ammunition industry (as part of the defence industry) is supervised by the Ministry of Industry and Trade. The ministry does not provide detailed statistics on ammunition production in the Russian Federation, including ammunition for small arms and light weapons. A request that it provide statistics for light weapons ammunition production for 2008 received no response.

Another request for light weapons ammunition export data was forwarded to Rosoboronexport, the country's state-owned arms trade agency, which holds a monopoly right to sell domestically produced defence products abroad. Rosoboronexport provided a specially prepared information sheet on its light weapons ammunition export that is rather descriptive, but contains no exact figures of total export volumes or volumes of deliveries to certain clients. Some of the data in this study was obtained through interviews with Rosoboronexport officials.

The reports by small arms and light weapons ammunition manufacturers were more useful, although still limited, sources of information. The level of corporate information disclosure in the Russian Federation directly depends on the legal status of a company. The manufacturers that act as open joint stock companies are obliged to disclose publicly their financial and operational results through quarterly and annual reports. But the number of open joint stock companies in the country's small arms and light weapons ammunition industry is decreasing, thus affecting, unfortunately, the scope of available data. In 2002 the small arms and light weapons ammunition industry numbered four public companies out of nine, while in 2010 there were only two: Tula Cartridge Works and Ulyanovsk Ammunition Plant. Moreover, although the reports by these two companies are available on the Internet, Tula Cartridge Works does not

disclose its export revenues in its reports, referring by way of explanation to the 1993 Federal Law on State Secrets (Tula Cartridge Works, 2009a).

The other small arms and light weapons ammunition manufacturers have the legal status of either closed corporations (Barnaul Ammunition Plant, Novosibirsk Cartridge Plant, and Klimovsk Specialized Ammunition Plant) or state-owned enterprises (Vympel Ammunition Plant, GNPP Bazalt, FNPTs Pribor, and KBP Instrument Design Bureau). These legal statuses do not require the disclosure of corporate information, thus these companies do not publish regular reports on their financial and operational activities. On request, Bazalt provided some information on the light weapons ammunition it manufactures and exports, but again with no exact figures on production or export volumes.

The shortage of official data from government bodies and the industry was partly compensated for by the information available from local media. Nevertheless, this information was quite limited and included irregular announcements of operational or financial achievements and export successes. This shows that the small arms and light weapons ammunition industry remains closed, while its achievements do not attract media attention because the industry plays a comparatively insignificant role in the country's overall defence production.

Products and producers

The manufacturing of small arms and light weapons ammunition is a part of the ammunition branch of the Russian Federation's defence industry. This sector includes six companies that produce ammunition for small arms: Barnaul Ammunition Plant (a subsidiary of Barnaul Machine-Tool Plant), Klimovsk Specialized Ammunition Plant, Novosibirsk Cartridge Plant, Tula Cartridge Works, Ulyanovsk Ammunition Plant; and the Amursk-based Vympel Ammunition Plant; and three light weapons ammunition manufacturers: the Moscow-based GNPP Bazalt and FNPTs Pribor, and the Tula-based KBP Instrument Design Bureau. All of these small arms ammunition manufacturers except Vympel are privately owned companies. Vympel and all the light weapons ammunition manufacturers are state owned.

Russian manufacturers produce the entire range of ammunition for the domestically designed small arms used by the country's armed forces and paramilitary agencies (see Table 4.1). Most companies, except Novosibirsk and Klimovsk, produce ammunition of such popular calibres as the 5.45 x 39 mm and 7.62 x 39 mm rounds used in Kalashnikov assault rifles. The Klimovsk plant is focused on special subsonic 9 mm and 7.62 mm ammunition for silent weapons, while Ulyanovsk and Novosibirsk plants produce ammunition for large calibre (12.7 mm and 14.5 mm) machine guns and anti-materiel rifles.

Russian light weapons ammunition manufacturers produce ammunition for hand-held under-barrel and mounted grenade launchers, portable launchers of anti-tank missile and rocket systems, and mortars of calibres of less than 100 mm.

