

# AMMUNITION TRACING KIT

Protocols and procedures  
for recording small-calibre  
ammunition



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Published in Switzerland by the Small Arms Survey

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First published in June 2008

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Printed by Paul Green Printing, London

ISBN 2-8288-0097-0

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# ABOUT THE SMALL ARMS SURVEY

The Small Arms Survey is an independent research project located at the Graduate Institute of International and Development Studies in Geneva, Switzerland. Established in 1999, the project is supported by the Swiss Federal Department of Foreign Affairs, and by sustained contributions from the Governments of Belgium, Canada, Finland, the Netherlands, Norway, Sweden, and the United Kingdom. The Survey is also grateful for past and current project support received from the Governments of Australia, Denmark, France, Germany, New Zealand, and the United States, as well as from different United Nations agencies, programmes, and institutes.

The objectives of the Small Arms Survey are: to be the principal source of public information on all aspects of small arms and armed violence; to serve as a resource centre for governments, policy-makers, researchers, and activists; to monitor national and international initiatives (governmental and non-governmental) on small arms; to support efforts to address the effects of small arms proliferation and misuse; and to act as a clearinghouse for the sharing of information and the dissemination of best practices. The Survey also sponsors field research and information-gathering efforts, especially in affected states and regions. The project has an international staff with expertise in security studies, political science, law, economics, development studies, and sociology, and collaborates with a network of researchers, partner institutions, non-governmental organizations, and governments in more than 50 countries.

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# ACKNOWLEDGEMENTS

I would like to express my sincere thanks to a number of people who have helped to develop the Ammunition Tracing Kit. In particular, I am grateful to Alex Vines for sharing his experience and insight as a field researcher; Richard Jones and Adrian Wilkinson for their combined technical expertise in the fields of ammunition identification and safety (the Tracing Tool and Bullet Diameter Guide are their inspiration); Holger Anders for calling the project into being; David Huxford for having ‘done it before’ and explaining how; and Eric Berman for providing continuous support to all aspects of the Small Arms Survey’s ammunition tracing work from the outset.

The participants of the ammunition tracing workshop held at the Small Arms Survey in February 2007 provided encouragement and structure for this kit. They include Allard Blom, Ben Coetzee, Rob Deere, Pablo Dreyfus, Barbara Gimelli Sulashvili, Sahar Hasan, Jennifer Hazen, Merete Lundemo, Nicole Maric, Sarah Petrino, and Matthew Waechter.

Almost all of my Small Arms Survey colleagues have piloted parts of the Tracing Forms and deserve thanks for their efforts. Alex Losikiria and the APEDI team in northern Kenya and Rob Deere and his colleagues in Liberia also deserve particular mention for piloting parts of the form.

Nicolas Florquin, Alex Vines, and Holger Anders reviewed large parts of the Tracing Kit, notably the Protocols and Manual. The development of the kit has, however, been a rolling review process, involving many peers, including Eric Berman, Ben King, Richard Jones, Jonah Leff, and Adrian Wilkinson.

I thank Alex Potter for his copy-editing (and critical insight regarding the logic of the kit), Rick Jones for the layout, Daly Design for the illustrations, Donald Strachan for proofreading, and, in particular, Tania Inowlocki for her tireless efforts in planning and directing the publication process.

The German Federal Foreign office funded the Tracing Kit and has provided continuous support to all of the Small Arms Survey's ammunition tracing projects. In particular, I would like to thank Michael Hasenau most sincerely for his support throughout.

—James Bevan

# INTRODUCTION

Ammunition is a rapidly consumable good. During periods of intense armed conflict or high rates of crime, it is used up quickly and needs to be replenished often. In this context, controlling the supply of ammunition can have a more immediate impact on armed violence than can the control over weapons.

Nevertheless, studies of ammunition have remained largely on the sidelines of policy-relevant research on armed violence. Growing international interest in ammunition, however, suggests that things are changing. Activists, journalists, and researchers increasingly view ammunition as a way to identify human rights abusers; parties to armed conflict; and, by extension, their supporters. Yet since publicly available or verifiable information on tracing illicit ammunition remains limited, these efforts can be problematic.

It is rarely true, for example, that the factory or manufacturing state of an illicitly appropriated cartridge is directly complicit in the illicit trade. Information gleaned from ammunition itself is rarely misleading, but its interpretation can be incorrect and even harmful.

When engaged in properly, ammunition tracing goes beyond explaining the origin of every cartridge discovered on the illicit market. Its aim is to develop data on the types of ammunition circulating in particular regions and in the hands of particular groups—whether state or non-state. This ‘baseline’ information can then be used to direct, support, or (where necessary) discredit observations made about the sources of illicitly proliferating ammunition.

## **Development of the Ammunition Tracing Kit**

The Ammunition Tracing Kit was developed during a 14-month process of extensive field testing, revision, and consultation. The project germinated during a workshop, held in Geneva in February 2007, which aimed to clarify the Small Arms Survey’s rapidly developing ammunition tracing agenda.



Workshop participants were selected for their expertise in the field of armed violence or in ammunition more specifically. Whether researchers, technical specialists, or practitioners of various field-based activities, they often find themselves in conflict zones or high-crime areas.

The workshop explored core issues related to ammunition tracing methods and data analysis. It focused particular attention on the great potential for misinterpreting tracing data and, consequently, on the need to develop systems to ensure comprehensive review and evaluation of all findings. All of these requirements are reflected in the Ammunition Tracing Kit.

## Using the Kit

The Ammunition Tracing Kit is designed to enable rapid, reliable, and responsible reporting of small-calibre ammunition in a variety of circumstances. It provides instructions for reporting on ammunition recovered at crime scenes and on cartridges collected during disarmament or weapons collection programmes; it also supplies guidelines for investigating parties to armed conflict or crime.

In addition, the Kit includes the information needed to judge the validity and reliability of the data collected, understand the limitations of tracing data, and generate comparable information.

While offering guidance on issues such as safety considerations, the Tracing Kit also outlines the Small Arms Survey's comprehensive, evidence-based approach to ammunition tracing and its commitment to providing secure, impartial, and timely analysis of ammunition data.

Using the components of the Ammunition Tracing Kit:

- Use the **magnetic Ammunition Tracing Tool** to measure cartridges, identify case composition, and photograph the ammunition.
- Use the **Bullet Diameter Guide** to establish the calibre of small-calibre cartridge-based ammunition and to photograph it against a clean background.
- Before conducting any investigations or recording ammunition, read the **Ammunition Tracing Protocols** carefully to find out about important safety issues and guidelines for data handling and analysis.

The Protocols provide a first step in clarifying the requirements and limitations of ammunition tracing. They underscore that ammunition tracing can be a powerful tool for understanding the illicit trade in ammunition and for reducing its effects. But tracing is a complex process and one that needs to be controlled by a strict set of rules for interpreting, verifying, and publishing findings.

The Protocols provide clear guidance on the risks inherent in ammunition tracing—both in terms of accurate and responsible reporting and on issues related to the physical security of ammunition tracing practitioners and their informants. While the Protocols draw on many years of collective experience in the field of armed conflict, it should be noted that they cannot predict all eventualities.

- Read the **Ammunition Tracing Manual** to learn how to complete the Ammunition Reporting Forms and how to submit them to the Small Arms Survey for analysis. The Manual provides the step-by-step instructions for recording small-calibre ammunition quickly and reliably in field conditions.
- Complete the **Ammunition Reporting Forms** to record specific types of ammunition and their identifying features. These Forms have been field-tested in a number of countries and in different contexts, ranging from cartridges found on the ground after a violent incident to ammunition recorded directly from non-state armed groups.

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# AMMUNITION TRACING PROTOCOLS

## A Guide to Safe, Responsible, Evidence-based Ammunition Tracing

### 1. About these protocols

These protocols are a guide to safe, responsible, evidence-based ammunition tracing. They have been developed by the Small Arms Survey to meet growing demand for reporting on the illicit trade in and misuse of small calibre ammunition.

The protocols are designed to be used together with the Small Arms Survey's Ammunition Tracing Kit, which aims to standardize ammunition data collection and generate comparable information on the distribution of small calibre ammunition.

The protocols are designed for use in a variety of circumstances. They are formulated in this way because access to information differs significantly according to local circumstances—in particular, local security dynamics. Some studies may be able to generate detailed background information on the trade in ammunition and report on patterns of acquisition by specific groups. Other studies may only be in a position to record the types of ammunition found in a particular location or following a violent event. Regardless of circumstances, however, almost all ammunition tracing information is useful. Whether complete or partial, it contributes to the global understanding of ammunition proliferation. But different circumstances of ammunition tracing impose different limits on what can be deduced from the data, and these protocols explain what those limits are.

Ammunition tracing is a relatively young field of research and there is no single, commonly agreed upon approach to tracing. These protocols should there-

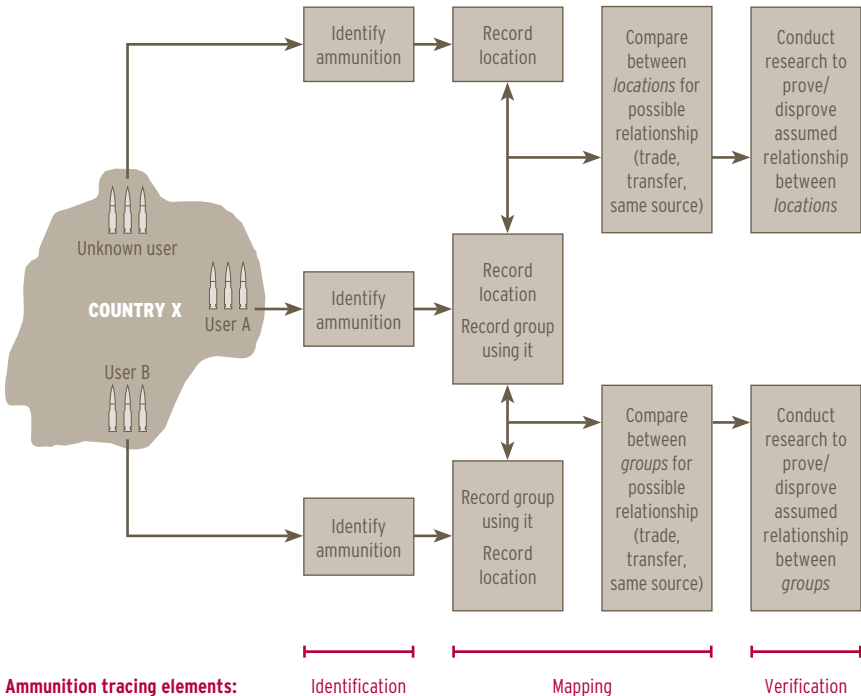
fore be read as a set of guidelines to aid responsible research and help design projects, whichever tracing method is decided upon.

## 2. The objectives of ammunition tracing

Ammunition tracing is ‘a set of diverse methods that are used to identify ammunition, its origins, and patterns of transfer’.<sup>1</sup> It can be employed in various ways, ranging from identifying the manufacturer of a particular type of ammunition, to more complex studies that use multiple sources of information to establish patterns of ammunition transfer. It can be used to monitor the illicit trade or to establish the origins of ammunition that was legally transferred, but later misused.

It is important to note that the legal and illicit trade are so seamlessly linked in some contexts that ammunition in both markets often needs to be recorded and analysed, comparatively, in order to understand illicit transfer dynamics.

**Figure 2.1 The ammunition tracing process and elements within it**



### 3. Elements of ammunition tracing

There are essentially three elements of ammunition tracing: identification, mapping, and verification (see Figure 2.1). Identification uses the physical characteristics of ammunition to determine where and when it was manufactured. Mapping involves recording samples of ammunition from different locations or groups and using this information to develop a detailed picture of the distribution of ammunition. It can provide clues as to where there may be trade in ammunition, either between groups or between different geographical locations. Verification is used to test any assumptions that are made using the trends revealed by mapping. It involves comprehensive field research on the dynamics of ammunition transfers. It also includes additional qualitative methods, such as reviews of defence literature and media reports, and analysis of existing research on the dynamics of armed conflict.

Information on identification, mapping, and verification is summarized in Annexes 1, 2, and 3 to these protocols.

A comprehensive ammunition tracing project necessitates carrying out all three tracing elements in sequence: identification, followed by mapping, followed by verification. The sequence does not have to be followed to its conclusion, as the following sections note. However, partially following the sequence (e.g. carrying out identification, or identification and mapping, without verification) limits the scope of the analysis and reduces the strength of claims that can be made about the distribution and transfer dynamics of the ammunition in question.

**Table 3.1 Elements of ammunition tracing**

Element	Purpose	Outcome/relevance for illicit transfers
Identification	Determines the type of ammunition (i.e. place and date of manufacture)	Used to monitor the presence of ammunition that may have been unlawfully or illicitly exported, imported, or distributed
Mapping	Plots the distribution of ammunition (by groups or geographically)	Used to narrow down plausible (or implausible) avenues for trade, transfer, or other forms of acquisition
Verification	Generates qualitative information about the security situation and the dynamics of illicit trade	Used to prove or disprove trends in trade or transfers suggested by mapping and to provide explanations for their dynamics

### 3.1 Identification

Ammunition tracing begins with collecting information on the physical characteristics of ammunition, including:

- markings applied at the time of manufacture;
- the calibre of the ammunition in question; and
- associated information related to its construction.

It may also include any other physical information that can be used to identify ammunition and its origins, including: magazines; machine gun belts; clips or links from machine gun belts; and, often most importantly, ammunition packaging.

The Small Arms Survey's Ammunition Reporting Forms and Cover Sheet provide a systematic method for collecting information that can later be used to identify ammunition. The Manual (the next section of the Tracing Kit) explains the relevance of this information.<sup>2</sup>

Information recorded from the ammunition in question is used to identify the producer (manufacturing entity), the country of origin, and (usually) the date of production.

For many purposes, ascertaining the identity of the ammunition is, by itself, a valuable exercise. It can generate data on the types, ages, and calibres of ammunition that one would expect to find in a particular region—and, hence, provide a baseline against which to assess whether there are changes in the types of ammunition circulating (i.e. an influx of certain new varieties). For example, identifying one particular type of ammunition on the illicit market can be important, because the item may have been exported or imported illegally, or may be unusual for some other reason in the context in which it was found.

Any identifying information can be used to generate background information, which, even if not useful at the time of recording, contributes to a 'global' dataset and can later be used for comparison with other types of ammunition.

However, pure identification data is also limited in the uses to which it can be put. The trade in ammunition is complex. Many items are legally traded, but



later resold under questionable circumstances. Others are stolen. Given that many types of ammunition on the world's illicit markets are old (sometimes 20 or 30 years), there are limited applications for identifying the origin of ammunition alone.

**EXAMPLE:** *In 2006, small arms control advocacy organizations reported that cartridges manufactured in Greece, Russia, and the United States had been found in the hands of rebel groups in the eastern Democratic Republic of the Congo. Although the report noted that the manufacturing states could not be directly implicated in illicit trade or transfer to the region, it did not elaborate on the fact that many of the cartridges were old (some approaching two decades).<sup>3</sup>*

The report highlighted the fact that manufacturers often have little control over ammunition that they may trade entirely legally. Implicitly, the report raises questions regarding the security of ammunition once it has been transferred from the manufacturer to the recipient, or regarding the potential for recipients to retransfer ammunition irresponsibly.

However, the identification data presented in the report remains background information, which may be useful for later comparative analysis, but cannot be used alone to establish the dynamics of trade. Successfully identifying a piece of ammunition cannot explain when, where, or how it entered the illicit market. From the perspective of providing information to help design policies to control (rather than raise awareness of) the illicit trade in ammunition, identification alone is often insufficient.

**EXAMPLE:** *A single Chinese-manufactured cartridge found in the Sudanese region of Darfur does not imply that China has exported arms to the region in contravention of a United Nations arms embargo. Even if the Sudanese military is known to use Chinese-manufactured cartridges, these cartridges are also used by the armed forces of three or four nearby states in the region. The cartridge found in Darfur could just as easily have been lost or stolen from one of those armed forces as it could have been supplied through Sudan.<sup>4</sup>*

It is also important to note the rare cases in which ammunition has been falsely marked—i.e. marked with one manufacturer's symbols, while having been produced in another factory. This phenomenon is extremely rare, and ammu-

nition tracing practitioners are more likely to encounter unknown markings than false ones.

**EXAMPLE:** *In the 1970s, one or a number of Chinese manufacturers produced a  $7.62 \times 51$  mm cartridge whose headstamp was an exact copy of an existing cartridge manufactured by the British company Radway Green. The cartridges are virtually indistinguishable to the untrained eye and can only be differentiated because the Chinese version is manufactured in copper-washed steel. While rare, falsely marked cartridges have the potential to skew ammunition tracing results. The example illustrates the importance of recording as much information about ammunition as possible.*<sup>5</sup>

The Small Arms Survey's 'long' Ammunition Reporting Form ARF(L) allows the recording of cartridge case colour and information regarding the composition of the cartridge case as a means of verifying whether marking information is accurate. This information is used to generate important background information on the types of ammunition circulating in various regions of the world.

### 3.2 Mapping

The problem with simply identifying ammunition is that the analysis is static, rather than dynamic. A dynamic analysis requires identifying ammunition and organizing the information into samples that can then be compared with one another. The process is still binary, in the sense that types of ammunition in a sample are either 'there' or 'not there'. But, in the case of mapping, the fact that ammunition may be absent in one location can be just as important as its presence in another. In short, mapping can suggest a potential relationship between the presence of ammunition in one locale and another, or in the hands of one group and the next.

