Following the Thread: Arms and Ammunition Tracing in Sudan and South Sudan

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List of abbreviations

AGL	Automatic grenade launcher
CPA	Comprehensive Peace Agreement
DRC	Democratic Republic of the Congo
EU	European Union
GoS	Government of Sudan
GRSS	Government of the Republic of South Sudan
HAEI	Homicho Ammunition Engineering Industry
HSBA	Human Security Baseline Assessment for Sudan and South Sudan
JEM	Justice and Equality Movement
JIU	Joint Integrated Unit
MIC	Military Industry Corporation
NISS	National Intelligence and Security Services
ONLF	Ogaden National Liberation Front
RPG	Rocket-propelled grenade (launcher)
SAF	Sudan Armed Forces
SLA–AW	Sudan Liberation Army–Abdul Wahid
SLA–MM	Sudan Liberation Army–Minni Minawi
SPLA	Sudan People's Liberation Army
SPLM/A	Sudan People's Liberation Movement/Army
SPLM–N	Sudan People's Liberation Movement–North
SRF	Sudan Revolutionary Front
SSDF	South Sudan Defence Forces
SSDM/A	South Sudan Democratic Movement/Army
SSLM/A	South Sudan Liberation Movement/Army
TFG	Transitional Federal Government
UAV	Unmanned aerial vehicles
UN Comtrade	United Nations Commodity Trade Statistics Database
UNMISS	United Nations Mission in South Sudan

I. Introduction

Over the past ten years, the Small Arms Survey and others have documented the role of small arms and light weapons in the multiple conflicts within and between Sudan and South Sudan. Until very recently, however, the specific types of arms and ammunition, their sources, and their possible pathways into the hands of non-state armed actors have been only generally understood.

To enhance our understanding, the Small Arms Survey's Human Security Baseline Assessment (HSBA) for Sudan and South Sudan launched the HSBA Arms and Ammunition Tracing Desk in September 2011. The tracing project's objectives are to (a) refine previous estimates of the numbers and types of weapons held by various actors through focused field research; (b) apply tracing techniques employed by UN expert panels and other official bodies to investigate the origins and possible sourcing routes of weapons and ammunition; and (c) promote best practices for the identification and tracing of arms and ammunition in Sudan and South Sudan among all interested stakeholders. To date, the HSBA project has released 18 tracing reports providing detailed documentation on specific weapons and ammunition in the hands of non-state actors involved in conflict in Sudan and South Sudan.

This *Working Paper* provides an overview of the project's findings with regard to the types of weapons observed, their country of manufacture, and patterns of holdings among different actors that are indicative of common supply sources. It synthesizes the findings of more than two years' worth of fieldwork and follow-up investigations by HSBA project staff and consultants, initially published in web-based reports. In the interest of timeliness, those initial reports were rapidly released following field investigations. This *Working Paper* takes the opportunity to reflect more fully on the tracing project and the wider implications of its findings for Sudan and South Sudan, parties committed to supporting armed violence reduction efforts there, and arms and ammunition exporters. In addition, the paper provides a snapshot of what is known about domestic Sudanese arms and ammunition production.

Key findings include the following:

- Older weapons from the Eastern Bloc and Iran, as well as newer weapons from China, predominate among all armed actors in Sudan and South Sudan.
- Sudanese security forces are the primary source of weapons to non-state armed groups in Sudan and South Sudan, through deliberate arming and battlefield capture.
- Khartoum's deliberate supplying of Chinese-manufactured arms and ammunition to Southern insurgents took place in apparent violation of end-user agreements concluded with the Government of China.
- As Sudan has bolstered its arms manufacturing sector since the 1990s, Sudanese military equipment has increasingly appeared on the battlefield and in the hands of non-state armed groups.
- Sudanese-manufactured ammunition proliferates not only in Sudan and South Sudan, but also in other conflict zones, such as in the Central African Republic, Côte d'Ivoire, the Democratic Republic of the Congo (DRC), Somalia, and Syria.
- The Government of the Republic of South Sudan (GRSS) and Southern insurgent groups have supplied arms and ammunition to civilians in South Sudan.
- Investigations reveal that South Sudanese armed groups are in possession of an increasing number of weapons whose factory marks and serial numbers have been removed, a tactic designed to undermine identification and tracing.
- By responding to information requests, governments and private companies have shown a willingness to cooperate in the process of weapons and ammunition tracing in conflict zones.

While the HSBA's focus is squarely on insecurity and arms proliferation *within* Sudan and South Sudan, this report also touches on the intentional transfer of Sudanese arms and ammunition to actors beyond the borders of the two countries, as well as on the Sudanese government's alleged role in the transfer and retransfer of arms to other states. These important issues, which were recently raised in international media and UN expert panel reports,[1] require further research and analysis.[2]

II. The HSBA Arms and Ammunition Tracing Desk

Rationale

The Small Arms Survey's HSBA project,[3] launched in late 2005 following the Comprehensive Peace Agreement (CPA), began documenting persistent insecurity and armed violence in Sudan in 2006. The project has since published more than 50 empirical, peer-reviewed studies—*Working Papers* and *Issue Briefs*—on a wide range of security-related topics, including conflict dynamics in Darfur, South Kordofan, and Blue Nile; dissident militias; civilian disarmament; and pastoralist and tribal violence. The project's main objectives include the investigation of transfers of arms to and within Sudan and South Sudan, as well assessments of domestic small arms and ammunition stockpiles.[4]

In April 2007, the project released its first assessment of arms flows and holdings, *The Militarization of Sudan* (Small Arms Survey, 2007). It notes that public reporting of arms transfers to Sudan did not capture the diversity and magnitude of weapons and ammunition exports to Sudan, and that:

> *Multiple entry points, sources, and actors contribute to arms flows into Sudan, with sponsoring states, foreign and domestic armed groups, and brokers involved throughout the procurement chain* (Small Arms Survey, 2007, p. 2).