The Moscow-based GNPP Bazalt is a designer and exclusive manufacturer of various ammunition for RPG-7 and RPG-29 grenade launchers, i.e. shaped charge, high-explosive, anti-tank, and thermobaric grenade rounds. Additionally, the company manufactures 82 mm mortar rounds; disposable 72.5 mm RPG-26, 105 mm RPG-27, 105 mm RShG-1, and 72.5 mm RShG-2 anti-tank rocket launchers; 30 mm non-cartridge rounds for AGS-17 and AGS-30 automatic grenade launchers; and hand grenades.¹

Table 4.1
Military small arms ammunition produced by Russian manufacturers

Company	Military small arms ammunition produced, by calibre
Barnaul Ammunition Plant	9 x 18 mm, 9 x 19 mm, 5.45 x 39 mm, 5.56 x 45 mm, 7.62 x 39 mm, 7.62 x 51 mm, 7.62 x 54 mm
Klimovsk Specialized Ammunition Plant	Special pistol 9 and 7.62 mm, special rifle 9 x 39mm, 5.66 mm for underwater weapons, 7.62 x 39mm
Novosibirsk Cartridge Plant	9 x 17 mm, 9 x 18 mm, 9 x 19 mm, 7.62 x 54 mm, 12.7 mm
Tula Cartridge Works	5.45 x 18 mm, 9 x 17 mm, 9 x 18 mm, 9 x 19 mm, .40 SW, .45 Auto, 5.45 x 39 mm, 7.62 x 39 mm, 7.62 x 54 mm
Ulyanovsk Ammunition Plant	5.45 x 39 mm, 7.62 x 39 mm, 12.7 mm, 14.5 mm
Vympel Ammunition Plant	9 x 19 mm, 5.45 x 39 mm, 5.56 x 45 mm, 7.62 x 39 mm

Source: Barnaul Machine-Tool Plant (n.d.); Klimovsk Specialized Ammunition Plant (n.d.); Novosibirsk Cartridge Plant (n.d.); Tula Cartridge Works (n.d.); Ulyanovsk Ammunition Plant (2007; 2009); Vympel Ammunition Plant (n.d.)

Two other Russian light weapons ammunition manufacturers—Pribor and KBP—do not have such a vast range of light weapons ammunition products as Bazalt, as this type of ammunition represents a small portion of their business revenues. For example, the main specialization of the Moscow-based FNPTs Pribor is the development and production of small calibre artillery rounds. Nevertheless, the company produces 40 mm caseless rounds for the armed forces' under-barrel grenade launchers and ammunition for 30 mm automatic grenade launchers; and is now marketing, mainly for export, a new model of 40 mm rounds for the Balkan automatic grenade launcher (ARMS-TASS, 2009).

The Tula-based KBP Instrument Design Bureau also produces a number a portable and under-barrel grenade launchers, among other weaponry. Some of KBP's grenade launchers use ammunition produced by Bazalt and Pribor, but some models such as the GM-94 grenade launcher are compatible with 43 mm rounds of KBP's own design.²

Production, domestic procurement, and exports

Similar to the defence industry in general, ammunition production faced a lack of domestic procurement orders during the 1990s and the most of the 2000s and had to survive through exports. In 1991, at the end of the Soviet era, the industry produced annually five billion small arms cartridges, but due to the sharp decrease in Russian defence expenditure in the 1990s, by 2000 the annual production volume had shrunk to 50 million rounds (INFO-TASS, 2001). By 2000 the level of domestic combat small arms and light weapons ammunition procurement had decreased by 40 times, with manufacturing facilities working at only 10 per cent of their capacities (ARMS-TASS, 2007). This situation forced ammunition plants to produce hunting and sporting ammunition, which became their main source of revenues in the early 2000s.