Mapping entails identifying ammunition and then either its location or the group of people using it at the time of recording. Mapping can be general, such as indicating the country in which it was recorded, or specific, whereby it identifies the group of people or individuals using the ammunition.

Mapping requires relatively large samples of ammunition, because it depends on being able to ascertain whether the presence or absence of certain items is

significant or not. A small sample, for example, one consisting of two pieces of ammunition in one geographical location and three in another close by, might include five different types of ammunition in use by only two individuals. By contrast, a large sample, such as 50 pieces in one location and 60 in another, if representative of a broader range of users in the location (see Box 1),

### **Box 1 Representative sampling from groups**

Comparing the ammunition stocks of different groups requires 'representative' samples of ammunition. A sample is representative if it contains ammunition that is indicative of the 'actual' distribution of ammunition within a given group. Determining the actual distribution requires knowledge of the group in question and its structure.

The actual distribution could be the result of various factors. For instance, some group members may use different calibres from others. Certain members of the group, or factions within it, may acquire ammunition from different parties or different locations. Differences may also be the result of other factors, including theft or capture of ammunition on the battlefield by some group members (and not others) or individual preferences for using (firing) some types of ammunition before using other types.

Failing to take these factors into account can result in an unrepresentative sample of the types, calibres, and origins of ammunition used by a group as a whole. The following suggestions are illustrative of the measures that can be taken to make a sample more representative:

- If the entire group is the focus of investigation, samples need to be taken from *all* factions within the group.
- Samples need to be taken from a range of group (or faction) members in order to try and cover as many different circumstances of acquisition as possible.

There is no single rule for ensuring a representative sample, with the exception that more background information on the group in question is always better (e.g. the group's internal dynamics, its ammunition preferences, and its acquisition patterns). The more detailed the background information, the better are the chances of establishing from whom to sample (see 'Verification' in Section 3.3, below).

As a rule of thumb, researchers should try to record as broad a sample as possible, given security and access constraints. However, it is imperative that researchers acknowledge sampling limitations when analysing results and drawing conclusions, as a partial sample means that conclusions are valid only for the sampled group or faction (and possibly the individual).

might reveal that over half of the items in the two locations share identical markings.

Findings such as these may indicate a relationship between the two samples—the two locations may have similar sources of ammunition or the actors who reside in each may trade ammunition with one another. When it is carried out extensively, with numerous samples and large sample sizes, mapping can be used to identify trends that *may* suggest transfer patterns.

It is important to stress, however, that the presence of similar types and numbers of ammunition in the hands of two or more groups, or in two or more locations, does not mean that trade or transfer exists. It merely informs the researcher of potential avenues to explore or, conversely, avenues that are implausible or unlikely and that can be excluded from further investigation.

**EXAMPLE:** *A sample of ammunition circulating among pastoralist communities in the Kenyan, Sudanese, and Ugandan border regions revealed very large numbers of a type of ammunition that could not be attributed to a specific manufacturer. Sampling from both state and non-state actors excluded Uganda as a possible source of the ammunition, because there were only small numbers of examples of this type of ammunition in the hands of Ugandan non-state groups and it did not appear in samples recorded from Ugandan armed forces. The ammunition was also notably scarce on the Sudanese side of the border, but concentrated in Kenya. Even though the ammunition could not be identified, this information was sufficient to direct further research towards one or more Kenyan groups as a potential source of illicit trade.<sup>6</sup>*

Given the complexity of the illicit trade in ammunition, and the fact that reliable accounts are often difficult to obtain, knowing where to carry out further investigations (and where not to investigate) can save time and resources.

### 3.3 Verification

Mapping may suggest potential relationships between ammunition types found in one sample and those found in another. It can indicate where to look to find evidence of transfers, but it cannot prove beyond reasonable doubt that hypothesized relationships (trade, transfer, or similar sources of ammunition) are responsible for the distribution patterns observed.

As a general rule, if the findings generated by ammunition mapping appear to implicate a party's involvement in illicit trade or transfer, these findings should never be released until the information has been verified by extensive additional research.

Verification methods include interviews conducted in and around the location in which the ammunition in question was recorded; reviews of existing documentation relevant to ammunition trade, transfer, or acquisition; and informal requests to the implicated parties for confirmation, clarification, or denial. Verification may include:

- interviews with people suspected of involvement in illicit trade, whether on the supply or the demand side of the transfer;
- interviews with people who may be unconnected with transfers, but who may have important insights into their workings;
- reviews of existing reports (whether academic or media reports, or government statements) that may have previously acknowledged or investigated illicit trade or transfer in the region;
- investigations into patterns of political or military support to one faction or another, in order to determine plausible supply patterns;
- comprehensive investigations into the dynamics of armed conflict or crime, in order to gain an understanding of demand and acquisition opportunities; and
- sending research findings to parties that may be implicated in the trade, so that they have the opportunity to refute, refine, or corroborate those findings.

***EXAMPLE:** Research conducted in 2006 and in 2007 revealed that Ugandan-manufactured ammunition was circulating in large quantities among warring non-state factions in the north-east of the country. Ammunition mapping suggested that elements within the Ugandan security forces might have illicitly diverted the ammunition in question. The findings were verified by a combination of field interviews with the recipients of the ammunition; an assessment of local trade in all military-related commodities; reviews of the Ugandan press; and the fact that Ugandan government statements had acknowledged illicit diversion from some members of the security forces in the past. The research also eliminated sources of significant transfers other than Ugandan security forces,*

*including trade with neighbouring groups, diversion from neighbouring state forces, and the capture of ammunition.*<sup>7</sup>

There is often a strong temptation to release unverified information, particularly when the findings are newsworthy or of immediate policy relevance. This temptation should always be weighed against the consequences of making false allegations, including the potential for harming future opportunities for research on the trade in ammunition.

#### **4. Recording ammunition in different circumstances**

The circumstances in which ammunition is recorded have strong implications for how any information generated is later used. These circumstances fall into two broad categories.

The first allows practitioners to record ammunition that is in the hands of particular users. This can be called *attributed sampling*. The second allows practitioners to record ammunition, but this ammunition cannot be attributed to a particular user. This can be called *unattributed sampling*. These two forms are used under the following circumstances:

- *Attributed sampling*: The person recording the ammunition does so while the ‘user’ of the ammunition is present. The recording party knows that the ammunition in question ‘belongs’ to a particular person or group.
- *Unattributed sampling*: The person recording the ammunition does so without complete knowledge of who the ‘user’ is, and does not know to whom the ammunition in question ‘belongs’.

The term ‘user’ denotes the person who is in possession of the ammunition. The user could be a member of the military, a civilian, or a combatant in a non-state armed group. The user may also be a ‘user group’, whether a military unit, a community, or a rebel force.

As the following sections explain, while it is often more difficult to record samples of ammunition directly from users, the attributed sampling method is always preferable to unattributed sampling, from the perspective of analysing the illicit trade.

## 4.1 Attributed sampling

Attributed sampling is used to record the types of ammunition used by specific individuals, groups, or states. Attributed sampling can reveal where to look (or not to look) to find evidence of trade.

The basis of comprehensive ammunition tracing is comparison—whether comparing ammunition found in two different countries, or ammunition found in the hands of two different communities, armed groups, or police forces. Comparison requires mapping the distribution of ammunition and, ultimately, inferring possible transfer dynamics. In particular, it requires the labelling of ammunition records according to a unit of analysis (or unit of comparison), which could include any number of the following:

- individual (a person);
- group (military unit, faction, community, etc.); and/or
- location (geo-reference, road intersection, village, town, country, region).

As a general rule, as the units of analysis become smaller or more defined, the potential for finding meaningful information about the trade in ammunition becomes greater. The Small Arms Survey's Ammunition Reporting Cover Sheet (ARCS) ('Forms' tab of the Tracing Kit), for example, is designed to record various types of information, including the group from which the ammunition was sampled, the specific sampling location, the location in relation to the nearest town, and the host country.

Because the illicit transfer of ammunition is a social phenomenon (carried out by people not places), it is sometimes more useful to map ammunition distribution according to the people using it—the 'users'—than simply to map its location.

User-attributed recording can only be conducted when the researcher is absolutely certain of the user or user group, such as in the following cases:

- the researcher asks the users to unload their weapons and records the unloaded ammunition;
- the researcher records ammunition from the user at the exact moment of hand-over during a disarmament or weapons collection programme;

- the researcher records ammunition that is stored in a central storage facility (armoury, arms store, etc.) under a user's control; or
- the researcher records ammunition recovered from the scene of a crime/incident *only when* it has been forensically verified as coming from one user.

Certainty in attributing ammunition to a user/user group is essential in the case of ammunition mapping. If the ammunition is attributed to the wrong user, any assumptions made regarding the ammunition data can be skewed.

## Box 2 A note on forensic methods

Cartridges, cartridge cases, and bullets can provide forensic evidence to determine the origin of ammunition, a weapon used in an act of violence, and the circumstances in which the weapon was used. Forensic methods focus on what are often called the 'mechanical fingerprints' that are produced by irregularities in ammunition manufacturing processes or caused by the weapon in which the ammunition has been used. Bullets may also pick up trace evidence from intermediate targets, such as distortions caused by passing through particular types of material. They may also carry genetic material from human users or human targets.

In the field of ammunition tracing, forensics first focuses on the physical evidence (marks, irregularities, and distortions) particular to ammunition and its components. When cartridges are unmarked, falsely marked, or have unidentifiable headstamps, cartridge case composition, manufacturing tool marks, and the various types of steel cores/penetrators within bullets can be used to narrow down the range of possible manufacturers.

In the case of ammunition that has been used in an act of violence, both bullets and cartridge cases can be used to match ammunition to specific weapons and their users. The rifling, or twisted grooves, inside a weapon's barrel, for instance, leaves marks on bullets and ejected cartridge cases. Different twist rates, different numbers and widths of grooves and lands (raised areas between grooves), and the direction of twist (whether turning clockwise or counter-clockwise) inside the barrel can be used to identify the weapon or the type of weapon from which a bullet was fired.

Furthermore, firing pins, extractors, ejectors (if any), the breech block, the chamber, and the magazine may leave distinctive patterns on the cartridge case. These 'class characteristics' can be used to identify the weapon used, and include the calibre; the shape of the firing chamber; the location, size, and shape of the firing pin; the size and shape of the extractors and ejectors; the geometrical relationship of the extractor, ejector, and breech face marks; and any chamber marks that may be left on the cartridge case.

Source: Khaldoun Kabbani, firearms examiner<sup>3</sup>



## 4.2 Unattributed sampling

Unattributed sampling occurs when a practitioner records ammunition but is unable to ascertain precisely who its users are or were. It may occur under the following conditions:

- Spent (used) ammunition is recovered and recorded from the scene of a battle, human rights abuse, or crime. It is unclear (a) which protagonists fired the ammunition and (b) whether it may have been fired during a previous act of aggression that took place at the same place (i.e. unconnected with the current investigation).
- Ammunition is recorded after having been assembled during a disarmament or weapons collection programme. It is unclear (a) to which faction the ammunition belonged and (b) whether the ammunition has been transported from several different locations to its current location.
- Ammunition is found in an abandoned cache or other storage facility. Even though the cache may apparently belong to one group, without supporting evidence, using this information can risk drawing wrong conclusions about the user of the ammunition in question.
- Records are compiled from photographs or physical samples collected by a third party. It is unclear (a) where the person photographed or collected them, or (b) whether the person may have an interest in providing false information about their origin.

Identifying ammunition alone can be a useful exercise, as noted above. There are, however, quite severe limitations on what can be deduced from ammunition that cannot be attributed to a particular user or user group. The Small Arms Survey's Ammunition Reporting Cover Sheet (ARCS), for example, makes an important distinction between ammunition that is verifiably attributable to one user and ammunition that cannot be attributed. This is because unattributed ammunition data cannot be used in the following circumstances:

- to indicate the type of ammunition in use by a particular group (and, by extension, any subsequent inferences made about illicit trade involving the group and that ammunition); or
- to implicate any actor or group in an act of violence or a case of human rights abuse (without corroborating forensic evidence).

In particular, spent (used) ammunition found on the ground may have been tampered with in some way, simply because the investigating party is not in a position to verify who fired it.

**EXAMPLE:** *In 2004 an armed group massacred 160 people in the Burundian Gatumba refugee camp. Subsequent eyewitness testimony suggested that the group who carried out the attack retrieved their spent ammunition cartridge cases and scattered cases of a different type to conceal their involvement in the attack. These reports have never been confirmed, but clearly illustrate the difficulties of attributing ammunition found on the ground to particular users—and notably the potential for tampering with evidence.<sup>9</sup>*

Despite the limitations of unattributed sampling, it can still be very useful. Even if the exact user or user group cannot be identified, the information can sometimes be used in a different type of analysis. For instance:

- ammunition that is known to belong to non-state armed groups, but cannot be attributed to one faction, may be labelled ‘non-state’ and compared with ammunition in the hands of state forces in the country in question or with groups in neighbouring countries; or
- ammunition that has been collected from several unidentified groups during a disarmament exercise, but from *one area only*, can be labelled according to the location in which it was collected. It can then be compared with ammunition recorded in neighbouring areas.

Even though they are less specific than particular user groups, broader group attributions (such as state or non-state) or geographic attributions (such as district, region, or country) can provide useful, comparable data.

**EXAMPLE:** *Ammunition recovered from police seizures made in the Brazilian city of Rio de Janeiro was stored in one place, and had not been labelled according to which particular criminal faction it had been recovered from. However, because the vast majority of this ammunition had been recovered from the city’s drug factions (and not from other criminals), the sample was a good representation of the types of ammunition used by these drug factions. The sample was used, as a whole, to compare the recovered ammunition with the types of ammunition used by Brazilian security forces and to test for possible cases of illicit diversion from those forces to the city’s factions.<sup>10</sup>*

## **5. Safety, security, and protocol before sampling**

Practitioners of ammunition tracing are likely to carry out their research in an environment that may suffer high levels of armed violence, whether crime- or conflict-related. Even when ammunition has been collected by a third party, comprehensive ammunition tracing requires follow-up research to verify the information provided. It is important to note that even asking questions and conducting interviews in some environments can present a risk to the researcher and to interviewees.

The next sections outline important aspects of safety, security, and protocol that must be considered before entering into potentially hazardous situations.

### **5.1 Assessing the security situation in the sampling location**

In the interests of minimizing risk, the Small Arms Survey recommends that field-based personnel restrict their tracing activities to ammunition that they may encounter during the normal course of their work.

In addition, the Survey recommends that ammunition tracing practitioners do not to visit a location unless:

- they are already based in the area and have detailed knowledge of the security situation there; or
- they can partner with an individual or organization that is based in the area and has detailed knowledge of the security situation there.

### **5.2 Locating the appropriate research partner**

Ammunition tracing can be carried out ‘cold’, without lengthy attempts to reassure interviewees or ammunition users of the aims, objectives, and usefulness of the research, but only when there are clear lines of authority and the relevant authorities agree to the tracing work being carried out.

In most other cases, reaching the point where people are prepared to answer potentially sensitive questions about ammunition requires patience and extensive efforts to reassure potential interviewees. The most effective way to reassure a group or community is to locate a partner that is:

- locally based (preferably of the same ethnic/linguistic/political group);
- known and respected by the community or group; and
- fully briefed on the research activities (and in agreement with them).

The support of a local partner is necessary for a variety of reasons, including:

- *access*: approaching prospective interviewees and ammunition users;
- *reassurance*: explaining the research objectives in the local context;
- *safety*: advising on security risks or potentially sensitive situations; and
- *communication*: interpreting languages and interpreting how people respond to the research.

### **5.3 The role of national and sub-national authorities**

National or sub-national authorities in some countries are likely to view arms and ammunition as a national security issue. This view may be adopted regardless of who is in possession of the arms and ammunition (including civilians), or the nature and objectives of the research.

Handling or recording information on weapons and ammunition may therefore risk breaking national laws or locally accepted prohibitions. A practitioner's failure to declare the nature of the research in advance and obtain official approval for it could result in his/her arrest or imprisonment. Relevant authorities to approach in advance include, but are not limited to:

At the national level:

- the Office of the President or Prime Minister;
- the Ministry of Internal Affairs (or its equivalent);
- national/federal police authorities;
- the national firearms registrar; or
- the National Focal Point on small arms and light weapons.

At the sub-national level:

- a military force commander;
- a police commander;

- the internal intelligence services;
- the civil administration;
- the armed civil authorities (customs, wildlife protection, etc.); or
- community or religious leaders.

In certain contexts (particularly where there are high levels of armed violence or ongoing military operations), civil administrations may be subordinate to military or paramilitary institutions.

As a general rule, it is better to approach the authority that is best able to guarantee that the research can be carried out safely and efficiently (i.e. an individual or institution that will not be overruled or contravened by competing authorities).

#### **5.4 Notifying appropriate authorities in advance**

All ammunition tracing practitioners need to notify relevant national or local authorities in advance that they intend to carry out research. Ideally, this should involve:

- making the necessary enquiries before carrying out the research to determine which are the relevant and effective authorities in the region;
- drafting a general written statement that explains the nature of the work and the reasons for it before carrying out the research;
- making a formal visit to the relevant authorities in order to present the general written statement about the research and answer any questions; and
- obtaining, if possible, a letter of accreditation from those authorities that explains the scope of the research activities, and has been officially signed and stamped.