Those observations remained as true in early 2014 as they were in 2007.

During the civil war and in the CPA period, older weapons continued to recirculate, but inflows of newer materiel were clearly ongoing. In many cases, arms seem to have arrived in Sudan as the result of *authorized transfers* that were approved by exporting agencies.[5] Yet some of those weapons were eventually intentionally retransferred to pro-government forces within the country—such as to Darfur, in violation of the UN embargo, or across the Southern border to non-state armed groups, including tribal militia and insurgent forces. Meanwhile, the South Sudanese Sudan People's Liberation Army (SPLA) and other anti-Sudanese forces obtained weapons from both battlefield

capture and external supply. But on these points and others concerning overall arms acquisitions by state and non-state forces, there was much speculation and little evidence.

A subsequent HSBA report confirmed the dearth of publicly available information on transfers of small arms and light weapons to and within Sudan—while nevertheless noting that weapons imports were continuing (Small Arms Survey, 2009). In the run-up to contentious elections and the end of the CPA interim period, tribal violence in South Sudan surged and numerous volatile issues between Sudan and South Sudan remained unresolved (Mc Evoy and LeBrun, 2010). At this crucial juncture, other techniques were needed to enhance our understanding of the characteristics of weapons in armed actors' hands and the circumstances surrounding their acquisition and use in violence.

By 2009, the Small Arms Survey had already promoted the concept of 'conflict tracing' in post-conflict environments to 'monitor potentially escalatory influxes of weapons and to investigate particular cases of concern' (Bevan, 2009, p. 109).

In mid-2011 the HSBA obtained a grant to develop a pilot project to:

> *provide Sudanese and international stakeholders with evidence-based field research and analysis on the sources of weapons and ammunition recovered from armed actors in Sudan [to] obtain a deeper understanding of the likely sources of these weapons, their routes into Sudan, supply lines, and relationships with external supplier states and companies.*[6]

The HSBA Arms and Ammunition Tracing Desk launched in September 2011. In its first year, the Tracing Desk produced an *Issue Brief* on weapons documented in the hands of Southern insurgent groups (Small Arms Survey, 2012b) and established regular web-based reporting on arms and ammunition tracing fieldwork conducted in South Sudan and the Sudanese border areas. By January 2014, 18 such reports had been released.[7]

The HSBA tracing process

In its tracing work, the HSBA applies a multi-step process of identification, mapping, and verification of arms and ammunition, each of which is described

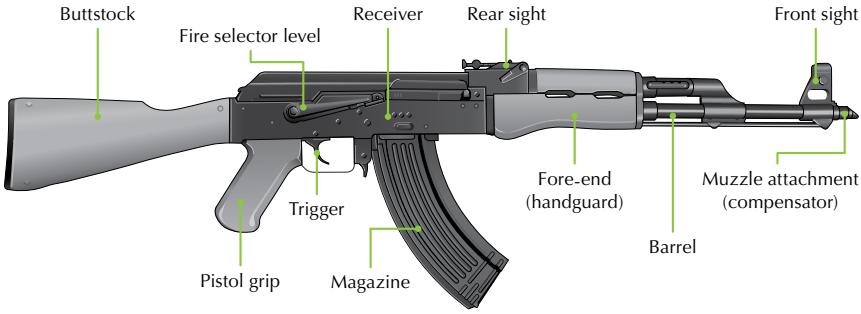
below. While the process and methods are based on the work of UN expert panels, the HSBA team further developed the approach through context-specific mapping and other tools. The project has both fostered and benefitted from colloboration with independent arms experts.

Weapons identification

Identification involves recording the make, model, and unique identifying characteristics and markings of each weapon, round of ammunition, and weapons- or ammunition-bearing container or vessel, such as ammunition boxes. Models in widespread circulation, such as AK-pattern assault rifles, can often be distinguished from one another only after close physical inspection and with particular attention to one or two specific features, such as the type of buttstock and the muzzle attachment (see Figure 1) and marking position (see Figure 2). Essential information for investigators includes the model, marks designating the manufacturer, serial number, import marks, and proof house marks—some or all of which suppliers or users may attempt to remove or obscure. When feasible, field investigators photograph weapons and ammunition markings for entry in the databases used for mapping, as discussed below.