Domestic procurement of light weapons ammunition also fell sharply in the 1990s and early 2000s, forcing the industry almost to suspend production. But increased domestic defence expenditures in the second half of the 2000s gave the manufacturers new orders from the national armed forces.

Small arms ammunition production, procurement, and exports

Unfortunately, there is no complete dataset available on small arms manufacturing and export for 2004–08. Only four companies—Ulyanovsk, Novosibirsk, Tula, and Barnaul—report production and export volumes through corporate reports or media. Klimovsk revealed information only for 2005, while Vympel does not provide any information about its financial or operations results. For 2005 Novosibirsk reported the quantities of small arms ammunition manufactured and exported as opposed to values: 30 million cartridges and 6 million cartridges, respectively (*Voенно-promyshlenny kurier*, 2006).

Nevertheless, the available information shows an increase in small arms ammunition production in the Russian Federation for the period 2004–08 from USD 42.7 million to USD 151.6 million (see Table 4.2). Growing exports and domestic procurement of both civilian and military ammunition apparently caused this increase. Available figures represent both types of ammunition output, as the manufacturers usually do not provide a breakdown that distinguishes between these products. Most companies, however, report that hunting and sporting ammunition accounts for the largest part of their total ammunition production.

Tula Cartridge Works became the largest manufacturer, with its total output increasing from USD 34.9 million in 2004 to USD 91 million in 2008. Its domestic sales, which included both military and civilian ammunition, amounted to USD 17.6 million in 2004 (Tula Cartridge Works, 2005) and about USD 29 million in 2006 (ARMS-TASS, 2007).

Ulyanovsk Ammunition Plant demonstrated the sharpest increase in production. After the plant was reorganized in 2004 and bought by Tula Cartridge Works, its production output skyrocketed from USD 3.2 million in 2005 to USD 43.7 million in 2008. Ulyanovsk confirmed an increase in domestic ammunition sales in the last few years (USD 4.8 million in 2006, USD 8.3 million in 2007, and USD 22.1 million in 2008).

As for Barnaul, its domestic sales also grew from USD 5.4 million in 2004 to USD 18.4 in 2007 (see Table 4.2). The plant reportedly had domestic orders for military ammunition (ARMS-TASS, 2007).

Among all the manufacturers, only Vympel reportedly remains in a difficult financial situation due to the lack of both domestic and export orders (ARMS-TASS, 2007).

Table 4.2

Russian small arms ammunition production and exports, 2004–08 (USD million unless otherwise indicated)

Manufacturer	2004		2005		2006		2007		2008	
	Total revenues	Exports	Total revenues	Exports	Total revenues	Exports	Total revenues	Exports	Total revenues	Exports
Vypyel Ammunition Plant	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data
Ulyanovsk Ammunition Plant	No data	No data	3.2 ^a	No data	18.6 ^b	12.8 ^c	34.6 ^d	26.3 ^e	43.7 ^d	21.6 ^e
Novosibirsk Cartridge Plant	No data	No data	No value given; 30 million cartridges ^f	No value given; 6 million cartridges ^g	15.6 ^h	No data	23.0 ^h	No data	16.9 ⁱ	No data
Tula Cartridge Works	34.9	9.1 ^j	52.9 ^k	No data	59.4 ^k	About 30.0 ^l	81.9 ^m	No data	91.0 ^m	No data
Barnaui Ammunition Plant	7.8 ⁿ	2.4 ^o	1.1 ⁿ	0.2 ^o	19.2 ^p	4.4 ^q	27.4 ^q	9.0 ^q	No data	13.9 ^r
Klimovsk Specialized Ammunition Plant	No data	No data	16.0 ^s	15.4 ^s	No data	No data	No data	No data	No data	No data
Total available	42.7	11.5	73.2	15.6	112.8	About 47.2	166.9	35.3	151.6	35.5

Notes:

^a Ulyanovsk Ammunition Plant (2006)^b Total revenues from ammunition sales (Ulyanovsk Ammunition Plant, 2007)^c Ulyanovsk Ammunition Plant (2007)^d Total revenues from ammunition sales (Ulyanovsk Ammunition Plant, 2009)^e Calculated as a percentage of total production volume that may include exported products other than ammunition (Ulyanovsk Ammunition Plant, 2009)^f *Voenna-promyshlennyi kurier* (2006)^g 20% of total production; see *Voenna-promyshlennyi kurier* (2006)^h *Expert Sibir* (2008)ⁱ Fomina (2009)^j This figure is only for exports of military ammunition (Tula Cartridge Works, 2005)^k Tula Cartridge Works (2007)^l More than 50% of total revenues; see ARMS-TASS (2007)^m Tula Cartridge Works (2009)ⁿ Total ammunition revenue (Barnaui Machine-Tool Plant, 2006)^o Barnaui Machine-Tool Plant (2006)^p *Expert Sibir* (2007)^q Globalsib.com (2008)^r VIS-Inform (2009)^s Garavsky (2006)

Table 4.3

Russian light weapons ammunition production and exports, 2006–09 (USD million)

Manufacturer	2006		2008		2009 (expected)	
	Total revenues	Exports	Total revenues	Exports	Total revenues	Exports
GNPP Bazalt	21.6	No data	72.6	14.5	116.7	52.0–58.0
KBP	No data	No data	495.3	0	No data	No data
Pripor	No data	No data	No data	No data	No data	No data

Light weapons ammunition production and exports

None of the three light weapons ammunition manufacturers publicly reports its financial or operations results in terms of either volume or value of output. Among the three, Bazalt seems to be the dominant manufacturer due to its narrow light weapons ammunition specialization. It has reportedly increased its revenues in the last few years: from RUB 565 million (USD 21.6 million) in 2006 (*Kommersant*, 2008) to RUB 2.2 billion (USD 72.6 million) in 2008. Revenues for 2009 are expected to reach RUB 3.5 billion (USD 116.7 million) (Myasnikov, 2009). It can be assumed that most of Bazalt's revenues come from light weapons ammunition, although the company produces some other defence products such as aerial bombs, artillery and 120 mm mortar rounds, and ammunition for anti-aircraft guns and grenade launchers.

Such growth is reportedly caused by the increase in procurement by the Defence Ministry and law enforcement agencies as part of the overall increase in the Russian Federation's defence expenditure in the 2000s. In 2008 domestic orders amounted to 80 per cent of Bazalt's revenues, RUB 1.76 billion (USD 58.1 million). However, the volume of domestic defence orders has been very unstable over the last few years (Korenkov, 2008).

KBP and Pribor are likely to manufacture light weapons ammunition in much smaller volumes. KBP's total revenues in 2008 amounted to RUB 15 billion (USD 495.3 million),³ but the major portion is generated by sales of larger weapons, such as air defence systems and anti-tank guided missiles. In the light weapons ammunition class KPB reportedly produces only the 43 mm round to support several hundred GM-94 grenade launchers purchased annually for the Russian Federation's security and law enforcement agencies.⁴

Official data on Pribor's production volumes, domestic procurement, and exports is unavailable.

The Russian Federation does not import ammunition for light weapons as: (1) it has no foreign-made light weapons in service in its armed forces and paramilitary agencies; and (2) the local defence industry is still capable of producing all types of ammunition for the light weapons used by the country's military and law enforcement agencies. As for small arms ammunition, some special task units of the Ministry of the Interior and other paramilitary

agencies reportedly have a limited number of foreign-made small arms in service, mainly sniper rifles and handguns. It is not clear whether these units import ammunition for these weapons or buy it from local manufacturers that can produce NATO-type ammunition. But even in the case of imports, these deliveries are unlikely to be significant, as the number of foreign small arms in service in the Russian Federation is quite limited.