In some cases, it may be best to prepare a standard, printed letter in advance. The letter can then be signed and stamped by the relevant authorities. In countries where local authorities do not have access to typewriters or computers, a signed, printed document may carry more authority than a handwritten note. The pre-prepared document should explain:

- the nature of the work;
- any relevant institutional affiliations that have authorized the work;
- the reasons for the work (i.e. to better understand illicit trade);
- some local/regional context related to the problem of illicit trade;
- a request 'to whom it may concern' to offer safe passage and assistance; and
- contact information (preferably the telephone number) of the authorizing authority.

## **6. Safety, security, and protocol when sampling**

Sampling ammunition and carrying out verification interviews present dangers to ammunition tracing practitioners and to the people they sample from or interview. Ammunition is a sensitive subject area and one that may result in ammunition users:

- becoming hostile when approached about whether they might be willing to discuss issues related to illicit trade;
- becoming hostile during the course of ammunition sampling or during an interview related to illicit trade; or
- becoming hostile after the event, particularly if they realize that they may have provided information that may harm them in some way.

Ammunition tracing practitioners need to be aware of these risks before, during, and after sampling or interviewing. The following sections outline some of the methods that can be adopted to minimize potential problems caused by ammunition tracing.

### **6.1 Respecting interviewee/ammunition user concerns**

The users of illicit ammunition often fear (for good reasons) that ammunition tracing may lead to policies or outcomes that can interrupt the supply of ammunition or negatively affect their security. This may include fears that:

- the research is designed to compile information in advance of a disarmament exercise that could negatively affect the security of the group or community concerned;

- the research may result in effective polices to restrict the supply of ammunition, which will reduce the group's or community's chances of replenishing ammunition;
- the group or community, by revealing its particular stocks of ammunition, is likely to suffer a decrease in supply, while its adversaries will not;
- adversaries may use information generated by the research to assess the strength of the group or community in question and to devise new ways to attack them; or
- the findings of the research will be released to authorities, who may then punish the group or community in question.

Fears differ from group to group or community to community, and the above list is by no means complete. In general, however, interviewees usually concentrate on the potential for the research to negatively impact on their own security, whether from an offensive perspective (i.e. an armed group or faction wishing to maintain military parity with an adversary) or a defensive perspective (i.e. a community seeking protection from armed violence and criminality).

For these reasons, there is always a chance that an ammunition user or interviewee may decide that the information they have provided to an ammunition tracing practitioner may threaten or jeopardize their security. Practitioners should be aware that a situation could develop in which their own safety may be placed at risk and should:

- be prepared to abandon an interview at any time should this occur;
- be prepared to 'return' data to the interviewee and promise not to use it; and
- indicate, in advance, to the interviewee that he/she is prepared do either of these things should the interviewee request it.

## **6.2 Reassuring interviewees/ammunition users**

Honesty is always the best policy. People have a right to know the objectives of ammunition tracing, particularly when the data that is generated has the potential to affect their lives. However, the way the project is explained to ammunition users or interviewees should always be sensitive to local security

concerns and ‘in tune’ with local views on the legitimacy of using weapons and ammunition, such as:

- there may be legitimate reasons for using illicit weapons in the region, owing to the absence of state-provided security;
- groups or communities may be locked into a security situation in which arms reduction and disarmament could prove disastrous if it is done inequitably; or
- the individuals or groups concerned may be legitimate users of the ammunition in question and may object to being linked to the illicit trade.

Reassuring ammunition users or interviewees (a) that the ammunition tracing practitioner is aware of these views and (b) that these views will be firmly reflected in any research report is an essential part of building trust. This is very important, because illicit ammunition users, in particular, may be highly sensitive to the fact that ammunition is a strategic resource and very aware that they are likely to be the first ‘casualties’ if its supply is controlled.

Despite these concerns, however, many people in conflict or high crime situations have an ambivalent relationship with illicit weapons and ammunition—on the one hand, they may wish to retain them for security reasons, while on the other, they may be very aware of the damage caused to their families and communities by armed violence.

For these reasons, people may well agree to talk about ammunition, even though this could later result in its restricted supply. They are, however, likely to be concerned that the research (and any resulting policies) should be:

- *equitable*: the sample does not include them and their ammunition alone;
- *anonymous*: the sample does not record personal information; and
- *beneficial*: the project has the potential to affect them positively.

It is important to note that many ammunition users (particular non-state, illicit users) will generally (and justifiably) be sceptical about the potential benefits of ammunition tracing, but may choose to provide information in good faith, when they see that the intentions of the person carrying out ammunition tracing are sincere.



Practitioners of ammunition tracing should therefore be careful not to ‘over-sell’ the project and make claims that it will directly benefit the person, group, or community in question. The interviewee is likely to be sceptical of any benefit from the start, and frankness regarding the project’s limitations on the part of the researcher can help promote openness and trust in the researcher–interviewee relationship.

There may be very little success to be had when approaching state armed forces for information on ammunition. Most state security forces believe that arms and ammunition are items of national security and out of bounds to anyone but members of the security services. However, when provided with the appropriate authorization from national or sub-national authorities, some forces may be willing to provide researchers with information.

### **6.3 Maintaining a discreet presence**

Even if some people are willing to share information on their ammunition stocks or to provide information related to illicit trade, others may be suspicious—particularly if they do not understand the nature of the work or have incomplete information about its objectives.

Weapons and ammunition naturally attract attention and are likely to arouse suspicion in many circumstances. Practitioners of ammunition tracing should therefore:

- ensure that anyone who is likely to observe or take serious interest in the research is informed of the objectives of the work;
- select locations where ammunition can be recorded, or where interviews can be conducted, away from casual, uninformed observers; and
- avoid carrying out tracing activities near roads or other routes where people who are unconnected with the project are likely to pass by.

As a general rule, ammunition users and interviewees are likely to be aware of local sensitivities regarding arms and ammunition. It is worthwhile consulting them about finding a suitable place to carry out the research before sampling or interviewing.

## 6.4 Weapons and ammunition safety in groups

Being in the presence of armed individuals presents dangers, of which the danger of someone accidentally or unintentionally firing a weapon is probably the most important. This most commonly occurs when:

- a person accidentally pulls the trigger while a round is chambered (loaded into the breach of a weapon); or
- a person accidentally chambers and fires a shot while clearing or reloading a weapon.

Sampling ammunition, or possibly carrying out verification interviews, is very likely to involve contact with loaded weapons. The Small Arms Survey recommends that ammunition tracing practitioners do not touch or handle weapons unless they have received proper and adequate training in firearms safety.<sup>11</sup> Furthermore, even persons who are qualified in firearms safety should not approach or touch explosive light weapons (such as grenades, missiles, and rockets, or their launchers) unless permitted to do so by a qualified ammunition technical officer (see the Tracing Kit Manual).

When recording ammunition in a group setting, practitioners should avoid situations in which many weapons are passed around at a time; where people load and unload weapons very close to one another; and where untrained people crowd around the venue. The following precautions can help to minimize risks, but people carrying out ammunition tracing should always be on the look-out for potential dangers:

- choose a location that encourages order (preferably people should be seated);
- encourage people to remain still and quiet;
- try to dissuade people from passing weapons around among themselves;
- dissuade people from inappropriately handling or pointing weapons; and
- leave if any of these conditions cannot be controlled.

## 6.5 Weapons and ammunition safety in storage facilities

Certain types of ammunition are inherently unstable when poorly stored or maintained. Weapons and ammunition storage facilities present a significant hazard in this regard. Particular danger of explosions may be presented by:

- permanent and semi-permanent weapons storage facilities, such as ammunition depots, armouries within barracks, or arms caches; and
- temporary stores of weapons and ammunition collected during disarmament or weapons collection programmes.

Ammunition tracing practitioners should never enter a weapons storage facility unless permitted to do so, and supervised throughout the time they are in the facility, by a qualified ammunition technical officer. They should also be aware that ammunition technical standards in many parts of the world are not very high, and should never assume that the personnel in charge of storage facilities (including international peacekeeping forces) have the required expertise to ensure that the facility is safe to enter.

In particular, the Small Arms Survey strongly advises practitioners to avoid sampling in the following circumstances:

- when it concerns any item of explosive light weapons ammunition, unless permitted to do so by a qualified ammunition technical officer (see the Tracing Kit Manual);
- when the physical appearance of a depot or other storage facility suggests that the facility and munitions inside it have not been well maintained;
- if the physical condition of ammunition shows signs of corrosion or damage, which suggest that the item may have deteriorated;
- where weapons or ammunition have been piled up together rather than stored on racks or otherwise neatly ordered; or
- when small calibre cartridge-based ammunition is stored alongside larger calibre explosive ammunition, such as rockets or artillery shells (see the Tracing Kit Manual).

## **7. Data handling and review**

As with all sensitive research projects, informants, interviewees, and, in this case, ammunition users should be protected to the greatest extent possible from potential negative results of ammunition tracing. These may include the following situations:

- individuals or groups that supply information are later harmed (physically or in other ways) by people who have been implicated in illicit trade;
- local or national authorities punish informants, interviewees, or ammunition users for providing information that runs contrary to policy or practice;
- individuals, groups, commercial entities, or national governments are wrongly implicated in illicit trade; and
- other loosely associated or unconnected research or international assistance programmes are negatively affected by the findings.

No research can guarantee that it will do no harm. However, ammunition tracing is in the fairly unique position of directly sampling from and interviewing individuals and groups who, first, may be involved in illicit trade and, second, may suffer a decrease in security, status, or wealth if measures are taken to control the activity.

The following sections outline some basic precautions that need to be taken to ensure responsible data handling and analysis, and distribution of findings.

## **7.1 Handling unattributed, 'raw' ammunition data**

Unattributed, 'raw' ammunition data consists only of lists of the types (factory of origin, date of manufacture, etc.) of ammunition recorded in a given location. This information is rarely harmful to any party, provided that it is distributed with the appropriate warnings.

For example, information that identifies a certain type of ammunition as having been produced in one country does not *usually* implicate the country of origin in illicit activity, regardless of the circumstances in which the ammunition was found. Research findings should, where appropriate, reflect this, and always include a warning along the lines of: 'no conclusions regarding illicit trade can be drawn from finding ammunition manufactured by this company'.

Moreover, the findings should also be careful not to refer, in any way, to possible manufacturer involvement in illicit trade without clear corroborating evidence. Manufacturers are often a valuable source of information for practitioners of ammunition tracing. Unverified references to potential manufacturer

complicity are not only unscrupulous, but could ultimately prove damaging to the success of future tracing projects.

## **7.2 Handling attributed ammunition data**

Attributed ammunition data may include very specific information that links ammunition to particular user groups—and possibly even to individuals. This data can never be released unless it has been carefully reviewed.

As a general rule, the attributed part of data (i.e. the names of groups or individuals or information associated with them) should be stored separately from raw, unattributed ammunition data, and access should be limited only to a core group of analysts and reviewers from the time of sampling onwards.

In certain circumstances, the loss or seizure of data could result in sensitive information falling into the hands of people who could misuse it. The Small Arms Survey recommends that, where loss or seizure could prove damaging, practitioners do not compile records related to individuals or groups using plain language, until they are in a position to ensure data security.

For example, when sampling from several groups, a predefined (and entirely non-suggestive) letter code can be used to distinguish the groups in question. This information can later be converted into plain language when the information can be stored in a more secure location.

The Small Arms Survey's ARCS cover sheet (see the Tracing Kit Forms), for instance, is designed to record sensitive information and is therefore separate from the ARF(L) and ARF(S) reporting forms. The ARCS cover sheet should preferably be left blank until it can be completed in a secure environment (i.e. it should not be completed while recording ammunition from a user).

## **7.3 Review processes**

Review processes are designed to check data for factual inaccuracies and compilation errors and to assess the credibility of any assumptions or allegations that may have been made.

Ideally, a review process should be a ‘rolling’ one, whereby information is continually questioned, weighed, and verified throughout an ammunition tracing project. A rolling process ensures that each step of the project is based on credible evidence and that major questions are less likely to be raised at the end of the project when deadlines may be close and there may be strong demands to produce answers quickly.

The Small Arms Survey recommends that practitioners of ammunition tracing should have their information reviewed externally—i.e. by people from outside their organizations (rather than conducting reviews themselves or within their own organizations). External review provides impartiality and also specific expertise that most organizations do not have available. In particular, external reviewers should include various people with knowledge of:

- the field of ammunition identification or tracing;
- the local dynamics of conflict or crime in the region;
- the legal and illicit trade in arms and ammunition; and
- the political and legal framework of the country or region in question.

Ideally, the consultative process should be confined to a small group, and access to data should be carefully limited. Inevitably, review processes (and verification more generally) involve the release of information, but information should only be released to people when their credentials have been fully assessed and on a ‘need to know’ basis.

## 7.4 Release of findings

Ammunition tracing is carried out in order to understand the illicit transfer of ammunition. The rationale behind most studies is that understanding particular aspects of transfers can promote targeted policies to control them, or else stimulate interest in arms control/armed violence reduction more generally. Evidence released in support of these objectives should not include unnecessary information that could prove unduly damaging. Ammunition tracing findings should always be:

- *targeted*: If the findings have the potential to cause harm (whether to a group, manufacturer, or state), they should implicate only those parties that hold

key positions, where controlling their actions could yield significant reductions in armed violence; and involve

- *minimal attribution*: If parties are implicated in illicit trade, research findings should aim to attribute illicit activities, or illicit possession of ammunition, in the broadest way that does not reduce the significance of the findings (e.g. implicating a group rather than an individual).

Any allegations made in the findings should be assessed against a ‘beyond reasonable doubt’ criterion before release.

## 8. The Small Arms Survey Ammunition Tracing Project

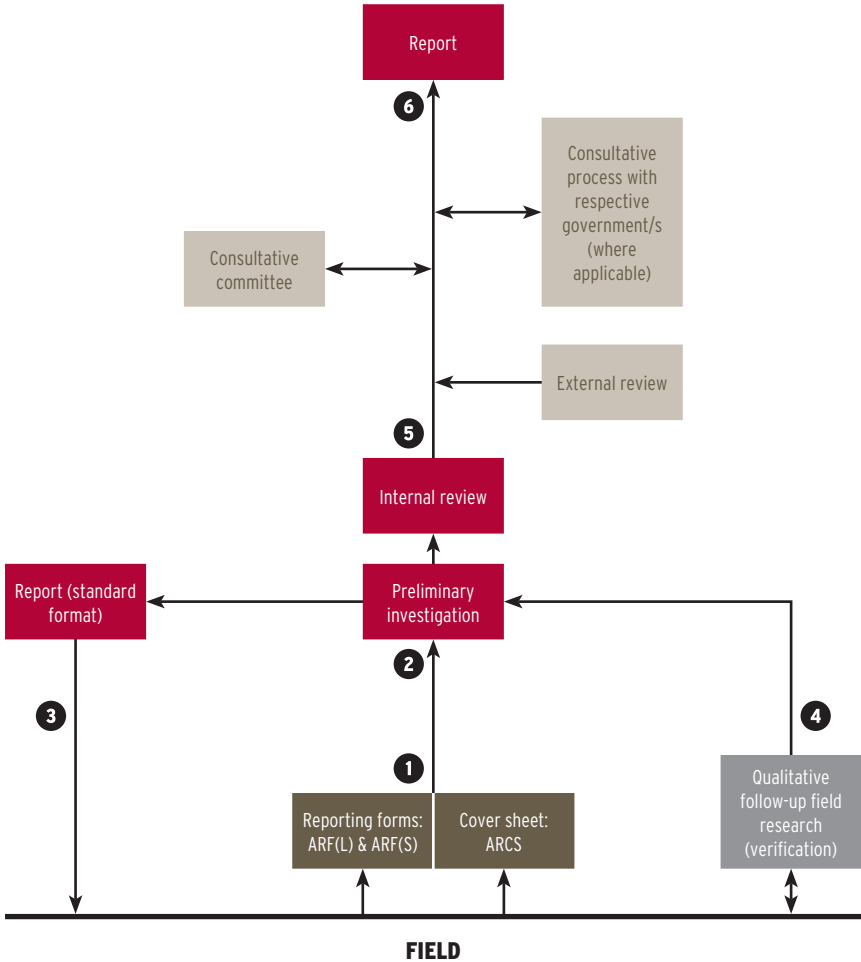
The Small Arms Survey Ammunition Tracing Project began in 2006. Since then, the project has evolved into a central repository for information on ammunition recorded throughout the world. The Survey provides an ammunition tracing service to all practitioners in the field of arms violence reduction and to anyone with a stake in restricting the trade in illicit ammunition.

The Small Arms Survey has the in-house capacity, assisted by a growing network of international experts, to identify ammunition and analyse ammunition tracing data. This involves a process (see Figure 8.1) whereby partners—‘reporting parties’—working on any number of field-based activities ❶ submit data to the Survey. This information consists of raw ammunition data recorded in the ARF(L) and ARF(S) reporting forms and separate, more sensitive, actor- or group-attributed information submitted using the ARCS cover sheet (see the Tracing Kit Forms).