Model and calibre. Manufacturers often produce different weapon models—such as G3A3 and G3A4—some of which differ only slightly from one another. In the context of weapons tracing, identifying the model of a weapon precisely is important for two reasons. First, manufacturers tend to stamp production

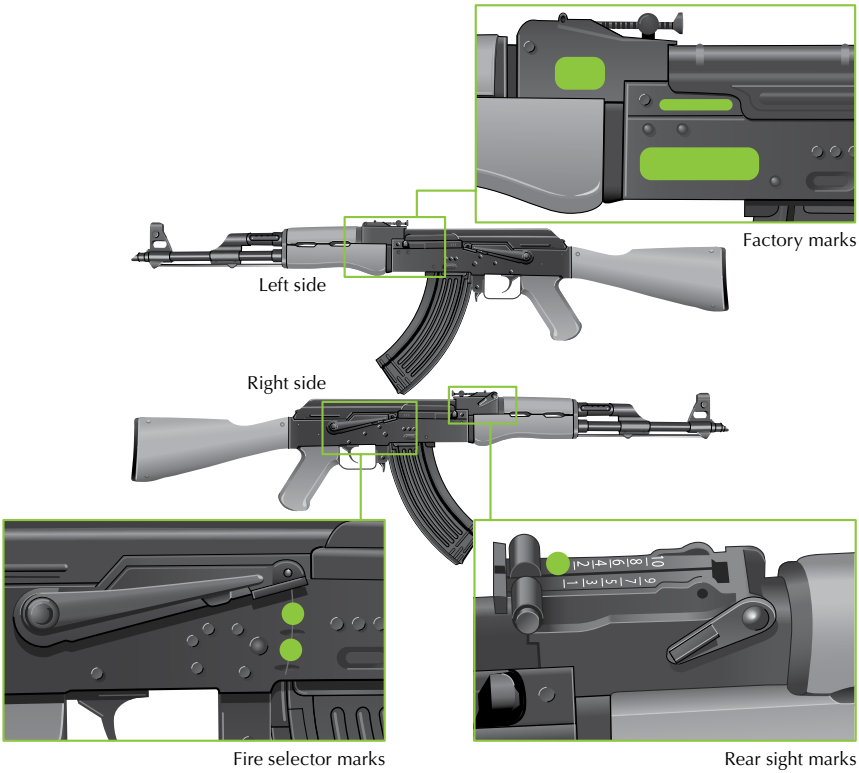
Figure 1 **Identifying features of a modern military rifle**



Source: reproduced from Jenzen-Jones (2013)

runs of one type of model with successive serial numbers; these records are subsequently stored together. Several decades can separate the production of two models by a single manufacturer. Any records that might pertain to their transfer are likely to be stored separately. The calibre of a weapon is key in identifying the exact model. In some cases calibre may change with the introduction of newer models. For instance, the introduction of the AK-74 three decades after the release of the AK-47 saw a shift in the calibre from 7.62 mm to 5.56 mm in view of changes in warfare. Knowing the weapon model and, by extension, the production period can significantly reduce the volume of documentation to be consulted in response to a tracing request. Second, transfer documentation may likewise list weapons by their model designations. Any attempt to locate a weapon in manufacturing, export, or import records

Figure 2 **Positions of identifying marks on AK-pattern weapons**



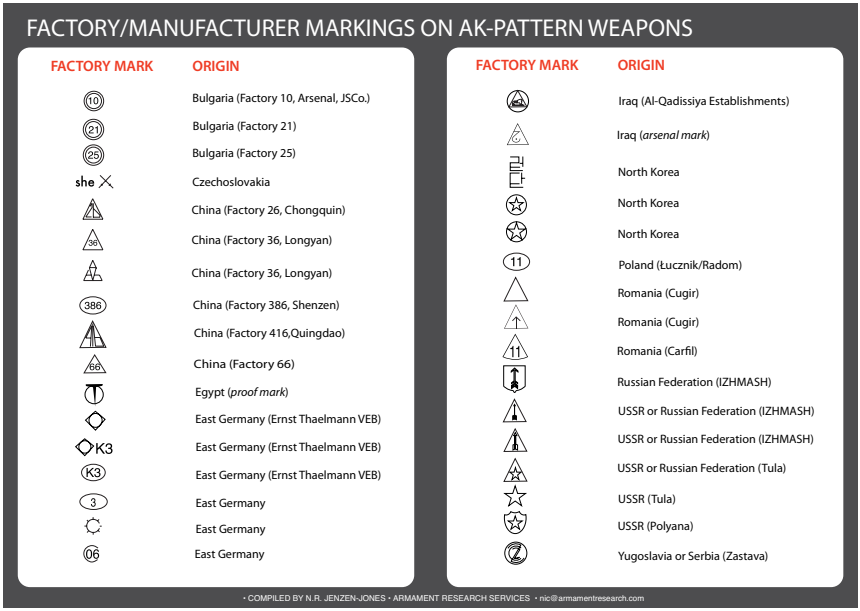
Source: reproduced from Conflict Armament Research (2012a, p. 6)

by serial number alone could be extremely time-consuming. Together with the serial number and manufacturer, the model is one of a weapon's three most important identifying features.

Manufacturer and factory marks. Factories identify their products by marking them in specific locations. For AK-pattern rifles, for example, producers typically apply factory marks on the left side of the receiver, fire selector marks on the right side of the receiver, and other identifying marks on the rear sight (see Figure 2). Manufacturers apply a variety of marks, ranging from the name of the factory, written in plain text, to symbols and numerical codes or combinations thereof (see Figure 3). While most factories or manufacturing countries brand weapons with their own marks, many weapons date from years before states may have implemented unique manufacturer markings.

Serial number. Successful weapons tracing invariably depends on locating a serial number. The serial number is the only way to identify a weapon uniquely with the naked eye and without extensive forensic research. Once recorded and

Figure 3 **Sample factory and manufacturer marks for AK-pattern rifles**



Source: reproduced from Jenzen-Jones (2013)

submitted to a manufacturing, exporting, or importing country or company, the serial number can be used to identify an individual weapon in transfer records. Manufacturers normally apply serial numbers to the receiver (main body) of sub-machine guns, rifles, assault rifles, and light and heavy machine guns. They sometimes use letters in addition to numbers, creating an alpha-numeric code. Since there is no international standardized system for marking weapons and ammunition, experts depend on a wide variety of resources for the identification process. To date, most databases that facilitate weapons identification are the products of individual researchers working independently and in collaboration, rather than institutions.