An overview of exports

The exact volume of Russian small arms and light weapons ammunition exports is unavailable because official statistics do not separate these products into a separate category. Instead, they are calculated together with other weapons. Rosoboronexport, the state-owned arms trade monopolist, accounts for both small arms and light weapons ammunition in the category 'other'. In 2008 this category's share in Rosoboronexport's total arms export was 3 per cent⁵ or about USD 200 million (Safronov, 2009).⁶ But this category does not reflect the real volume of the small arms and light weapons ammunition exported as it may include other defence equipment exported through Rosoboronexport that does not fall under the main categories (aircraft, naval weapons, land weapons, etc.).

Rosoboronexport has annually increased the volume of small arms and light weapons export deliveries by 13–15 per cent (Rosoboronexport, 2009). The growing demand for Russian small arms and light weapons is explained by their reliability, optimal value for money, and expanded product range, including new ammunition and ammunition adapted to NATO standards.

Rosoboronexport does not specify what kind of NATO standard ammunition it exports, but it probably includes ammunition for NATO-calibre derivatives of Kalashnikov AK rifles. Former Warsaw Pact countries in Eastern Europe produce such weapons. The Russian Federation's largest small arms manufacturer, Izhmash, also offers 5.56 mm AK-101 and AK-102 assault rifles, based on the AK-74 design. At least one ammunition company—Barnaul Ammunition Plant—sells NATO standard 5.56 × 45 mm and 7.62 × 51 mm ammunition (Globalsib.com, 2008).

However, demand for Russian small arms and light weapons ammunition is not comprehensive, e.g. mortar shells have not been exported for several years.⁷

Interestingly, according to Rosoboronexport, in the global arms market the Russian Federation is the second largest exporter of small arms and light weapons ammunition, followed by the United States in third place. This counters the current assessment of reported transfers in the global market, which has the United States as the leader. Rosoboronexport reports that China is the actual global leader, exporting ammunition designed from Russian technologies. Other Chinese advantages that Rosoboronexport's analysts name include dumping, vast offset programmes, and arms import loans. At the same time, Rosoboronexport points out that some other countries use Russian Federation technologies transferred in the Soviet era for unauthorized manufacturing and export of light weapons ammunition, mainly rounds for automatic, under-barrel, and anti-tank grenade launchers (Rosoboronexport, 2009).

The available data from manufacturers shows that in 2004 total exports of small arms ammunition (both military and civilian) amounted to USD 11.5 million; USD 15.6 million in 2005; about USD 47.2 million in 2006; and about USD 35 million in both 2007 and 2008.

Some export statistics are available from the manufacturers that sell ammunition to foreign customers through Rosoboronexport. But Russian manufacturers of small arms ammunition usually report their total exports, which include both military and civilian ammunition. For example, the total exports of Tula Cartridge Works in 2004 totalled USD 17.3 million, but the share of military ammunition in total exports was about 50 per cent (USD 9.1 million) (Tula Cartridge Works, 2005).

In 2008 Bazalt export deliveries amounted to only 20 per cent of its revenues (*RIA Novosti*, 2008) and totalled USD 14.5 million. In 2009 the export share of total production increased to 45–50 per cent and was expected to reach the level of USD 52–58 million. KBP did not export light weapons ammunition, but instead focused on deliveries to domestic customers, while data on Pribor's exports is unavailable.

According to Rosoboronexport, the Middle East is the leading region importing Russian light weapons ammunition, followed by the Caribbean, East Asia, and Africa. Some demand for light weapons ammunition remains from the former Warsaw Pact states who still use Soviet-made light weapons. In addition, Western European countries and the United States purchase small batches of Russian light weapons ammunition in order to study its combat performance (Rosoboronexport, 2009).

This export geography is confirmed by Bazalt's experience. According to the company, it has supplied grenade launchers and their ammunition to Algeria, Bangladesh, Bulgaria, China, Finland, Jordan, India, Iran, Libya, Malaysia, Mexico, North Korea, Syria, Sudan, Turkey, Turkmenistan, Venezuela, the United Arab Emirates, Uruguay, Uzbekistan, and Yemen.⁸ Since 2005 Bazalt has been developing the RPG-32 Hashim dual-calibre grenade launcher, which is to be assembled under licence in Jordan. The assembly facility was expected to be launched at the end of 2009.