This information is then investigated, preliminarily, ❷ by the Small Arms Survey, with technical assistance from a number of partners. The Survey prepares a report on initial findings and returns it ❸ to the reporting party. The report details the types and origins of the ammunition in the sample; suggests potential avenues for further investigation or requests verification; and includes important warnings regarding the reporting party’s future use of the information.

The Small Arms Survey carries out further investigations ❹ *only* if the data (and communication with the reporting party) reveals reasonable grounds to

**Figure 8.1 Data handling by the Small Arms Survey Ammunition Tracing Project**



**Key:** ■ Collecting partner activities; ■ Collecting partner and SAS activities; ■ SAS activities

believe that illicit trade in ammunition is taking place. If these investigations reveal strong evidence of trade, the Survey undertakes an extensive review and consultative process ⑤ to ensure the veracity of the findings, and may release a research report ⑥.

Ammunition tracing practitioners are invited to submit information to the Small Arms Survey, or to use the process described above as a guide to carrying out their own comprehensive ammunition tracing project.



## **Annexe 1**

### **Identification**

#### **Objective:**

Identification aims to identify types of ammunition found in a particular locality.

#### **Method:**

Ammunition markings can be used to identify the manufacturer (factory, state) of the ammunition in question. This method can be used for both live (unfired) ammunition or spent (used) cartridges found on the ground, because it aims *only to report what kind of ammunition is (or has been) circulating in a locality.*

#### **Utility:**

Identification can be used to outline very broad trends in ammunition supply, such as possible defence cooperation between states (e.g. a very high prevalence of Chinese- or US-manufactured ammunition in certain regions). In addition, it can be used to establish:

- most common calibres in a region; and
- average ages of the ammunition circulating there.

#### **Limitations:**

The data cannot be used to make a dynamic assessment of trade unless it is used to make a crude time series analysis (e.g. Russian Federation ammunition is most prevalent in a sample from 2008; German ammunition is most prevalent in a sample taken in 2010).

Because the ammunition in question is not attributed to any one user group (i.e. military, police, non-state group), no assessment can be made of similarities (or differences) in the types of ammunition stocked by different groups. As a result, it becomes impossible to hypothesize which groups might trade with one another.

Claims cannot be made that a manufacturing country supplies ammunition to a particular faction, because the ammunition in question may have changed hands many times.

## **Annexe 2**

### **Mapping**

#### **Objective:**

Mapping aims to generate reports on the types of ammunition in circulation among specific groups (i.e. military, police, non-state group).

#### **Method:**

Mapping records types of ammunition according to the group or specific location from which they were recorded.

#### **Utility:**

Mapping can be used to ascertain plausible (or implausible) ammunition trading patterns. For instance, it may reveal that Group A stocks the same types of ammunition as Groups B and C, whereas Group D uses entirely different types. In this scenario, Group D may be an unlikely supplier or recipient of the ammunition used by Group B.

Mapping may specifically establish the preferences of groups for certain types of ammunition (for instance, the military may prefer one type and the police another). This information may be useful when considering possible cases of diversion (i.e. which security force units to study for possible lax controls or ineffective stockpile management). In addition, the mapping may reveal:

- which groups use newer ammunition (i.e. which may have been recently resupplied); and
- a group's dependence on certain calibres (important when assessing the demand for specific types of weapon).

#### **Limitations:**

The data cannot be used alone to conclude that one group trades with another. In particular, data of this kind is susceptible to the phenomenon of 'sampling on the dependent variable', whereby two groups may never trade ammunition with each other, but may have both been supplied by a third group that is not in the sample.

Mapping needs a large sample of ammunition from each of the groups to enable inter-group comparison. In addition, the research needs to sample from as many groups as possible in a particular region if it is not to leave out potentially significant sources of trade.

The method cannot be used when recording information from spent (used) cartridges, because of the difficulty of attributing these to a specific group of users (i.e. if a cartridge is found on the ground, it is very difficult to identify who fired it).

## **Annexe 3**

### **Verification**

#### **Objective:**

Verification aims to verify whether potential trends revealed by the mapping component of ammunition tracing are credible. It can be used to determine whether trends suggest:

- trade between groups; and
- possible cases of loss or diversion (from legal users to the illicit market).

#### **Method:**

Verification involves qualitative research into the trade in ammunition, including the following activities:

- reviews of national defence agreements and trade in military materiel;
- interviews with state and non-state parties to the trade in ammunition;
- assessments of conflict dynamics (i.e. allies and adversaries);
- demand and supply assessments based on field interviews; and
- supporting documentation, including legal investigations as well as media coverage.

This information is used to narrow down possible sources of illicit ammunition through a continually refined process of elimination.

#### **Utility:**

Because it relies on extensive research, verification can generate a relatively nuanced appraisal of the trade in illicit ammunition—notably by including vital contextual information in the study, such as:

- the dynamics of crime or conflict in the region;
- resulting supply and demand dynamics; and
- recipients of arms and ammunition.

Because the method relies on multiple sources of information, given sufficient time, most data can be cross-checked (triangulated) with other relevant sources.

For this reason, verification is a preferred part of any tracing study and necessary for most projects that aim to publicize research findings.

**Limitations:**

Verification activities are limited only by the constraints of incomplete or inaccessible information. These barriers can usually be overcome if enough time and resources are available.

Practitioners should be aware of the need for in-depth background knowledge of a particular region before attempting to carry out a study of this kind, including an extensive knowledge of both conflict dynamics and the orientation of particular factions in a conflict or crime environment.

## Endnotes

- 1 See Bevan (2008, p. 42) for an introduction to various forms of ammunition tracing.
- 2 Various reference sources help identify small calibre, cartridge-based ammunition. Among the more comprehensive sources are: CartWin (2008), a computerized database of headstamp and manufacturer information; and Jorion and Regenstreif (1995a; 1995b), two printed volumes detailing the markings and manufacturers of civilian and military small calibre ammunition.
- 3 Information published in an Oxfam (2006) press report.
- 4 This example is based on a number of requests made to the Small Arms Survey by journalists regarding assault rifle cartridges (and larger munitions) photographed in the Darfur region of Sudan.
- 5 See Jorion and Regenstreif (1995a, p. 238) for information on the cartridge in question.
- 6 Ammunition records compiled by James Bevan in Kenya, Sudan, and Uganda, 2006–08.
- 7 These findings are presented in Bevan and Dreyfus (2007).
- 8 This box summarizes parts of Kabbani (2008).
- 9 Information supplied by a confidential source, February 2007.
- 10 These findings are presented in Bevan and Dreyfus (2007).
- 11 Firearms safety courses can be arranged by most national security forces or dedicated firearms resource centres, such as the National Firearms Centre, United Kingdom (see <<http://www.royalarmouries.org>>). Ammunition tracing practitioners should be aware, however, that training on firearms safety provided by some organizations may not prepare them for conditions that they may encounter in a field research environment.

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**AMMUNITION TRACING MANUAL**

**MANUAL**

<b>A. Introduction to using the Ammunition Tracing Kit .....</b>	<b>1</b>
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# AMMUNITION TRACING MANUAL

## A Guide to Using the Small Arms Survey Ammunition Tracing Kit

This manual is designed to be used together with the Small Arms Survey's Ammunition Reporting Forms and Ammunition Tracing Protocols. The manual is designed for people who come into contact with illicitly proliferating ammunition, but who may have little technical knowledge of the subject.

Before using the manual, carefully read the Small Arms Survey's Ammunition Tracing Protocols (ATP), which provide important safety and methodological information about the process of tracing ammunition.

### **A. Introduction to using the Ammunition Tracing Kit**

This kit is made up of several parts that are designed to show someone how to record useful information about ammunition accurately and simply, and to ensure that anyone recording this information does so with proper care for his or her own safety and that of others.

The kit includes:

1. Ammunition Tracing Protocols, which highlight important safety issues and provide guidelines for data handling and analysis;
2. Ammunition Reporting Forms, to record specific types of ammunition; and
3. this Ammunition Tracing Manual, which shows people how to complete the reporting forms rapidly and reliably, and gives the procedures for sending information to the Small Arms Survey.

The kit is designed to enable anyone with access to illicitly proliferating ammunition to send relevant information to the Small Arms Survey accurately and in a way that permits comparative analysis. The steps to follow when sending information to the Survey are:



1. Carefully read the Ammunition Tracing Protocols before investigating any ammunition.
2. Record the required information about the ammunition using one of the ammunition reporting forms—either ARF(L) or ARF(S).
3. Complete the ARCS cover sheet and attach it to whichever of the reporting forms you have used.
4. Send the reporting forms and cover sheet, together with any supporting information, photographs, and documentation, to the Small Arms Survey.

The Small Arms Survey will analyse the information you have provided and return the findings to you, together with any suggestions for further investigation or requests for you to clarify particular details in your reports.

## **B. Types of ammunition that may be recorded safely**

### **B.1 Cartridge-based small arms ammunition**

**NOTE:** The Small Arms Survey is interested in receiving information about:

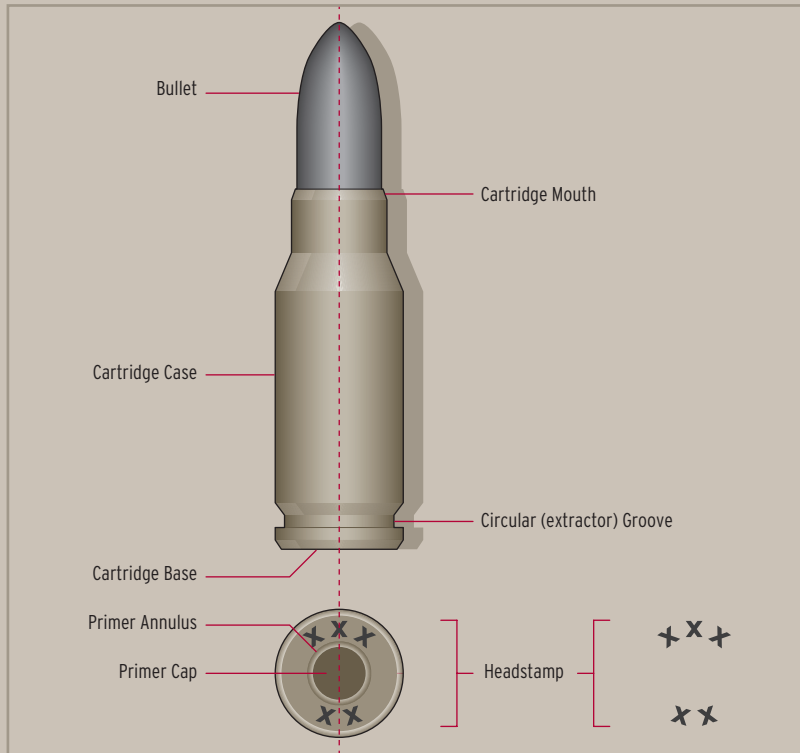
-  **live** ammunition (i.e. ammunition that has not been fired, where the bullet is still joined to the cartridge case); and
-  **spent** ammunition (i.e. ammunition that has been fired, where only the cartridge case is left).

**IMPORTANT:** Any information in addition to that about live or spent rounds of ammunition can provide important clues to the origin of ammunition, including: ammunition magazines, machine gun belts, clips or links from machine gun belts, and ammunition packaging (such as wooden and cardboard boxes). Packaging marks (text and symbols), in particular, are useful for obtaining manufacturer and lot/batch number information. Information on these items can be entered in the notes section of the ARCS cover sheet (Section 5). Ideally,

### Box 1 Components of a small calibre cartridge

A cartridge is a complete round of ammunition, consisting of a projectile (bullet) and cartridge case. The cartridge case contains the propellant and the primer (including the primer cap). Most small calibre cartridges are stamped with text or symbols—the ‘headstamp’—which may specify combinations of manufacturer, calibre, or date information. The headstamp can be found on the base of the cartridge case.

Figure 1 Components of a small calibre cartridge



photographs of these items should also be taken and sent to the Small Arms Survey.

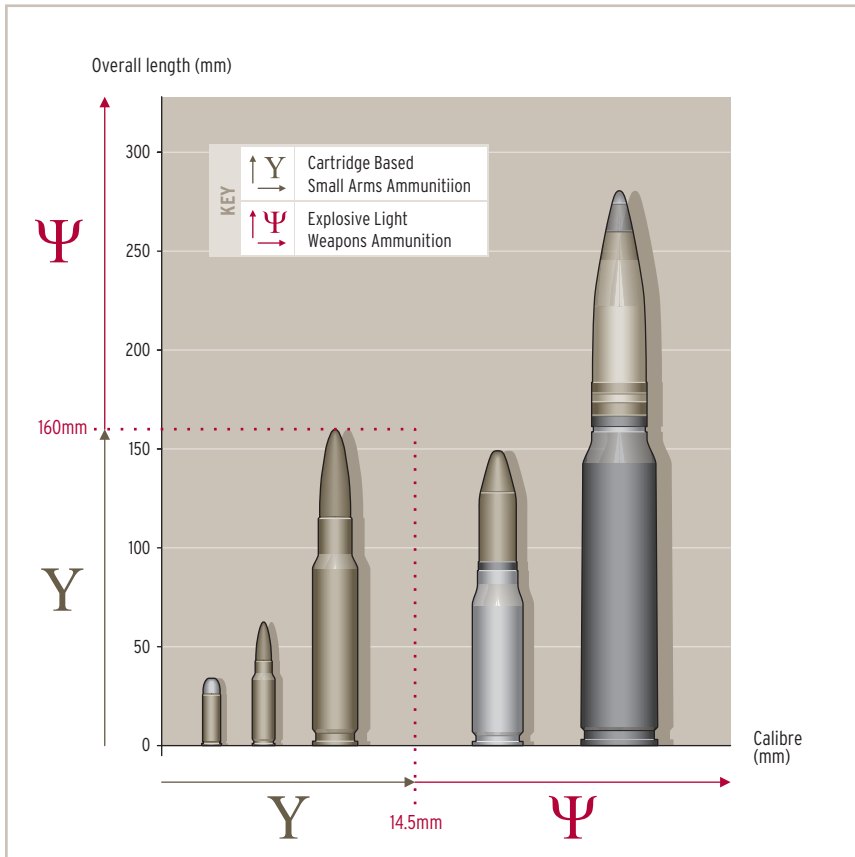
Cartridge-based small arms ammunition includes ammunition for:

- pistols and revolvers;
- sub-machine guns;

- rifles and assault rifles;
- light machine guns;
- heavy machine guns; and
- sniper and anti-materiel rifles.

Small calibre cartridge-based ammunition ranges from the smallest cartridges to those of 20 mm calibre (but usually less than 14.5 mm calibre). The bullets are generally inert (i.e. the bullets themselves do not explode), and complete rounds of small calibre ammunition are designed to be durable (i.e. long-lasting) and stable. This type of ammunition is indicated by the letter Y in Figure 2, below.

**Figure 2 Identifying cartridge-based small arms ammunition and explosive light weapons ammunition**



Provided that the ammunition has not deteriorated (i.e. shows signs of severe damage or corrosion), cartridge-based small arms ammunition can be safely (although carefully) handled by untrained people and recorded using the ARF(L) and ARF(S) reporting forms.

Larger types of cartridge-based ammunition (such as cannon and recoilless rifle ammunition) may look similar to cartridge-based small arms ammunition. These munitions, however, may have explosive warheads, and people handling them must *not* assume that they are safe or stable. These types come in the category of **explosive light weapons ammunition** (to identify them, see Figure 2, where they are indicated by the letter Ψ). *You should not approach or handle them unless you are permitted to do so by a qualified ammunition technical officer.*

**Do not approach or handle cartridge-based ammunition unless you are permitted to do so by a qualified ammunition technical officer if . . .**

**. . . its overall length (from bullet tip to cartridge base) is larger than 160 mm**

*or*

**. . . it is larger than 14.5 mm in calibre**

*or*

**. . . the bullet/projectile is completely painted.**

## **B.2 Identifying explosive light weapons ammunition**

There are many types of explosive light weapons ammunition. They include ammunition for:

- single shot, rotary, and automatic grenade launchers;
- mortars;
- unguided recoilless rifles and rocket launchers; and
- guided, man-portable missile systems.

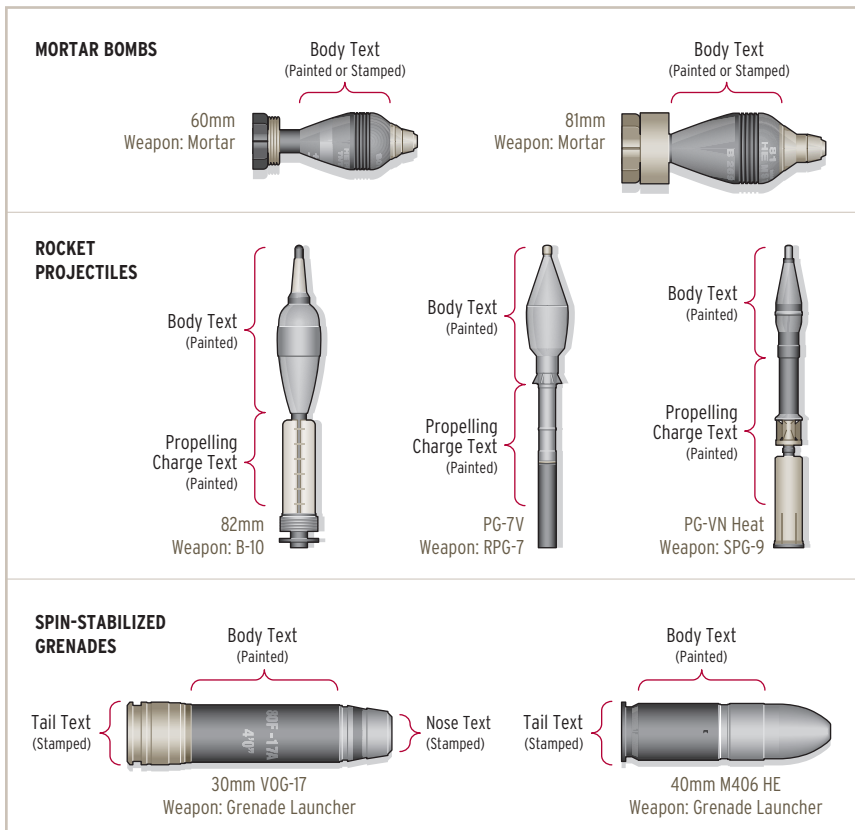
This ammunition can usually be distinguished from cartridge-based small arms ammunition because of its size—i.e. its larger overall length or calibre (see Figure 2)—and because it is often ‘missile’ shaped or has stabilising fins and other protrusions.