Box 1 **Serial number and factory mark removal in Sudan and South Sudan: a new trend?**

In 2009, arms investigator James Bevan wrote:

> [I have] viewed many thousands of military weapons, held by numerous parties to armed conflict, and have found few weapons that were not marked with a serial number (however faded or damaged). Reviews of thousands of weapons collection records also suggest that the intentional removal of serial numbers is uncommon in the context of armed conflict. The probable reason is that, in contrast to crime situations in which criminals (notably illegal sellers) may fear discovery by law enforcement officials, most combatants have little reason to believe that their weapons will be subject to investigation (Bevan, 2009, p. 131, n. 12).

When the HSBA began tracing arms and ammunition in 2011, its investigators also noted that very few of the encountered weapons had intentionally removed markings. By 2013, following the publication of numerous reports detailing evidence of arming of Southern rebels by the Government of Sudan (GoS), the project team began to observe increasing numbers of removed markings—serial numbers as well as factory markings—among rebel forces. Most obliterated markings had been ground out manually, probably with a grinder or a mill, which are typically used in criminal contexts. The obviously visible markings were removed, while marks that were harder to observe or reach were untouched. According to several rebel defectors, markings on their weapons had already been removed when they received them from Sudanese security officers.

Without a serial number or factory mark, investigators cannot uniquely identify a weapon.[8] But other clues—such as other markings and possibly unique model characteristics, as well as the location of the weapon and the other weapons and ammunition with which it was seen—may provide important contextual information. The fact that a weapon's markings have been intentionally removed is also itself an important piece of information. It is a clear red flag, evidence that one party, at least, found it necessary to obscure the weapon's sourcing. For this reason, the HSBA has made it a point to document all weapons with intentionally removed markings. Over time, documentation of these weapons will almost certainly reveal patterns of interest to investigators.

Conflict weapons without serial numbers are relatively rare and tend to reflect erosion over time or as a result of rough handling; however, arms experts have increasingly observed deliberately removed serial numbers in the Sudan–South Sudan context (see Box 1).

Import marks. Import marks are stamps or engravings applied to the weapon at the time of importation. Import marks have the potential to make weapons tracing much easier by shortening the chain of possible transfers that need to be investigated to establish how a weapon entered a conflict zone. South Sudan and Sudan commenced a weapons marking initiative in November 2010 and March 2011, respectively (Bevan and King, 2013, p. 32), but it is not clear to what extent both countries have applied this programme to imported weapons. The Survey has never observed Sudanese or South Sudanese import marks on weapons documented with non-state actors.[9]

Small arms ammunition identification[10]

Identifying and tracing ammunition is as important as tracing weapons. In the context of Sudan and South Sudan, in which weapons proliferation is already widespread, non-state armed groups often value ammunition more than other military assets. Furthermore, weapons and ammunition are often transferred together and, since particular weapons only fire specific kinds of ammunition, ammunition identification and tracing can provide clues as to which weapon types are in the hands of non-state groups.

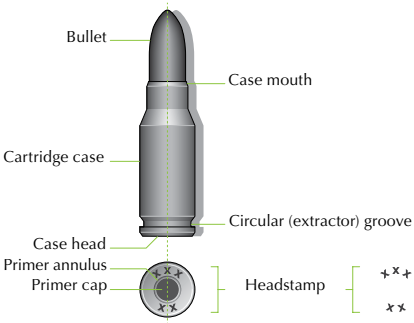
Small arms and light weapons ammunition identification relies on the same principles as weapons identification but is based on a different set of characteristics (see Figure 4). These include:

General characteristics. Different types of cartridges are produced to fulfil different battlefield functions. They include ball, soft-point, hollow-point, tracer, incendiary, armour-piercing, and grenade-propelling cartridges, as well as training blanks.

Calibre. Although exceptions exist, the calibre designation of a cartridge is typically determined by measuring the projectile's diameter and the length of the cartridge case—measured from the case head to the case mouth for small-calibre ammunition.

Case type. Cartridges have distinct case types, including rimmed, semi-rimmed, rimless, and belted cases. Most of these can be identified visually, although it can be difficult to differentiate between some varieties.

Figure 4 **Components of a small-calibre cartridge**



Source: Bevan (2008)

Case composition. The type of material used in a cartridge case can provide an indicator of the factory or country of production. Case materials include brass, copper-clad steel, coated or lacquered steel, aluminium, plastic, and nickeled brass. Brass and copper-clad steel are the most common cartridge case materials.

Headstamp. Cartridges typically feature alphanumeric characters and/or symbols applied to the head of cartridge cases, which are known as headstamps. These headstamps can provide valuable information about the country of origin, producer, year of production, calibre, and type of cartridge. In some cases, they may contain additional information, such as a lot or batch number.

Coloration and markings. Cartridges are marked and coloured in a variety of ways, generally to indicate type or purpose. Occasionally, markings denote a particular brand of ammunition.