The Russian Federation's small arms ammunition manufacturers do not report where they sell military small arms and light weapons ammunition, as all exports go through Rosoboronexport. Perhaps the largest known export deal in recent times involving the country's military small arms and light weapons ammunition was with Venezuela, which purchased 100,000 AK-103 assault rifles and received a licence to produce its ammunition locally (Nikolsky and Kudashkina, 2006). The purchase of these weapons was supplemented by a contract for the delivery of 72 million 7.62 × 39 mm cartridges valued at USD 58 million reportedly concluded in 2006. The ammunition was to be manufactured by Barnaul Ammunition Plant (Agentstvo Natsionalnikh Novostey, 2006). According to other reports, several million cartridges were also purchased from Klimovsk Specialized Ammunition Plant (Litovkin, 2006). The Russian Federation also agreed to build a facility in Venezuela for the licensed production of 7.62 mm ammunition for Kalashnikov AK-103 rifles (Kolesnikov, 2006). As for exports of civilian ammunition, the major markets are the United States, Europe, and the Middle East (ARMS-TASS, 2007).

Conclusion

The lack of complete and detailed statistics on Russian small arms and light weapons ammunition production and sales makes it difficult to produce accurate estimations. Not all of the manufacturers report their financial and operational results, but those that do, do so sporadically. Besides, as mentioned above, the available data from small arms ammunition manufacturers does not disaggregate military and civilian ammunition, which makes any estimation even less accurate. Nevertheless, the total available data can be used as an estimation for minimally possible levels of small arms ammunition production, export, and domestic procurement.

As for light weapons ammunition production, Bazalt's data can be taken as a basis for the estimations of light weapons ammunition production, domestic procurement, and exports, as this company seems to be the largest and most specialized manufacturer in the field. It is clear that light weapons ammunition constitutes a tiny portion of KBP revenues, while its outputs are much smaller in terms of volume and value than Bazalt's. The lack of information from Pribor probably indicates that its outputs are very modest.

So we can assume that annual light weapons ammunition production volumes are more or less equal to Bazalt's annual output, i.e. between USD 20 million and USD 117 million in 2006–09. As for light weapons ammunition procurement for the Russian armed forces and security and law enforcement agencies, it can be assumed that it also roughly equals Bazalt's domestic orders, which amounted to USD 58.1 million in 2008.

By adding up the available export values for 2008, i.e. small arms ammunition (USD 35 million) and light weapons ammunition (Bazalt's USD 14.5 million), we get USD 49.5 million. This total fits well within the range of the USD 200 million value of Rosoboronexport's 'other' category for defence exports. This figure of USD 49.5 million reflects the minimally possible level of the Russian Federation's small arms and light weapons ammunition exports, as it does not include the production of those manufacturers that did not report exports in 2008. While the figure of USD 200 million is not very precise, and may include defence products other than ammunition, it is nevertheless the best one available and can be taken as the maximum possible level of the country's small arms and light weapons ammunition exports in 2008. ■

Endnotes

- 1 Author email interview with GNPP Bazalt representative, Moscow, October 2009.
- 2 Author interview with KBP representatives, Moscow, 27 October 2009.
- 3 Estimations by Centre for Analysis of Strategies and Technologies representative in author interview, Moscow, October 2009.
- 4 Author interview with KBP representatives, Moscow, 27 October 2009.
- 5 Author interview with Rosoboronexport representative, October 2009.
- 6 Rosoboronexport's arms exports totalled USD 6.75 billion in 2008; see Safronov (2009).
- 7 Author interview with Rosoboronexport representative, October 2009.
- 8 Author email interview with GNPP Bazalt representative, Moscow, October 2009.

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