**Explosive light weapons ammunition can initiate (combust or explode) when handled if it has been poorly maintained and monitored. We strongly advise you *not to approach or touch* this kind of ammunition unless you are permitted to do so by a qualified ammunition technical officer.**

**B.2.1 Recording information about explosive light weapons ammunition**

Because this type of ammunition has many different designs (see Figure 3, below), it is not possible to supply a standard reporting form for explosive light weapons ammunition. The Small Arms Survey recommends that you do the following *under the guidance of a qualified ammunition technical officer*:

**Figure 3 Selected types of explosive light weapons ammunition and positions of marking information**





Using the ARCS cover sheet and an ARF(S) short reporting form:

1. Photograph the ammunition in question (making sure that any symbols, numbers, and colour codes can be clearly seen in the photographs).
2. State in the notes section (Section 5) of the ARCS cover sheet that the ammunition in question is explosive light weapons ammunition.
3. Enter the photograph numbers and (if relevant) the position of the object in the photograph in field 4 of the ARF(S) short reporting form.

### Alternatively:

1. Draw the ammunition in the notes section of the ARCS cover sheet.
2. Make sure that you accurately copy any symbols, numbers, or colour codes, and use arrows to show their position on the sketch.

## C. The reporting forms

This manual is designed to be used with Ammunition Reporting Forms **ARF(L)** and **ARF(S)**, in addition to the Ammunition Reporting Cover Sheet **ARCS**. These documents can be found in the Forms section of this Kit.

The **ARF(L)** long reporting form is a detailed form designed to record *all* relevant information about any type of small calibre ammunition, whether live or spent, that you might find. We recommend that you use this reporting form wherever possible because it provides detailed information that allows the Small Arms Survey to cross-reference ammunition characteristics and therefore better identify the types and origins of the ammunition in question.

### AMMUNITION REPORTING FORM (LONG) ARF(L)

The image shows a thumbnail of the Ammunition Reporting Form (Long) ARF(L). The form is titled 'AMMUNITION REPORTING FORM (LONG) ARF(L)' and includes a 'REPORTER DETAILS' section at the top. Below this is the 'AMMUNITION DETAILS' section, which contains several numbered fields for recording information about the ammunition. Field 1 is for '1. Draw the markings (copy to the space provided)'. Field 2 is for '2. Draw the markings (copy to the space provided)'. Field 3 is for '3. Number (if of cartridge) (inserted at this type)'. Field 4 is for '4. Colour (if of cartridge) (inserted at this type)'. Field 5 is for '5. Overall length'. Field 6 is for '6. Case length'. Field 7 is for '7. Colour of cartridge (if of cartridge) (inserted at this type)'. Field 8 is for '8. Colour of primer (if of cartridge) (inserted at this type)'. Field 9 is for '9. Colour of primer (if of cartridge) (inserted at this type)'. Field 10 is for '10. Colour of primer (if of cartridge) (inserted at this type)'. Field 11 is for '11. Photograph (if of cartridge) (inserted at this type)'. The form also includes a 'PHOTOGRAPH' section at the bottom with fields for '1. Photograph #', '2. Photograph #', '3. Photograph #', and '4. Photograph #', each with a corresponding 'Position in photograph' field.

The reporting form is relatively quick to use when there are very few types of ammunition in a given sample (for the definition of a sample, see Section C.1.1, below). However, should you find many different types of ammunition in one sample (i.e. more than 10 types), then we recommend that you use the shorter ARF(S) reporting form.

Even if you are identifying a large sample of ammunition, we recommend that you use the ARF(L) reporting form in the following circumstances:

- if you have little knowledge of small calibre ammunition and are unfamiliar with its various characteristics (particularly calibres); or
- if you are knowledgeable, but find samples that you believe require detailed analysis (i.e. rarely found, rarely documented, or non-standard types of ammunition).

**ARF(S)** is a shortened version of ARF(L), and is designed to record the *minimum* information necessary to trace ammunition. It is useful to use when there are very many (i.e. more than 10) types of ammunition in one sample.

The ARF(S) short reporting form uses a tally system for recording the number of rounds of a particular type of ammunition in a sample. This method of counting is useful when magazines contain many different types of ammunition, or when you are working through loose (unboxed) ammunition that may be of different origins.

We recommend that you use ARF(S) under the following circumstances:

- if you have basic technical expertise in the process of identifying ammunition; or
- if you believe that the ammunition in question is easily identifiable and simply needs counting.

**ARCS** is a standard cover sheet that is designed to record general information about the circumstances in which the ammunition was found and recorded.

ARCS is used to record information concerning the location where the ammunition was recorded and its users. The information contained within ARCS is therefore potentially sensitive and is handled separately by the Small Arms Survey from the information in the ARF(L) and ARF(S) reporting forms.

A new ARCS should be used every time a sample of ammunition is recorded and sent to the Small Arms Survey. For example, use a new ARCS cover sheet when recording ammunition from:

- a different location; or
- a different group; or
- a different event.

Do not combine ammunition records from different locations, groups, or events. The Ammunition Tracing Protocols explain why it is important to do this, particularly when you are linking ammunition to specific locations and user groups.

## INSTRUCTIONS:

When you are recording ammunition, use **either** the ARF(L) **or** the ARF(S) reporting form (choose which reporting form you think is best according to the instructions given above).

Attach the ARCS cover sheet to whichever reporting form you decide to use.

Also attach numbered photographs, additional notes, and other relevant supporting documentation to the ARCS form.

AMMUNITION REPORTING COVER SHEET ARCS

**IMPORTANT:**  
Attach Ammunition Tracing Manual and Ammunition Tracing Protocol before completing this form.

**REPORTER INFORMATION**

Use this box if you prefer to record anonymous CI  
 CI number (if you prefer) \_\_\_\_\_ and the location and date of this incident (date and location)  
 Alternatives (if reported to the Small Arms Survey, please specify)  
 For name \_\_\_\_\_ Last name \_\_\_\_\_  
 For user group(s) of interest (if you know) \_\_\_\_\_  
 For a small address for correspondence \_\_\_\_\_

**1. LINK THE WEAPON AMMUNITION AND RECORDS**

Weapon ID number \_\_\_\_\_  
 Quantity \_\_\_\_\_  
 OFS (category of incident) \_\_\_\_\_  
 Other relevant information about the incident \_\_\_\_\_

**2. STATES OF THE AMMUNITION WHEN RECEIVED**

The ammunition was:  live  non-live. Record the date and the location when received in detail.  
 1. To the field of origin and received by:  the user group(s) CI number(s) \_\_\_\_\_  
 2. Forward to the reporter or other party (in the ground, in custody of CI number(s) \_\_\_\_\_  
 3. Used in operations in which ammunition was received and only  was in a secure location

or

AMMUNITION REPORTING COVER SHEET ARCS

**IMPORTANT:**  
Attach Ammunition Tracing Manual and Ammunition Tracing Protocol before completing this form.

**REPORTER INFORMATION**

Use this box if you prefer to record anonymous CI  
 CI number (if you prefer) \_\_\_\_\_ and the location and date of this incident (date and location)  
 Alternatives (if reported to the Small Arms Survey, please specify)  
 For name \_\_\_\_\_ Last name \_\_\_\_\_  
 For user group(s) of interest (if you know) \_\_\_\_\_  
 For a small address for correspondence \_\_\_\_\_

**1. LINK THE WEAPON AMMUNITION AND RECORDS**

Weapon ID number \_\_\_\_\_  
 Quantity \_\_\_\_\_  
 OFS (category of incident) \_\_\_\_\_  
 Other relevant information about the incident \_\_\_\_\_

**2. STATES OF THE AMMUNITION WHEN RECEIVED**

The ammunition was:  live  non-live. Record the date and the location when received in detail.  
 1. To the field of origin and received by:  the user group(s) CI number(s) \_\_\_\_\_  
 2. Forward to the reporter or other party (in the ground, in custody of CI number(s) \_\_\_\_\_  
 3. Used in operations in which ammunition was received and only  was in a secure location

AMMUNITION REPORTING FORM (LONG) ARF(L)

**IMPORTANT:**  
Attach Ammunition Tracing Manual and Ammunition Tracing Protocol before completing this form.

**REPORTER DETAILS**

Use this box if you prefer to record anonymous CI  
 CI number (if you prefer) \_\_\_\_\_ and the location and date of this incident (date and location)  
 Alternatives (if reported to the Small Arms Survey, please specify)  
 For name \_\_\_\_\_ Last name \_\_\_\_\_  
 For user group(s) of interest (if you know) \_\_\_\_\_  
 For a small address for correspondence \_\_\_\_\_

**AMMUNITION TYPE 1**

1. Use or specify the type of CI (see protocol) \_\_\_\_\_ CI (report check) \_\_\_\_\_  
 2. Use the cartridge \_\_\_\_\_  
 3. Specify the # of cartridges recorded of this type \_\_\_\_\_  
 4. Color of the cartridge \_\_\_\_\_  
 5. Color of primer \_\_\_\_\_  
 6. Color of case \_\_\_\_\_  
 7. Color of primer \_\_\_\_\_  
 8. Color of primer \_\_\_\_\_  
 9. Color of primer \_\_\_\_\_  
 10. Color of primer \_\_\_\_\_  
 11. Color of primer \_\_\_\_\_  
 12. Color of primer \_\_\_\_\_  
 13. Color of primer \_\_\_\_\_  
 14. Color of primer \_\_\_\_\_  
 15. Color of primer \_\_\_\_\_  
 16. Color of primer \_\_\_\_\_  
 17. Color of primer \_\_\_\_\_  
 18. Color of primer \_\_\_\_\_  
 19. Color of primer \_\_\_\_\_  
 20. Color of primer \_\_\_\_\_

**AMMUNITION TYPE 2**

1. Use or specify the type of CI (see protocol) \_\_\_\_\_ CI (report check) \_\_\_\_\_  
 2. Use the cartridge \_\_\_\_\_  
 3. Specify the # of cartridges recorded of this type \_\_\_\_\_  
 4. Color of the cartridge \_\_\_\_\_  
 5. Color of primer \_\_\_\_\_  
 6. Color of case \_\_\_\_\_  
 7. Color of primer \_\_\_\_\_  
 8. Color of primer \_\_\_\_\_  
 9. Color of primer \_\_\_\_\_  
 10. Color of primer \_\_\_\_\_  
 11. Color of primer \_\_\_\_\_  
 12. Color of primer \_\_\_\_\_  
 13. Color of primer \_\_\_\_\_  
 14. Color of primer \_\_\_\_\_  
 15. Color of primer \_\_\_\_\_  
 16. Color of primer \_\_\_\_\_  
 17. Color of primer \_\_\_\_\_  
 18. Color of primer \_\_\_\_\_  
 19. Color of primer \_\_\_\_\_  
 20. Color of primer \_\_\_\_\_

**PHOTOGRAPHS OF THIS TYPE OF AMMUNITION**

1. Photograph # \_\_\_\_\_  
 2. Photograph # \_\_\_\_\_  
 3. Photograph # \_\_\_\_\_

+ Any relevant photographs, notes, or supporting documentation

AMMUNITION REPORTING FORM (SHORT) ARF(S)

**IMPORTANT:**  
Attach Ammunition Tracing Manual and Ammunition Tracing Protocol before completing this form.

**REPORTER DETAILS**

Use this box if you prefer to record anonymous CI  
 CI number (if you prefer) \_\_\_\_\_ and the location and date of this incident (date and location)  
 Alternatives (if reported to the Small Arms Survey, please specify)  
 For name \_\_\_\_\_ Last name \_\_\_\_\_  
 For user group(s) of interest (if you know) \_\_\_\_\_  
 For a small address for correspondence \_\_\_\_\_

**AMMUNITION TYPE 1**

1. Use or specify the type of CI (see protocol) \_\_\_\_\_ CI (report check) \_\_\_\_\_  
 2. Use the cartridge \_\_\_\_\_  
 3. Specify the # of cartridges recorded of this type \_\_\_\_\_  
 4. Color of the cartridge \_\_\_\_\_  
 5. Color of primer \_\_\_\_\_  
 6. Color of case \_\_\_\_\_  
 7. Color of primer \_\_\_\_\_  
 8. Color of primer \_\_\_\_\_  
 9. Color of primer \_\_\_\_\_  
 10. Color of primer \_\_\_\_\_  
 11. Color of primer \_\_\_\_\_  
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 13. Color of primer \_\_\_\_\_  
 14. Color of primer \_\_\_\_\_  
 15. Color of primer \_\_\_\_\_  
 16. Color of primer \_\_\_\_\_  
 17. Color of primer \_\_\_\_\_  
 18. Color of primer \_\_\_\_\_  
 19. Color of primer \_\_\_\_\_  
 20. Color of primer \_\_\_\_\_

**AMMUNITION TYPE 2**

1. Use or specify the type of CI (see protocol) \_\_\_\_\_ CI (report check) \_\_\_\_\_  
 2. Use the cartridge \_\_\_\_\_  
 3. Specify the # of cartridges recorded of this type \_\_\_\_\_  
 4. Color of the cartridge \_\_\_\_\_  
 5. Color of primer \_\_\_\_\_  
 6. Color of case \_\_\_\_\_  
 7. Color of primer \_\_\_\_\_  
 8. Color of primer \_\_\_\_\_  
 9. Color of primer \_\_\_\_\_  
 10. Color of primer \_\_\_\_\_  
 11. Color of primer \_\_\_\_\_  
 12. Color of primer \_\_\_\_\_  
 13. Color of primer \_\_\_\_\_  
 14. Color of primer \_\_\_\_\_  
 15. Color of primer \_\_\_\_\_  
 16. Color of primer \_\_\_\_\_  
 17. Color of primer \_\_\_\_\_  
 18. Color of primer \_\_\_\_\_  
 19. Color of primer \_\_\_\_\_  
 20. Color of primer \_\_\_\_\_

**PHOTOGRAPHS OF THIS TYPE OF AMMUNITION**

1. Photograph # \_\_\_\_\_  
 2. Photograph # \_\_\_\_\_  
 3. Photograph # \_\_\_\_\_

+ Any relevant photographs, notes, or supporting documentation

If you need to (i.e. if there are many different types of ammunition to record in one sample), you may attach more than one ARF(L) or ARF(S) reporting form to one ARCS cover sheet. (See the instructions in the ARCS for details.)

Please staple, or securely fasten, all reporting forms and supporting photographs, documentation, etc. to the ARCS cover sheet.

This manual provides step-by-step instructions for completing each form. The Small Arms Survey recommends that you first read the instructions for completing the ARF(L) reporting form, as these instructions explain the rationale behind the forms, in addition to providing useful background information on small calibre ammunition.

## **C.1 The ARF(L) reporting form**

The following sections illustrate, step-by-step, what you have to do to complete the ARF(L) reporting form.

To assist you, an example of a completed ARF(L) reporting form can be found in Annexe 1 at the end of this manual.

### ***C.1.1 Before you begin***

When we talk about a **sample** of ammunition, we mean a number of rounds of ammunition (which may be of different types) that are from the same location (place) or are linked to the same event (e.g. a particular attack) or particular user, and are recorded on the same date.

First, it is necessary to divide whatever sample of ammunition you have into groups of the same type of ammunition, because you will have to record information about each type in a separate section of the reporting form (the sections labelled 'Ammunition Type 1', 'Ammunition Type 2', etc.). Divide the ammunition up using the following steps:

**Step 1:** Divide the ammunition according to size.

**Step 2:** Sub-divide each group from Step 1 according to colour (brass, copper, steel, etc.).

**Step 3:** Sub-divide each group from Step 2 according to the *exact* markings on the headstamp (to find the headstamp, see Figure 1 in Box 1, above).

**Figure 4 Comparison of headstamp marks**



Each of the groups of ammunition that you now have will be a separate type of ammunition.

**CAUTION:** Look very carefully for small differences in headstamp marks. The cartridges in Figure 4, above, have a very similar headstamp, but are stamped with a '02' and '03', respectively. Note also the asterisk-shaped dot on the right-hand headstamp and the different coloured primer annulus. Group together only those rounds that are the same in every detail.

The ARF(L) reporting form features sections numbered 'Ammunition Type 1', 'Ammunition Type 2', etc. Once you have divided the sample into different types of ammunition, complete *one section* for *each one* of the types of ammunition you have just identified (see Figure 5, overleaf).