Packaging and documentation. Packaging generally consists of outer packaging, such as wooden shipping boxes, and inner packaging, such as metal tins. Occasionally, smaller units of ammunition may be enclosed in cardboard or plastic packaging. Packaging can provide valuable clues as to the origin, place of production, type, and destination of the ammunition. It may also feature contract numbers and provide clues as to ports of transit, dates of transfer, and other relevant information. Documentation, where present, can also provide a wealth of valuable information on the origin, quantities, dates, and ports of shipment involved in an ammunition transfer. In some cases, these documents reference intermediary parties or countries of origin other than the country of original manufacture.

Mapping

Arms and ammunition mapping is a powerful tool that the HSBA uses to illuminate patterns in holdings and procurement among different actors in Sudan and South Sudan. Such mapping relies on custom-built databases of arms and ammunition, including the identifying markings, quantities, locations, and circumstances of its most recent acquisition, in connection with photographs of the weapons taken by field researchers. The HSBA database includes information from dozens of arms caches observed by researchers, representing many hundreds of weapons and thousands of rounds of ammunition.

Through cross-referencing and analysis of independent samples of arms and ammunition, mapping allows researchers to identify trends and patterns as data sets grow, ultimately enhancing our understanding of the types of arms and ammunition that armed groups have in their stockpiles. Over time, it becomes possible to draw conclusions about the chain of custody of particular materiel. For instance, matching lot numbers of ammunition found in the stockpiles of several armed groups may indicate the same source-to-recipient pattern of supply. Likewise, a new variety of rifle never before observed in Sudan or South Sudan in the hands of two geographically disparate rebel groups may suggest a single source.

Verification

In verifying weapons and ammunition data, HSBA researchers triangulate (confirm) initial findings by using, first, a number of official, published sources of information, including:

- national arms export reports provided by a government on its initiative or pursuant to multilateral arms control agreements;
- publicly available trade databases such as the United Nations Commodity Trade Statistics Database (UN Comtrade), the UN Register of Conventional Arms, and the Stockholm International Peace Research Institute's Arms Transfers Database; and
- qualitative data, including media and research reports.

Second, the verification process relies on information culled from interviews with respondents in the field and beyond—such as military commanders, rebel

representatives, local community members with relevant knowledge, and government officials. Testimony from such key informants can provide essential contextual information to help corroborate or discount other interpretations of the data. Nevertheless, given the possibility of receiving false, misleading, or incomplete information, project investigators depend on independent corroboration and patterns in key informant testimony. The HSBA routinely refrains from using testimony when it is not supported by additional sources.

The third source of information used in data verification stems from responses to written inquiries and information requests sent to exporting governments, manufacturers, and transport companies. The requests detail the type of weapon(s) observed, identifying markings, and the circumstances under which an item was observed. They typically seek information such as:

- confirmation that a weapon or weapons system was manufactured in the country of export;
- date of manufacture;
- date of export;
- information on the intended end users;
- transporter/shipper;
- broker information, if applicable;
- confirmation that an export licence was required and obtained for the export to proceed; and
- information on possible resale or retransfer of the weapon(s).

The requests do not imply any wrongdoing or impropriety on the part of the exporting state, company, or individual (see Box 2). Nor are exporting agencies or private companies under any legal obligation to provide requested information to investigators. However, in many cases, they do so willingly, as a matter of cooperation and transparency.

This kind of cooperation can prove invaluable to the successful tracing of weapons, ammunition, and other military materiel. Along with accurate marking and record keeping by manufacturers and export agencies, it is an essential component of tracing. As one investigator writes:

> *Even if the necessary marking and record-keeping requirements have been met, tracing efforts will be brought to a swift halt if the countries of manufacture or*

Box 2 **Sample information request to an exporting agency[11]**

Small Arms Survey
Graduate Institute of International and Development Studies
Institut de hautes études internationales et du développement
P.O. Box 136
1211 Geneva 21
Switzerland

29 July 2012

Excellency,

The Small Arms Survey (www.smallarmssurvey.org) is an independent research project located at the Graduate Institute of International and Development Studies in Geneva, Switzerland. As you may know, the Small Arms Survey conducts a significant body of research on Sudan and South Sudan as part of its Human Security Baseline Assessment (HSBA) project, funded by the Danish Ministry of Foreign Affairs, the Dutch Ministry of Foreign Affairs, the Norwegian Ministry of Foreign Affairs, the US Department of State, and the United States Institute of Peace.

As part of the HSBA project, we are currently conducting research into the origin and acquisition of arms and other equipment held by a number of armed actors in Sudan. This research aims to improve the international community's knowledge of holdings and flows of military equipment in Sudan, particularly with respect to the ways in which equipment has moved from state stockpiles to armed forces and non-state armed groups within the country. We hope that this information will help reduce destabilizing flows of military equipment within Sudan and South Sudan and contribute to regional stability.

We are therefore taking the liberty to request your assistance in obtaining available information regarding mortar ammunition (60 mm; 82 mm and 120 mm) and fuzes bearing marking codes identical to those applied by manufacturers. These items were recently observed by our researchers in separate locations, in the possession of a Sudanese non-state armed group in South Kordofan between mid-2011 and early 2012.

It is against this background that the Small Arms Survey kindly requests detailed information on the following issues:

- Could the Government of the confirm that the items described above (see photos 1–16 and the related tables in Annexes I and II) were produced by one or more manufacturers?
- If applicable, could the Government of the identify the country/countries and/or individuals or entities to which it exported the items?
- In relation to the weapons in question, would the Government of the provide documentation on the sale of these items, including the sales invoices, end-user certificates, packing lists, and any other relevant information?

We would be extremely grateful for any information that you felt able to provide to the Small Arms Survey regarding these questions. We hope that this information may also prove helpful in any enquiries your government may be undertaking. In this respect, please also note that the Small Arms Survey stands ready to provide any additional elements of documented information on the presence and use of apparently manufactured military equipment in South Kordofan, should your government deem it relevant to analyse these.

Please allow us to stress that our request for your assistance is in no way intended to imply any wrongdoing or impropriety on the part of your government or any other exporters. We simply wish to request your assistance in establishing information regarding the chain of custody of the equipment to better understand how it was diverted from state stockpiles.

If you require any clarification or have any queries about this letter or our work in general, please do not hesitate to contact me or

Similarly, if this type of request is generally handled by another division, we would appreciate it if you could forward this letter to the appropriate individual.

Finally, please allow me, Your Excellency, to express our sincere gratitude for your kind assistance and our highest consideration.

Eric Berman
Managing Director

Table 1 **HSBA inquiries sent to exporting states**

State	Number of inquiries submitted	Number of responses, by type	Unanswered inquiries	Comments
Belgium	1	1 somewhat useful	0	Referred to the Dutch Ministry of Economic Affairs.
Bosnia and Herzegovina	1	0	1	
Bulgaria	5	4 useful 1 somewhat useful	0	Confirmed that 82 mm mortars were supplied to Ethiopia in 1999; 23 mm ammunition was supplied to Uganda in 2010; weapons and technology were transferred to Sudan in the late 1990s.
Croatia	1	0	1	
Czech Republic	1	1 useful	0	Noted that ammunition was produced in present-day Slovakia.
Germany	3	2 useful	1	Provided information on the supply of vehicles to Sudan and the production of Heckler & Koch G3 rifles.
Netherlands	1	1 useful	0	Provided information on the export of 4x4 vehicles to Port Sudan.
Serbia	1	0	1	
Slovakia	1	1 somewhat useful	0	Confirmed manufacture of 100 mm ammunition, but provided no records on the item in question because it was more than 30 years old.
South Korea	1	0	1	
Ukraine	1	0	1	
United States	1	1 useful	0	Confirmed supply of 106 mm ammunition to Sudan in 1980.
TOTALS	**18**	**12 (9 useful, 3 somewhat useful)**	**6**	

import—or trading entities within those countries—do not cooperate with tracing requests (Bevan, 2009, p. 2).

The HSBA tracing project has benfited from the cooperation of many government agencies and companies, although responses have varied in usefulness (see Table 1). Indeed, exporters may provide accurate, incomplete, or incorrect information on whether they produced an item, have records for its sale, or supplied it to a specific country. In some instances, particularly with companies that have been involved in the supply of dual-use items such as 4×4 vehicles,[12] useful information may be provided regarding a third party that is in some way involved in the transaction.

Government agencies responded to initial information requests in 12 of 18 cases. In 9 of 12 responses, governments provided 'useful' information that either helped to confirm that an item was supplied to a specific destination or provided information that required sending a new request to another government or company. Three other 'somewhat useful' responses included partial answers or referrals to other parties.

The relatively positive picture presented here hides an important caveat. According to UN panel reports, most major arms exporters that supply Sudan have failed to respond to information requests of this type (UNSC, 2009, p. 80; 2011a, pp. 26–28; Gramizzi, Lewis, and Tubiana, 2012, pp. 22–23). There are indications, however, that China—one of Sudan's top suppliers—recently began to cooperate more closely with UN panels.[13]

The HSBA has also sent 23 inquiries to companies—including manufacturers, shipping agencies, and maintenance companies—often focusing on military vehicles or commercial 4x4 vehicles that have been converted into 'technicals' by military forces or armed groups. In some cases, potential embargo violations were investigated. By this writing, nine of the 11 responses received from companies had confirmed the export of equipment or services to a specific party.

The legal context for arms imports[14]

The Darfur region of Sudan is subject to a United Nations arms embargo, first established in July 2004 in response to an international outcry over the humani-

tarian impact of the conflict there (UNSC, 2004). The resolution demanded that the GoS 'fulfil its commitments to disarm the Janjaweed militias' (para. 3) and established a ban on supplies of arms and related materiel to 'non-governmental entities and individuals, including the Janjaweed' (para. 7) operating in North, South, and West Darfur. By referring to 'janjaweed', the UN Security Council intended to include GoS-supported groups, but the vague phrasing allowed the GoS to argue that the embargo did not cover state-backed militias. A March 2005 resolution established mechanisms for monitoring compliance with the embargo (UNSC, 2005).

A 2012 Small Arms Survey report notes that, despite these measures, 'all sides in the Darfur conflict have continued to gain access to military resources' and that the embargo was violated 'openly, consistently, and without consequence' (Small Arms Survey, 2012c, p. 10). Regarding the embargo, the Survey finds that:

> *Its limited geographical scope, covering only the Darfur states, has for the last seven years allowed international suppliers (state and commercial) to furnish arms and assistance to the GoS entirely legally, despite clear evidence that the GoS is moving the arms rapidly and continually into Darfur* (Small Arms Survey, 2012c, p. 10).

The Council of the European Union (EU) integrated the UN sanctions into its existing regime of restrictive measures on Sudan, which had first been imposed in March 1994 (CEU, 1994; 2004; 2005). However, the EU embargo covers all of Sudan, not just Darfur—and, since its secession in 2011, South Sudan as well (CEU, 2011).