### ***C.1.2 Explanation of the reporting form's fields***

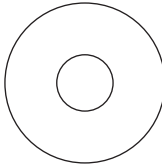
#### **1. Live or spent?** (tick only one box)

A **live** cartridge is one that has not been fired. The bullet will be firmly attached to the cartridge case. The primer cap will not have been struck by the firing pin (although it may have an indentation if the cartridge has been loaded and unloaded many times).

**Figure 5 An example of a section in the ARF(L) long reporting form used to record one type of ammunition**

**AMMUNITION TYPE 1**


**1. Live or spent?** (tick only one box)  Live (unfired)  or  Spent (fired) 




**2. Draw the markings** (exactly as they appear on the headstamp)

**3. Number (#) of cartridges recorded of this type #** .....


**4. Calibre** (leave blank unless you are absolutely sure) ..... X ..... mm  
**or** ..... inches or Bullet Diameter Guide hole number: # .....



**5. Overall length** ..... mm



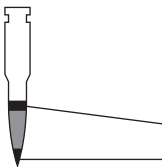
**6. Case length** ..... mm



**7. Colour of cartridge** (see the colour guide in the Tracing Manual)

Brass  Copper  Steel


Other (specify): .....



**8. Colour of paint on bullet** (only if it is painted)


Paint colour (if any): .....

Paint colour (if any): .....



**9. Case composition** (use the magnetic Tracing Tool in the Tracing Kit)

Ferrous (magnet sticks)  Non-ferrous (does not stick)



**10. Colour of primer annulus** (ring of paint on base of cartridge, if any)

No colour  Colour (specify): .....

**11. Photographs of this type of ammunition** (write down the number (#) you have written on the back of each printed photograph or the file # of each digital photograph of this type of ammunition. If the photograph contains more than one type of ammunition, write down the position in the photograph of the type of ammunition that you are recording on this copy of the ARF(L) form)

A. Photograph # ..... / digital file # ..... Position in photograph .....

B. Photograph # ..... / digital file # ..... Position in photograph .....

C. Photograph # ..... / digital file # ..... Position in photograph .....

A **spent** cartridge has been fired. It will have no bullet, and the cartridge case will be empty of propellant.

**INSTRUCTIONS:** Tick only the appropriate box next to 'Live' or 'Spent'.

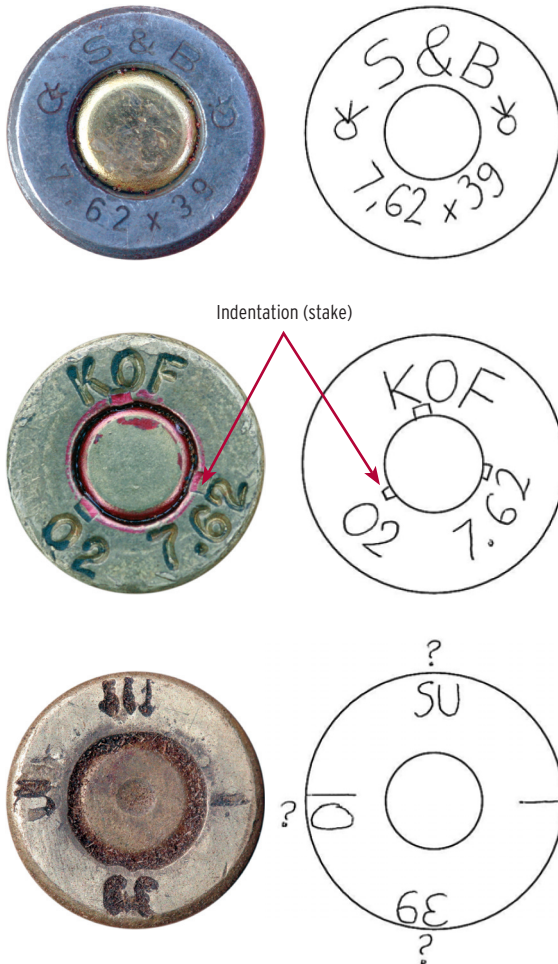
## 2. Draw the markings (exactly as they appear on the headstamp)

The headstamp is put on the cartridge at the time of manufacture. It is the fastest and easiest way to identify the cartridge's manufacturer. For this reason, it is important to make the most accurate drawing of the stamp as possible.

### Points to note:

- Try and copy the headstamp font (i.e. copy the exact shape of the letters).
- Try and keep the spacing between letters, marks, etc. as it appears on the headstamp.

**Figure 6 Drawing the headstamp**



**NOTE:** The three indentations (or 'stakes') around the primer cap are copied in the sketch. This is important because they provide information on manufacturing techniques.

**NOTE:** The marks on this headstamp are very unclear, so they are labelled with a question mark (?) in the drawing. This example shows the need for many reports of poorly marked types of ammunition, which together enable us to accurately identify the markings on the headstamp.

- Try and copy letters, numbers, and marks in the exact positions in which they appear on the headstamp.
- Include any points, dots, dashes, stars, and symbols.
- If you are unsure of any letter, number, or mark, label it with a question mark.

### 3. Number (#) of cartridges recorded of this type

Please include in this field the number (#) of cartridges *of the same type* (i.e. with the same shape, size, colour, and headstamp) that you have recorded in this copy of the reporting form.

For clarity, please use both numbers and words: # ..... 13 (THIRTEEN) .....

### 4. Calibre (leave blank unless you are absolutely sure)

Please do not guess the calibre. A mistake may mislead later analysis. The numbers on the headstamp do not necessarily identify the calibre of the ammunition.

#### INSTRUCTIONS:

If you are sure of the calibre, please enter it as follows, depending on whether it is in mm or inches:

7.62 x 51 mm **or** ..... inches

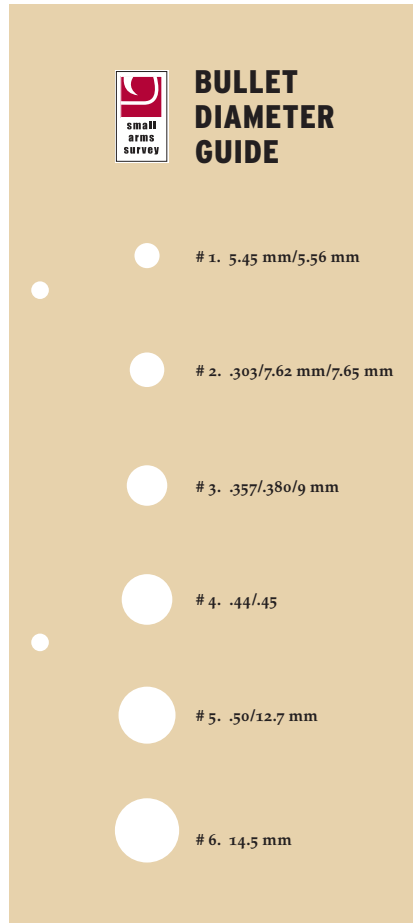
#### Alternatively:

..... x ..... mm **or** ..... 308 inches

If you are unsure of the calibre, use the Bullet Diameter Guide to identify the calibre (see Figure 7).

Place the bullet into the hole that corresponds to the bullet's diameter.

**Figure 7 The Bullet Diameter Guide**





The bullet should pass through the hole as far as the cartridge mouth.

Enter the corresponding hole number (#1, #2, etc.) in the space provided.

**CAUTION:**

Measure the diameter of the **bullet**, not the cartridge case or cartridge mouth.

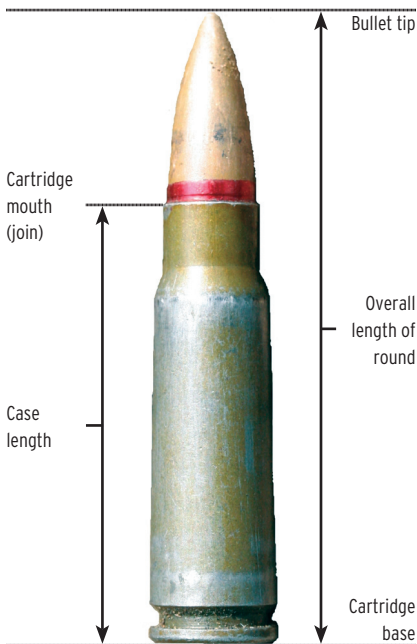
Do not force the bullets into the holes.

**NOTE:** The Bullet Diameter Guide may become oily with use. If this happens, clean it in warm, soapy water. Do not use solvents to clean the guide, as these may remove the printed markings.

**5. Overall length**

Overall length is the distance from the tip of the bullet to the base of the cartridge (see Figure 8). You need only record the overall length for live (unfired) cartridges.

**Figure 8 Overall length of a round of ammunition**



**Figure 9 Headstamp and profile of a shotgun cartridge**



## Box 2 Shotgun cartridges

Shotgun cartridges look different to most other small arms cartridge-based ammunition (see Figure 9). They are usually headstamped, but often have text or symbols printed on the (usually plastic) cartridge case. In addition to recording the headstamp, it is useful to record the information on the cartridge case in the notes section of the ARCS cover sheet:

### 5. NOTES SECTION

Please use this space to provide any other relevant information: *Ammunition in the ARF(L) section 'Ammunition Type 1' appears to be a white metal, coated in a brown lacquer or wash*

## 6. Case length

For both live and spent ammunition, the case length is the distance from the cartridge mouth to the cartridge base. All live cartridges show a distinctive join between the bullet and the cartridge (see Figure 8). This information is not applicable to, or required for, shotgun cartridges.

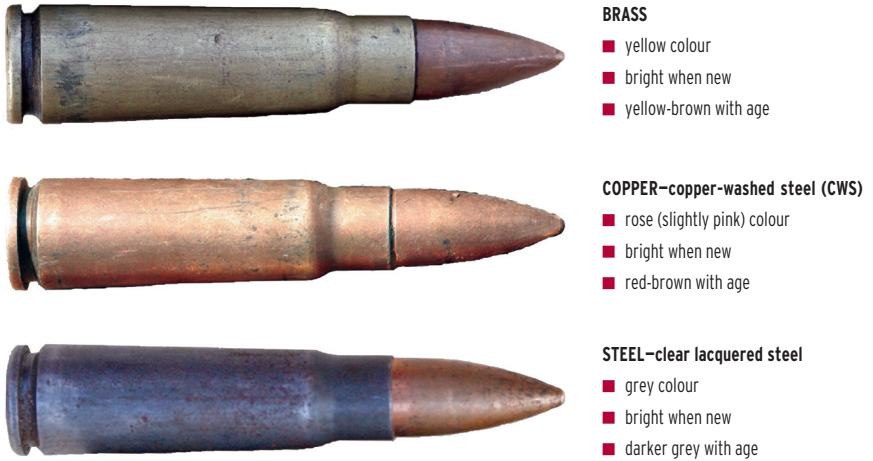
## 7. Colour of cartridge

Case colours vary considerably according to the metal that the cases are made of and the effects of aging (see Figure 10, below). The most common cartridge case finishes are:

- brass;
- copper-washed (copper-plated) steel (CWS);
- steel (with a clear lacquer applied to prevent oxidization); or
- coloured lacquer applied to steel (usually olive green/brown).

The well-worn examples in Figure 10 illustrate the three basic colours that are most common for military cartridges.

**Figure 10 Common case colours of military cartridges**



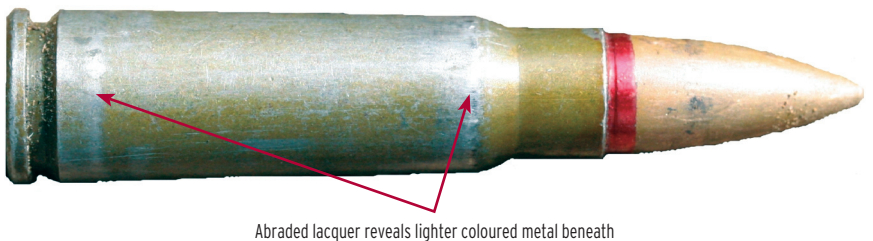
**INSTRUCTIONS:**

Tick the box next to the label that describes the cartridge colour most closely. If you are unsure of the colour, please leave this section blank.

For other colours, either write the colour down in the space provided or use the notes section (Section 5) of the ARCS cover sheet (see the example provided overleaf).

For example, some cartridge cases are ‘washed’ (plated) in a different metal (often copper or nickel) or lacquered in several different colours. Well-worn cartridges will often display the base metal where the wash or varnish has been worn away by use (see Figure 11). It is difficult to describe this kind of appearance in a few words, and therefore it is best if you provide this information in the notes section of the ARCS cover sheet.

**Figure 11 Abraded lacquer (steel beneath) on a 7.62 x 39 mm round**



## EXAMPLE: USING THE NOTES SECTION OF THE ARCS

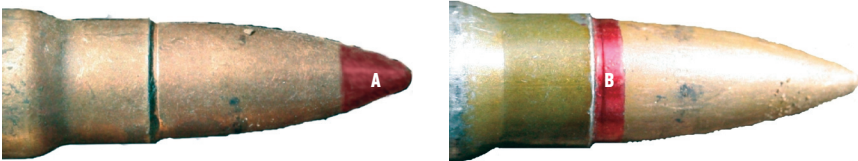
### 5. NOTES SECTION

Please use this space to provide any other relevant information: *Ammunition in ARF(L)*  
*Ammunition type 1 appears to be a white metal coated in a brown laquer or wash*

### 8. Colour of paint on bullet (only if it is painted)

Manufacturers often mark bullet tips, and the joins (join seals) between the bullet and cartridge case, with paint to distinguish different types of ammunition. Different countries use various colours and coding systems. Usually, bullets are either marked (see Figure 12) on the tip (A) or along the join where the bullet meets the cartridge (B).

**Figure 12** Paint markings on bullets



### INSTRUCTIONS:

Enter the colour or colours of the paint (if there is paint) next to the appropriate part of the bullet diagram. If the bullet is unpainted, please leave these sections blank.

### 9. Case composition (use the magnetic Tracing Tool in the Tracing Kit)

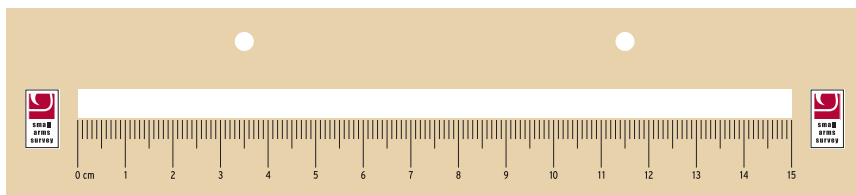
Here you identify what metal the cartridge case is made of. This information can be used to help distinguish between types of unmarked or similarly marked cartridges. A magnet can be used to identify ferrous (steel) cartridges from non-ferrous (copper, brass, and other base metals) cartridges, even if plating or lacquers have been applied to the cartridge in the manufacturing

process. A magnetic Tracing Tool is provided with the Tracing Kit for you to use here.

### INSTRUCTIONS:

- Place the magnetic Tracing Tool (see Figure 13) against the cartridge case (*not* the bullet).
- If the magnet sticks to the case, then tick the box labelled 'Ferrous (magnet sticks)'.
- If the magnet does not stick to the case, then tick the box labelled 'Non-ferrous (magnet does not stick)'.

**Figure 13 The magnetic Tracing Tool**



**NOTE:** The magnetic Tracing Tool may become oily with use. If this happens clean it in warm, soapy water. Do not use solvents to clean the Tool, as these may remove the printed markings.

#### 10. Colour of primer annulus (ring of paint on base of cartridge, if any)

Manufacturers often colour the ring of sealant between the primer cap and the primer annulus in order to specify the type of cartridge (i.e. ball or tracer) or to designate specific production batches of ammunition.

For an illustration of the primer annulus, please see Figure 1 in Box 1 of this manual, above.

### INSTRUCTIONS:

- If the cartridge does not have a coloured annulus, tick the box labelled 'No colour'.
- If the cartridge has a coloured annulus, write down this colour in the space provided.

**11. Photographs of this type of ammunition** (write down the number (#) you have written on the back of each printed photograph or the file # of each digital photograph of this type of ammunition. If the photograph contains more than one type of ammunition, write down the position in the photograph of the type of ammunition that you are recording in this section of the reporting form)

**CAUTION:** Photographing military materiel can make people or the authorities suspicious and may be prohibited under national law. We advise you to seek advice from appropriate national or local authorities before you photograph weapons and ammunition.

Taking a photograph is the most effective way to record ammunition characteristics for later analysis. Good photographs accurately record headstamp marks, manufacturing features (such as depth of stamping, cartridge case composition, and bullet tip marks), and the relative size of the object in question—features that cannot be reproduced using pen and ink.

Taking clear photographs can be difficult, particularly when photographing ammunition in strong or bright light, in awkward positions, or with a camera that is not designed for macro or ‘close-up’ photography.

**NOTE:** Please try to include only one type of ammunition in each photograph. Since you have first divided the ammunition sample up into different ammunition types, this is also the easiest way of taking the photographs. However, you may find it necessary for practical reasons to photograph several types of ammunition in one photo. For this reason, the sections in ARF(L) and ARF(S) allow you to identify the position of a particular type of ammunition in a photograph that contains many types.

### *General instructions for taking photographs*

- Do not photograph ammunition against white or reflective surfaces, because the camera’s automatic exposure settings may make the object seem dark.
- Rest your arms on or against a firm surface of some kind (e.g. a tree or a rock or a table) to stop the camera from shaking, which may make the photograph blurred.

### *Taking photographs using an auto-focus camera*

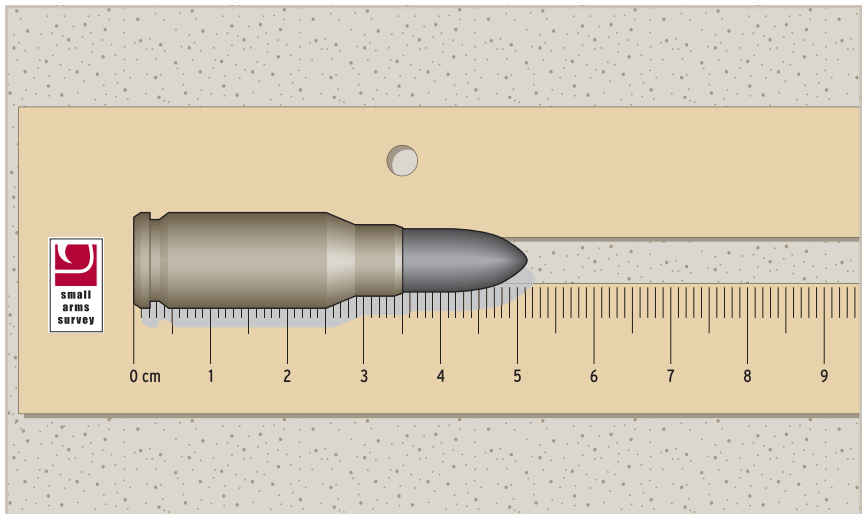
The Small Arms Survey recommends that you do the following when using a digital or 35 mm auto-focus camera.

1. Turn off the flash.
2. Make sure the round of ammunition or cartridge that you are photographing is clearly lit, but not in very bright light.
3. Do not use the zoom function.
4. Move the camera towards the object (to a minimum distance of approximately 150 mm).
5. Half depress (push down) the shutter release button in order to auto-focus.
6. If the camera does not auto-focus, move it a little further away from the object and carry out Step 5 again. Keep doing this until the camera does auto-focus and you can take the picture.

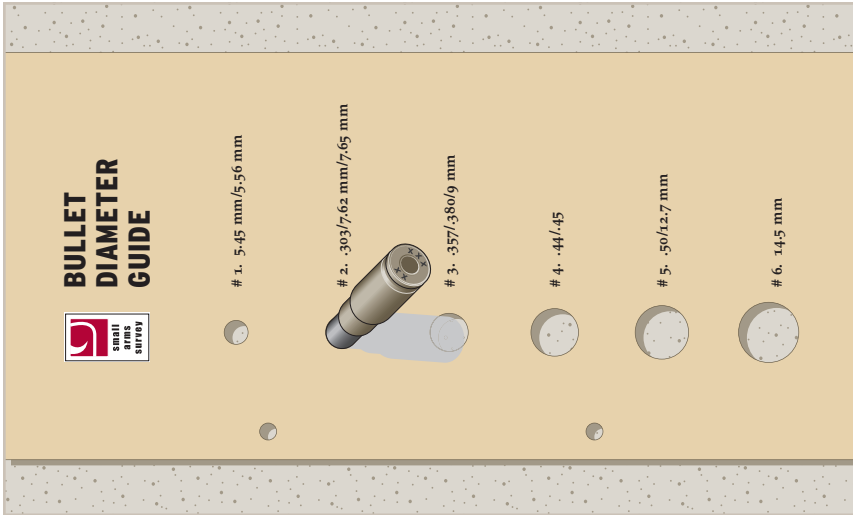
### *Photographing cartridge-based small arms ammunition*

Photographs should ideally include at least one photograph of the headstamp (see Box 3, below) and one photograph of the cartridge from the side.

**Figure 14 Photographing using the Ammunition Tracing Tool**



**Figure 15 Photographing using the Bullet Diameter Guide**



The Ammunition Tracing Tool (see Figure 14) is designed to provide a scale against which to photograph cartridge-based small arms ammunition in order to clearly identify its size. Place the round of ammunition in the tool's central groove, with the base of the cartridge aligned with the '0' mark, and take the photograph according to the instructions in Box 3.

The Bullet Diameter Guide (see Figure 15) is designed to provide a clear background against which to photograph ammunition headstamps. First place the bullet (not the cartridge case) into the corresponding hole and then take the photograph by following the instructions in Box 3.

### *Sending photographs to the Small Arms Survey*

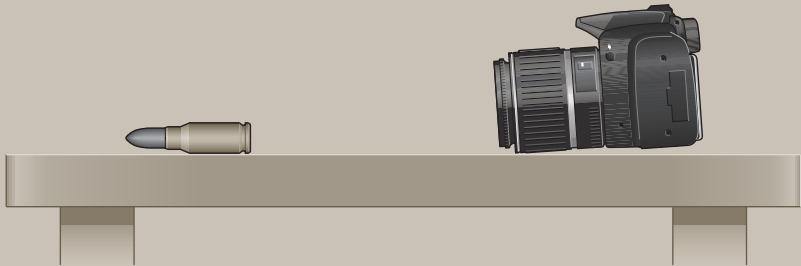
- If you are sending printed photographs, label the back of the photograph with your initials and a different number (#) for each photograph, then write the photograph number in the space provided in field 11 of the reporting form (see the line numbered A in the example below).
- If you are using a digital camera, write down the file number (#) in the space provided in field 11 of the reporting form (see the line numbered B in the example below).



### Box 3 How to photograph headstamps

#### Indoor photography

- Light the headstamp from the side using a lamp, or position the cartridge close to a window or door (side lighting shows up stamped marks better).
- Arrange the ammunition on a table or flat surface. Rest the camera on the surface while taking the photograph from the same level as the object, as in the illustration below.



#### Outdoor photography

- Shade the ammunition from very bright sunlight. The best conditions occur when the sun lights the object at an angle from the side (i.e. early morning or late afternoon).
- Push the bullet or mouth of the spent cartridge into soft ground and, in order to prevent the camera from shaking even slightly, use a bag or other stable, raised object to lean on while photographing downwards onto the headstamp, as in the illustration below.



- If either digital or printed photographs include more than one type of ammunition in a photograph, indicate the position in the photograph of the type of ammunition that you are recording on this copy of the reporting form (see the lines numbered A and B in the example below). If the photograph contains only one type of ammunition, leave the 'Position' section blank.

## EXAMPLE OF FIELD 11:

**11. Photographs of this type of ammunition** (write down the number (#) you have written on the back of each printed photograph or the file # of each digital photograph of this type of ammunition. If the photograph contains more than one type of ammunition, write down the position in the photograph of the type of ammunition that you are recording on this copy of the ARF(L) form)

- A. Photograph # ..... 12 ..... / digital file # ..... Position in photograph 2<sup>nd</sup> from right
- B. Photograph # ..... / digital file # ..... 00108 ..... Position in photograph 3<sup>rd</sup> from left
- C. Photograph # ..... / digital file # ..... Position in photograph .....

### C.2 The ARF(S) reporting form

The following sections provide, step-by-step, the stages required to complete the ARF(S) reporting form.

To assist you, an example of a completed ARF(S) reporting form can be found in Annexe 2 at the end of this manual.

#### C.2.1 Before you begin

Complete *one section of the* ARF(S) reporting form for each type of ammunition (see Figure 16).

Draw the markings on the headstamp in the diagram of the headstamp on the left of the form.

#### C.2.2 Explanation of the reporting form's fields

##### 1. Live or spent? (tick only one box)



A live cartridge is one that has not been fired. The bullet will be firmly attached to the cartridge case. The primer cap will not have been struck by the firing pin (although it may have an indentation if it has been loaded and unloaded many times).

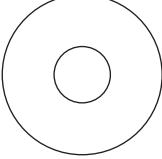
A spent cartridge has been fired. It will have no bullet and the cartridge case will be empty of propellant.

**INSTRUCTIONS:** Tick only the appropriate box next to 'Live' or 'Spent'.

**Figure 16 An example of one section in the ARF(S) reporting form used to record one type of ammunition**

**AMMUNITION TYPE 1**

**1. Live or spent?** (tick only one box)  Live (unfired)  or  Spent (fired) 



**2. Calibre** (leave blank unless you are absolutely sure) ..... X ..... mm  
**or** ..... inches or Bullet Diameter Guide hole number: # .....

**3. Tally** (||||) the # of cartridges recorded of this type .....

**4. Photographs of this type of ammunition** (write down the number (#) you have written on the back of each printed photograph or the file # of each digital photograph of this type of ammunition. If the photograph contains more than one type of ammunition, write down the position in the photograph of the type of ammunition that you are recording on this copy of the ARF(L) form)

A. Photograph # ..... / digital file # ..... Position in photograph .....

B. Photograph # ..... / digital file # ..... Position in photograph .....

C. Photograph # ..... / digital file # ..... Position in photograph .....

D. Photograph # ..... / digital file # ..... Position in photograph .....

**2. Calibre** (leave blank unless you are absolutely sure)

Please do not guess the calibre. A mistake may mislead later analysis. The numbers on the headstamp do not necessarily identify the calibre of the ammunition.

**INSTRUCTIONS:**

If you are sure of the calibre, please enter it as follows:

..... *7.62* X ..... *51* ..... mm or ..... inches

**Alternatively:**

..... X ..... mm or ..... *308* ..... inches

If you are unsure of the calibre, use the Bullet Diameter Card to identify the calibre. (See instructions on how to do this in the discussion of field 4 in Section C.1.2 of this manual.)

**CAUTION:**

- Measure the diameter of the bullet, not the cartridge case or cartridge mouth.
- Do not force the bullets into the holes.

### 3. Tally (###) the # of cartridges recorded of this type

The tally system allows you to enter information for one type of ammunition, continue to record different types of ammunition, and return to this section of the reporting form should you find the first type of ammunition again.

This method is suited to recording large, disorganized stocks that may contain many types of ammunition (e.g. during disarmament, demobilization, and reintegration [DDR] processes or when recording ammunition from individuals who have acquired their ammunition piecemeal).

**4. Photographs of this type of ammunition** (write down the number (#) you have written on the back of each printed photograph or the file # of each digital photograph of this type of ammunition. If the photograph contains more than one type of ammunition, write down the position in the photograph of the type of ammunition that you are recording in this section of the reporting form)

See instructions on how to take photographs in Section C.1.2 of this manual, in the discussion of field 11 of the ARF(L) reporting form.

## C.3 The ARCS cover sheet

The ARCS cover sheet provides contextual information about the ammunition sample recorded in the reporting forms (i.e. information about the circumstances in which this ammunition was found, and who its users are/were).

The information contained in ARCS is vital for analysis, because, when combined with other reports, it enables the Small Arms Survey to work out how illicit trade or transfers take place in any given region, including:

- the local users of particular types of ammunition (and therefore who these users may trade with);
- where particular types of ammunition are most common (and therefore also where they are not common);
- any variations in the types of ammunition circulating in a given region, which might suggest new trade routes or suppliers; and

- background information, which may provide information about the illicit market, such as trading centres or transportation routes.

### ***C.3.1 Before you begin***

The ARCS cover sheet is designed to give contextual information about *one sample* of recorded ammunition only. Remember that a sample of ammunition is defined as:

*A number of rounds of ammunition (which may be of different types) that are from the same location (place) or are linked to the same event (e.g. a particular attack) or particular user, and are recorded on the same date.*

#### **POSSIBLE SCENARIOS:**

1. The ammunition was found on the ground in several different locations.  
Use *one* ARCS sheet (and attached reporting forms and supporting documentation) for *each location* (e.g. town, village, place in a rural area) in which the ammunition was found.
2. The ammunition was recorded from several armed groups.  
Use *one* ARCS sheet (and attached reporting forms and supporting documentation) for *each of the groups* (e.g. rebel group A, rebel group B, etc.) from whom the ammunition was recorded.
3. The ammunition was recorded from two or more individuals in the same group.  
Use *the same* ARCS sheet (and attached reporting forms and supporting documentation) for the ammunition recorded from *all the individuals*.

**CAUTION:** Do not combine on the same ARCS sheet samples from different groups or different locations, or samples that were recorded on different dates. Combining samples will make the information inaccurate and render later analysis difficult or impossible.

### **C.3.2 Explanation of the cover sheet's fields**

#### **1. Reporter information**

This gives information about you, the person who is reporting the information. You may wish to remain anonymous. If so, please tick the box *and* provide your initials in the space provided.

**Note:** You do not have to use your own initials, but please use the same initials on all attached reporting forms, photographs, and documentation.

**Note:** If you choose not to include a postal address for correspondence, we ask that you at least provide an anonymous email address. All information sent to the Small Arms Survey is verified by contacting the person who sends it. If we cannot contact you, we will not be able to use the data that you have provided.

#### **2. Location where the ammunition was recorded**

**Nearest town:** If you are unable to provide exact coordinates, please give the name of a settlement (e.g. a village or town) that is listed in publicly available maps.

**Administrative region/district:** Please provide a first order (i.e. first national sub-division) administrative region. For example, if the country is first divided into regions, and then into smaller districts, provide the region name.

**Country:** Please use the country's commonly used name in the case of conflicting sovereignty claims.

**GPS coordinates (if available):** Please provide coordinates as they appear on the GPS unit (e.g. N. 03.88304; E. 034.57018).

**Other relevant information about the location:** Please use this space to provide detailed information about the location in which you recorded the ammunition.

For example: 'The ammunition was recorded about 5 km south of village X in the direction of town Y.'

#### **3. Status of the ammunition when recorded**

It is very important to specify the status of the ammunition when you recorded it. This information is essential for any later analyses that may be performed

using the data. See the Ammunition Tracing Protocols for a detailed explanation of what is required here.

**The ammunition was: (tick one box only, then enter the date when the ammunition was recorded or found)**

Tick the appropriate box, and then enter the date on which the ammunition was recorded (1) or found (2).

**Exact circumstances in which ammunition was recorded and why (please be as precise as possible)**

Use this space to explain why you were recording the ammunition in question and under what circumstances. You may wish to provide the following information:

1. The names of the group(s) from which the ammunition was recorded, for example:

- spent cartridges found after a fight between Group X and Group Y;
- cartridges used by Group X in an attack on civilians; or
- inspection of Group Y's ammunition stocks (here the ammunition is not related to a specific incident, like an attack).

2. The circumstances in which the ammunition may have been used, for example:

- in a roadside ambush or robbery;
- to carry out human rights abuses; or
- not used.

3. The circumstances in which you recorded the ammunition, for example:

- recorded during a visit to the scene of a crime or violent incident;
- recorded during a visit to a particular group; or
- found in a cache during a peacekeeping operation.

**4. Source of the ammunition**

**If the user/s was/were present during the recording, specify the group to which he/she/they belong/s: (do not give names of persons)**

Please try to be as specific as possible. For example: Group X, or splinter group of Group Y, or civilian.

**Did the user specify how he/she had come into possession of the ammunition?**

Please tick the appropriate box. If the answer is yes:

**Supplier (belongs to which group?):** If known, specify the group that supplied the user with the ammunition.

**Supplier location (town, district, country):** If known, specify the area where the supplier group is/was located at the time when the ammunition was supplied.

**Any other relevant information about the reported supplier or supply chain:**

Please be as specific as possible and include all relevant information, such as:

- how the user acquired the ammunition;
- who provided it and when;
- any other people/groups/organizations mentioned as part of the supply chain; and
- any background information, such as price or quantities supplied.

**5. Notes section**

Please use this section to provide additional information, including:

- information about markings on the ammunition itself; and
- information about any additional material you have identified, such as ammunition magazines, machine gun belts, clips or links from machine gun belts, and ammunition packaging (e.g. wooden and cardboard boxes), as well as any marks on the packaging (both text and symbols).

Please describe as accurately as possible what you are talking about here. Photographs of the object would be very helpful. Please number each photograph and say which number photograph you are talking about when you refer to a particular item of ammunition.



## 6. Contents of your report

This is a checklist, which enables the Small Arms Survey to make sure that it has received all of the information that you have attached to the reporting forms. Please fill in the number of:

- reporting forms you have attached to this ARCS cover sheet;
- the number of printed photographs you have attached to this ARCS cover sheet; or
- the number of digital photographs you have attached to this ARCS cover sheet (and intend to send by email to: [weaponsID@smallarmssurvey.org](mailto:weaponsID@smallarmssurvey.org)).

**IMPORTANT:** If you send the report by post, please check that *all* ARF(L) or ARF(S) reporting forms, photographs, and additional notes or documentation (if required) are labelled with your name or initials.

## D. Sending your report to the Small Arms Survey

Send your report to the Small Arms Survey by:

### Email

Email scanned or PDF forms to: [weaponsID@smallarmssurvey.org](mailto:weaponsID@smallarmssurvey.org)

Please put WEAPONS ID in the subject line of the email.

To avoid confusion, please attach only one ARCS cover sheet (with relevant photographs, notes, and supporting documentation) to each email. If you are sending information about more than one sample of ammunition, please use a separate ARCS cover for each sample, attach all reporting forms, photographs, notes, etc. related to that particular sample to it, and send it in a different email.