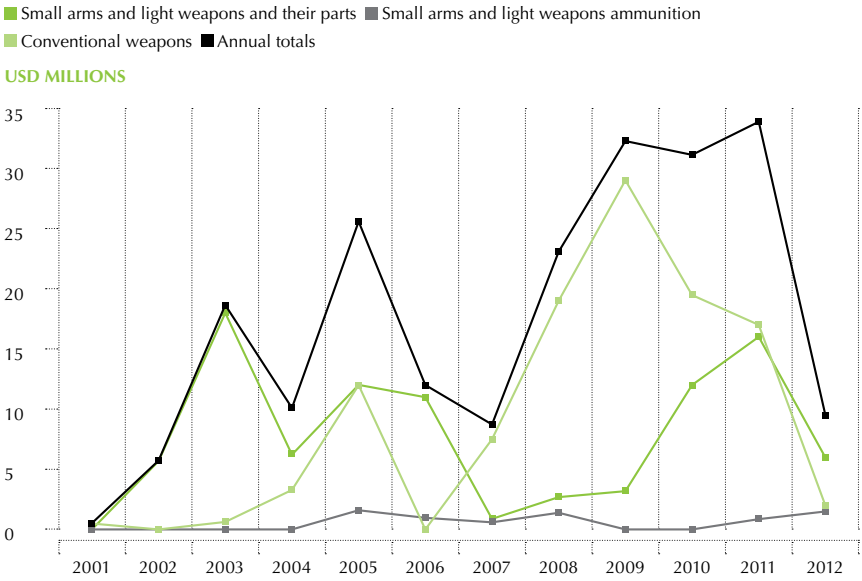
In contrast, in January 2012, US President Barack Obama lifted restrictions on the sale of defence materiel to South Sudan, stating that this would 'strengthen the security of the United States and promote world peace' (White House, 2012). US State Department officials indicated that the government was in discussions with the South Sudanese about how to 'secure their borders' and 'defend themselves', but that the United States had no immediate plans to approve the transfer of lethal equipment (Reuters, 2012). As of late 2013, this remained US policy.[15]

Reported Sudanese arms imports

Over the period 2001–12, Khartoum's reports to UN Comtrade reveal significant fluctuation in annual conventional arms imports (see Figure 5). The aggregate total values increased steeply—from less than USD 1 million in 2001 to almost USD 34 million in 2011, with a drop to less than USD 10 million in 2012. 'Conventional weapons'[16] represented more than half of the total value imported over the entire period (52 per cent). Small arms and light weapons represented 44 per cent of the total, and small arms and light weapons ammunition were 3 per cent of the total over the period.

The majority of the Sudanese government's total self-reported imports of small arms and light weapons, their ammunition, and 'conventional weapons' over the period originated in China (58 per cent), followed by Iran (13 per cent), St. Vincent and the Grenadines[17] (9 per cent), and Ukraine (8 per cent). As of late 2013, South Sudan had not reported any arms imports to UN Comtrade.

Figure 5 **Annual imports of small arms and light weapons, their ammunition, and 'conventional weapons' reported by Khartoum to UN Comtrade, 2001–12 (USD millions)**



Sources: El Jamali (2013); UN Comtrade data provided by the Peace Research Institute Oslo

Table 2 **HSBA tracing missions, April 2011–July 2013**[19]

Date	Location	Group visited/in possession of weapons
April 2011	Rubkhona, Unity, South Sudan	Sudan People's Liberation Army (SPLA) in possession of weapons captured from the South Sudan Liberation Movement/Army (SSLM/A) (Gadet)
	Mayom, Unity, South Sudan	SPLA in possession of weapons captured from SSLM/A (Gadet)
	Canal, Jonglei, South Sudan	SPLA in possession of weapons captured from the South Sudan Democratic Movement/Army (SSDM/A) (Athor)
November 2011	Mapel, Western Bahr el Ghazal, South Sudan	Former Sudan Armed Forces (SAF) Joint Integrated Unit in possession of their own weapons
January 2012	Rubkhona, Unity, South Sudan	SPLA in possession of weapons captured from SSLM/A (Gadet)
February 2012	Unity, South Sudan—various locations	SPLA in possession of various weapons
May 2012	South Kordofan, Sudan—various locations controlled by the Sudan People's Liberation Movement–North (SPLM–N)	SPLM–N in possession of weapons captured from SAF and other sources
September 2012	Paryak, Jonglei, South Sudan	SPLA in possession of weapons collected from the SSDM/A (Athor) and the South Sudan Defence Forces (John Duit)
December 2012	South Kordofan, Sudan—various SPLM–N-controlled locations	SPLM–N in possession of weapons captured from SAF and other sources
	Blue Nile, Sudan—various SPLM–N-controlled locations	SPLM–N in possession of weapons captured from SAF and other sources
February 2013	Pibor, Jonglei, South Sudan	SSDM/A (Yau Yau) defector group in possession of its own weapons
May 2013	Mayom, Unity, South Sudan	SSLM/A (Bapiny) in possession of its own weapons
July 2013	Paryak, Jonglei, South Sudan	SPLA in possession of weapons captured from SSDM/A (Yau Yau)
	Lul, Upper Nile, South Sudan[20]	SSDM/A (Olony) in possession of its own weapons

Working methods

The core of weapons tracing work consists of field investigations conducted by HSBA personnel and consultants with specific expertise in weapons and ammunition identification and tracing.[18] Experts who have had significant experience on UN panels of experts in Côte d'Ivoire, Darfur, the DRC, Somalia, and elsewhere have undertaken this fieldwork.