### Post

Mail the forms and supporting photographs, notes, and documentation to:

Weapons ID, Small Arms Survey, 47 Avenue Blanc, CH-1202, Geneva, Switzerland

Don't forget to label all reporting forms, photographs, notes, and supporting documentation with your name or initials.

## Fax

Include a first page (before the actual forms) with the heading on it: WeaponsID.

Fax the reporting forms and supporting documentation to: +41 22 732 27 38

If possible, try to fax your photographs as well, and if they are unclear, we will contact you and ask you to send them to us by post.

**Electronic versions of the ARF(L), ARF(S), and ARCS can be downloaded from:** [www.smallarmssurvey.org/weaponsID](http://www.smallarmssurvey.org/weaponsID)

- Go to the Web page.
- Click on the link.
- Save the document.
- Print the reporting forms and cover sheet and enter the information by hand or complete the forms electronically.
- Mail, email, or fax the forms with supporting photographs, documentation, etc. to the Small Arms Survey.

## Annexe 1

### Completed examples of two sections in the ARF(L)

The following two sections in the ARF(L) reporting form record information from the three live rounds of ammunition displayed here. For the purposes of this example, they were recorded from one location/event/user, and therefore make up one ammunition sample. The sample in question has been divided by type (10; 95 and 71; 99), and a separate section of the ARF(L) reporting form has been completed for each type of ammunition.



## AMMUNITION REPORTING FORM (LONG) ARF(L)



### IMPORTANT:

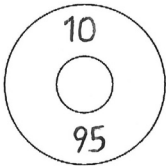
Read the Ammunition Tracing Manual and Ammunition Tracing Protocols before completing this form

#### REPORTER DETAILS

Last name: ..... or Initials: .....

#### AMMUNITION TYPE 1

1. Live or spent? (tick only one box)  Live (unfired)  or  Spent (fired) 



2. Draw the markings (exactly as they appear on the headstamp)

3. Number (#) of cartridges recorded of this type # 1 (ONE)

4. Calibre (leave blank unless you are absolutely sure) ..... X ..... mm  
or ..... inches or Bullet Diameter Guide hole number: # 2



5. Overall length 56 mm



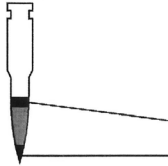
6. Case length 39 mm



7. Colour of cartridge (see the colour guide in the Tracing Manual)

Brass  Copper  Steel

Other (specify): .....



8. Colour of paint on bullet (only if it is painted)

Paint colour (if any): .....

Paint colour (if any): .....



9. Case composition (use the magnetic Tracing Tool in the Tracing Kit)

Ferrous (magnet sticks)  Non-ferrous (does not stick)



10. Colour of primer annulus (ring of paint on base of cartridge, if any)

No colour  Colour (specify): .....

11. Photographs of this type of ammunition (write down the number (#) you have written on the back of each printed photograph or the file # of each digital photograph of this type of ammunition. If the photograph contains more than one type of ammunition, write down the position in the photograph of the type of ammunition that you are recording on this copy of the ARF(L) form)

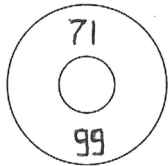
A. Photograph # ..... / digital file # 0095 Position in photograph CENTRE

B. Photograph # ..... / digital file # ..... Position in photograph .....

C. Photograph # ..... / digital file # ..... Position in photograph .....

## AMMUNITION TYPE 2

1. Live or spent? (tick only one box)  Live (unfired)  or  Spent (fired) 



2. Draw the markings (exactly as they appear on the headstamp)

3. Number (#) of cartridges recorded of this type # 2 (TWO)

4. Calibre (leave blank unless you are absolutely sure) 7.62 x 39 mm  
or ..... inches or Bullet Diameter Guide hole number: # .....



5. Overall length 55 mm



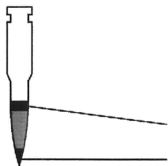
6. Case length 38.5 mm



7. Colour of cartridge (see the colour guide in the Tracing Manual)

Brass  Copper  Steel

Other (specify): .....



8. Colour of paint on bullet (only if it is painted)

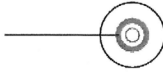
Paint colour (if any): .....

Paint colour (if any): .....



**9. Case composition** (use the magnetic Tracing Tool in the Tracing Kit)

Ferrous (magnet sticks)     Non-ferrous (does not stick)



**10. Colour of primer annulus** (ring of paint on base of cartridge, if any)

No colour     Colour (specify): RED

**11. Photographs of this type of ammunition** (write down the number (#) you have written on the back of each printed photograph or the file # of each digital photograph of this type of ammunition. If the photograph contains more than one type of ammunition, write down the position in the photograph of the type of ammunition that you are recording on this copy of the ARF(L) form)

A. Photograph # ..... / digital file # 0095 Position in photograph +3 FROM LEFT

B. Photograph # ..... / digital file # ..... Position in photograph .....

C. Photograph # ..... / digital file # ..... Position in photograph .....

## Annexe 2

### Completed examples of two sections in the ARF(S)

The following two sections in the ARF(S) reporting form record information from the three live rounds of ammunition displayed here. For the purposes of this example, they were recorded from one location/event/user, and therefore make up one ammunition sample. The sample in question has been divided by type (10; 95 and 71; 99), and a separate section of the ARF(S) reporting form has been completed for each type of ammunition.



## AMMUNITION REPORTING FORM (SHORT) ARF(S)

### IMPORTANT:

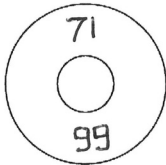
Read the Ammunition Tracing Manual and Ammunition Tracing Protocols before completing this form

#### REPORTER DETAILS

Last name: ..... or Initials: .....

#### AMMUNITION TYPE 1

1. Live or spent? (tick only one box)  Live (unfired)  or  Spent (fired) 



2. Calibre (leave blank unless you are absolutely sure) ..... X ..... mm

or ..... inches or Bullet Diameter Guide hole number: # 2

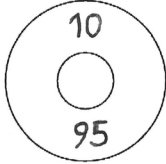
3. Tally (||||) the # of cartridges recorded of this type 11

4. Photographs of this type of ammunition (write down the number (#) you have written on the back of each printed photograph or the file # of each digital photograph of this type of ammunition. If the photograph contains more than one type of ammunition, write down the position in the photograph of the type of ammunition that you are recording on this copy of the ARF(L) form)

- A. Photograph # ..... / digital file # 0095 Position in photograph 1+3 FROM LEFT
- B. Photograph # ..... / digital file # ..... Position in photograph .....
- C. Photograph # ..... / digital file # ..... Position in photograph .....
- D. Photograph # ..... / digital file # ..... Position in photograph .....

## AMMUNITION TYPE 2

1. **Live or spent?** (tick only one box)  Live (unfired)  or  Spent (fired) 



2. **Calibre** (leave blank unless you are absolutely sure) ..... X ..... mm  
 or ..... inches or Bullet Diameter Guide hole number: # 2

3. **Tally** (||||) the # of cartridges recorded of this type 1

4. **Photographs of this type of ammunition** (write down the number (#) you have written on the back of each printed photograph or the file # of each digital photograph of this type of ammunition. If the photograph contains more than one type of ammunition, write down the position in the photograph of the type of ammunition that you are recording on this copy of the ARF(L) form)

- A. Photograph # ..... / digital file # 0095 Position in photograph CENTRE
- B. Photograph # ..... / digital file # ..... Position in photograph .....
- C. Photograph # ..... / digital file # ..... Position in photograph .....
- D. Photograph # ..... / digital file # ..... Position in photograph .....







**AMMUNITION REPORTING FORMS**

## **ARCS INSTRUCTIONS**

- Attach this cover sheet to one or more ARF(L) or ARF(S) Ammunition Reporting Forms.
- Use only one cover sheet for every location/event/user from which/whom ammunition was recorded.
- Label all of the attached reporting forms and supporting documents and photographs with your name or initials.

## **ARF(L) INSTRUCTIONS**

- Separate the ammunition into different types before completing the form (see the manual for how to do this).
- Complete one copy of the form for each type of ammunition.
- Label all copies of ARF(L) reporting forms, supporting documents and photographs with your name or initials.

## **ARF(S) INSTRUCTIONS**

- Separate the ammunition into different types before completing the form (see the manual for how to do this).
- Complete one copy of the form for each type of ammunition.
- Label all copies of ARF(L) reporting forms, supporting documents and photographs with your name or initials.



#### 4. SOURCE OF THE AMMUNITION

If the user/s was/were present during the recording, specify the group to which he/she/they belong/s:  
(do not give names of persons)

Group to which user belongs (e.g. police, rebel group, civilian, etc.): .....

Did the user specify how he/she had come into possession of the ammunition?

No, did not specify  Yes, specified origin

If yes, give exact details of how the user acquired the ammunition:

Supplier (belongs to which group?): .....

Supplier location (town, district, country): .....

Any other relevant information about the reported supplier or supply chain:

.....  
.....  
.....  
.....  
.....

#### 5. NOTES SECTION

Please use this space to provide any other relevant information: .....

.....  
.....  
.....  
.....  
.....  
.....

#### 6. CONTENTS OF YOUR REPORT

Number of ARF Reporting Forms enclosed/attached with this cover sheet: # .....

Numbers of printed photographs enclosed/attached with this cover sheet: # .....

Number of digital photographs sent to weaponsID@smallarmssurvey.org: # .....

**Please check before you post or fax the report that all ARF reporting forms, photographs, and additional notes or documentation (if required) are labelled with your name or initials.**

#### SENDING YOUR REPORT TO THE SMALL ARMS SURVEY

By email to: weaponsID@smallarmssurvey.org (please put 'WEAPONS ID' in the subject line)

By post to: Weapons ID, Small Arms Survey, 47 Avenue Blanc, CH-1202, Geneva, Switzerland

By fax to: +41 22 732 27 38 (include a first page with the heading WeaponsID on it)

Electronic cover sheets and reporting forms are available at: [www.smallarmssurvey.org/weaponsID](http://www.smallarmssurvey.org/weaponsID)

**The Small Arms Survey will make a preliminary analysis of the information you have sent and will contact you to verify the information. All information received by the Survey is confidential. It is stored securely and subject to restricted access.**

# AMMUNITION REPORTING FORM (SHORT) ARF(S)



**IMPORTANT:**

Read the Ammunition Tracing Manual and Ammunition Tracing Protocols before completing this form

**REPORTER DETAILS**

Last name: ..... or Initials: .....

**AMMUNITION TYPE 1**

1. **Live or spent?** (tick only one box)  Live (unfired)  or  Spent (fired) 

2. **Calibre** (leave blank unless you are absolutely sure) ..... X ..... mm  
 or ..... inches or Bullet Diameter Guide hole number: # .....

3. **Tally (||||) the # of cartridges recorded of this type** .....

4. **Photographs of this type of ammunition** (write down the number (#) you have written on the back of each printed photograph or the file # of each digital photograph of this type of ammunition. If the photograph contains more than one type of ammunition, write down the position in the photograph of the type of ammunition that you are recording on this copy of the ARF(L) form)



A. Photograph # ..... / digital file # ..... Position in photograph .....

B. Photograph # ..... / digital file # ..... Position in photograph .....

C. Photograph # ..... / digital file # ..... Position in photograph .....

D. Photograph # ..... / digital file # ..... Position in photograph .....

**AMMUNITION TYPE 2**

1. **Live or spent?** (tick only one box)  Live (unfired)  or  Spent (fired) 

2. **Calibre** (leave blank unless you are absolutely sure) ..... X ..... mm  
 or ..... inches or Bullet Diameter Guide hole number: # .....

3. **Tally (||||) the # of cartridges recorded of this type** .....

4. **Photographs of this type of ammunition** (write down the number (#) you have written on the back of each printed photograph or the file # of each digital photograph of this type of ammunition. If the photograph contains more than one type of ammunition, write down the position in the photograph of the type of ammunition that you are recording on this copy of the ARF(L) form)

A. Photograph # ..... / digital file # ..... Position in photograph .....

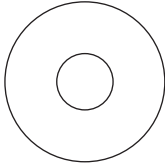
B. Photograph # ..... / digital file # ..... Position in photograph .....

C. Photograph # ..... / digital file # ..... Position in photograph .....

D. Photograph # ..... / digital file # ..... Position in photograph .....

### AMMUNITION TYPE 3

1. Live or spent? (tick only one box)  Live (unfired)  or  Spent (fired) 



2. Calibre (leave blank unless you are absolutely sure) ..... X ..... mm  
or ..... inches or Bullet Diameter Guide hole number: # .....

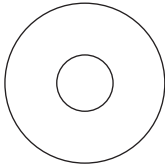
3. Tally (||||) the # of cartridges recorded of this type .....

4. Photographs of this type of ammunition (write down the number (#) you have written on the back of each printed photograph or the file # of each digital photograph of this type of ammunition. If the photograph contains more than one type of ammunition, write down the position in the photograph of the type of ammunition that you are recording on this copy of the ARF(L) form)

- A. Photograph # ..... / digital file # ..... Position in photograph .....
- B. Photograph # ..... / digital file # ..... Position in photograph .....
- C. Photograph # ..... / digital file # ..... Position in photograph .....
- D. Photograph # ..... / digital file # ..... Position in photograph .....

### AMMUNITION TYPE 4

1. Live or spent? (tick only one box)  Live (unfired)  or  Spent (fired) 



2. Calibre (leave blank unless you are absolutely sure) ..... X ..... mm  
or ..... inches or Bullet Diameter Guide hole number: # .....

3. Tally (||||) the # of cartridges recorded of this type .....

4. Photographs of this type of ammunition (write down the number (#) you have written on the back of each printed photograph or the file # of each digital photograph of this type of ammunition. If the photograph contains more than one type of ammunition, write down the position in the photograph of the type of ammunition that you are recording on this copy of the ARF(L) form)

- A. Photograph # ..... / digital file # ..... Position in photograph .....
- B. Photograph # ..... / digital file # ..... Position in photograph .....
- C. Photograph # ..... / digital file # ..... Position in photograph .....
- D. Photograph # ..... / digital file # ..... Position in photograph .....

# AMMUNITION REPORTING FORM (LONG)

# ARF(L)

## IMPORTANT:

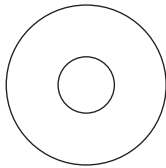
Read the Ammunition Tracing Manual and Ammunition Tracing Protocols before completing this form

### REPORTER DETAILS

Last name: ..... or Initials: .....

### AMMUNITION TYPE 1

**1. Live or spent?** (tick only one box)  Live (unfired)  or  Spent (fired) 



**2. Draw the markings** (exactly as they appear on the headstamp)

**3. Number (#) of cartridges recorded of this type #** .....

**4. Calibre** (leave blank unless you are absolutely sure) ..... X ..... mm  
or ..... inches or Bullet Diameter Guide hole number: # .....



**5. Overall length** ..... mm



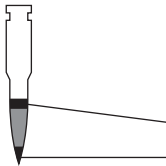
**6. Case length** ..... mm



**7. Colour of cartridge** (see the colour guide in the Tracing Manual)

Brass  Copper  Steel

Other (specify): .....



**8. Colour of paint on bullet** (only if it is painted)

Paint colour (if any): .....

Paint colour (if any): .....



**9. Case composition** (use the magnetic Tracing Tool in the Tracing Kit)

Ferrous (magnet sticks)  Non-ferrous (does not stick)



**10. Colour of primer annulus** (ring of paint on base of cartridge, if any)

No colour  Colour (specify): .....

**11. Photographs of this type of ammunition** (write down the number (#) you have written on the back of each printed photograph or the file # of each digital photograph of this type of ammunition. If the photograph contains more than one type of ammunition, write down the position in the photograph of the type of ammunition that you are recording on this copy of the ARF(L) form)

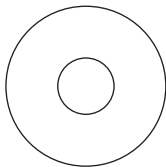
A. Photograph # ..... / digital file # ..... Position in photograph .....

B. Photograph # ..... / digital file # ..... Position in photograph .....

C. Photograph # ..... / digital file # ..... Position in photograph .....

## AMMUNITION TYPE 2

1. Live or spent? (tick only one box)  Live (unfired)  or  Spent (fired) 



2. Draw the markings (exactly as they appear on the headstamp)

3. Number (#) of cartridges recorded of this type # .....

4. Calibre (leave blank unless you are absolutely sure) ..... X ..... mm  
or ..... inches or Bullet Diameter Guide hole number: # .....



5. Overall length ..... mm



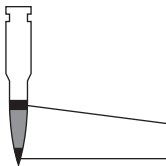
6. Case length ..... mm



7. Colour of cartridge (see the colour guide in the Tracing Manual)

Brass  Copper  Steel

Other (specify): .....



8. Colour of paint on bullet (only if it is painted)

Paint colour (if any): .....

Paint colour (if any): .....



9. Case composition (use the magnetic Tracing Tool in the Tracing Kit)

Ferrous (magnet sticks)  Non-ferrous (does not stick)



10. Colour of primer annulus (ring of paint on base of cartridge, if any)

No colour  Colour (specify): .....

11. Photographs of this type of ammunition (write down the number (#) you have written on the back of each printed photograph or the file # of each digital photograph of this type of ammunition. If the photograph contains more than one type of ammunition, write down the position in the photograph of the type of ammunition that you are recording on this copy of the ARF(L) form)

A. Photograph # ..... / digital file # ..... Position in photograph .....

B. Photograph # ..... / digital file # ..... Position in photograph .....

C. Photograph # ..... / digital file # ..... Position in photograph .....