The decision about where to conduct tracing fieldwork is based on a range of factors, including:

- Relevance: Are the suspected weapons associated with a particular conflict or were they held by actors who are strongly linked to armed violence or insecurity?
- Authorization: Can permission be obtained to view the weapons and speak to key informants?
- New research area: Is the weapons cache associated with an actor or conflict that the HSBA has not yet investigated?
- Staffing: Is a qualified arms and ammunition investigator available to conduct the fieldwork?
- Accessibility: Can the site be reached by commercial flights, private vehicle hire, or UN escort?
- Safety: Will investigators be protected from insecurity?

The HSBA Tracing Desk has conducted 14 tracing missions since 2011 (see Table 2). Fieldwork investigations would not be possible without considerable trust and cooperation offered by numerous actors in the chain of command of the SPLA and the GRSS.

III. Conflict-affected areas and armed actors

This section provides a brief overview of the conflict-affected areas in Sudan and South Sudan and the key armed actors as of early 2014.[21] Each of these conflicts is deeply influenced by the military resources accessible to the non-state armed groups involved, especially with respect to small arms and light weapons. Map 1 provides an overview of the conflict regions and non-state actors, and Table 3 summarizes the non-state opposition groups, their estimated troop strengths, and their general locations.

Sudan

As of early 2014, the GoS was fighting two conflicts within its territory. The first has pitted Khartoum against a coalition of armed opposition groups in Darfur; the second erupted in the border states of South Kordofan and Blue Nile, where the GoS has taken on indigenous rebels who maintain some ties with South Sudan and who recently allied themselved with Darfur's main rebel groups. In addition, Sudan, South Sudan, and the local communities remain at loggerheads regarding the disputed territory of Abyei, which the Sudan Armed Forces (SAF) and allied pastoralists entered and occupied in 2011.[22]

South Kordofan[23]

The current South Kordofan conflict has roots in the civil war, during which those who sided with the Sudan People's Liberation Movement/Army (SPLM/A) were subjected to widespread human rights abuses, including starvation through food blockades. Fighting erupted anew on 5 June 2011, pitting SAF and its paramilitary forces against the Sudan People's Liberation Movement–North (SPLM–N) and its supporters in the state, notably the Nubans. The conflict has involved the widespread bombing of civilians by SAF and accusations of human rights violations. As of January 2014, the SPLM–N controlled the southern Nuba Mountains south of Jaw, including the strategic road that connects South Kordofan to South Sudan.


Map 1 Non-state armed groups and conflict zones, Sudan and South Sudan, 2013
Red Sea
Red Sea
Northern
SUDAN
Nile
CHAD
North Darfur
Khartoum
Khartoum
Kassala
ERITREA
Gezira
North Kordofan
Gedaref
West Darfur
Sennar
White Nile
Central Darfur
South Kordofan
Blue Nile
South Darfur
East Darfur
ETHIOPIA
Unity
Upper Nile
Northern Bahr al Ghazal
Warrap
CENTRAL AFRICAN REPUBLIC
Jonglei
Western Bahr al Ghazal
Lakes
SOUTH SUDAN
Western Equatoria
Eastern Equatoria
Juba
Central Equatoria
DEMOCRATIC REPUBLIC OF THE CONGO
UGANDA
KENYA
0 km 200
Armed groups
SLA-AW/MM
JEM
SPLM-N
SSLM/A
SSDF
SSDM/A-Olony
SSDM/A-Athor
SSDM/A-Yau Yau
Lou Nuer (White Army)
Murle militia
Conflict zone
African Union-proposed border
International boundary
Abyei
National capital
State boundary
Icons are not intended to specify precise locations of armed groups

The **SPLM–N in South Kordofan** consists of some 20,000 men, the majority of whom were members of the SPLA's 9th Division in the state, with the remainder repatriated Nuba and other soldiers who had been stationed in South Sudan. The South Kordofan branch of the SPLM–N, now known as the 1st Division, is led by Abdelaziz al Hilu, a former gubernatorial candidate in the state.

The small South Kordofan branch of the **Justice and Equality Movement (JEM)** has been active, and militarily decisive, in the conflict since mid-2011. Thought to number fewer than 1,000 men, JEM–South Kordofan is commanded by Fadel Mohamed Rahoma, a Missiriya. The Missiriya presence in JEM is strong in the state, and most of the fighters are deployed in the Missiriya area of the state, in the west. JEM has captured a significant volume of SAF equipment, especially light infantry weapons and ammunition, as well as modified 4×4 'technicals'.

Under the banner of the **Sudan Revolutionary Front (SRF)**, which includes the SPLM–N and JEM, and which is also led by Abdelaziz al Hilu, the Darfur **Sudan Liberation Army–Abdul Wahid (SLA–AW)** and **Sudan Liberation Army–Minni Minawi (SLA–MM)** also participate, although they have not deployed significant numbers of fighters to South Kordofan.

Blue Nile[24]

The conflict in Blue Nile erupted in September 2011, less than two months after the celebration of South Sudan's independence, when long-standing and unaddressed tensions between the SPLM–N and the GoS boiled over. This violence followed a pattern reminiscent of the fighting that had broken out three months earlier in South Kordofan. The initial phase of the conflict saw the mobilization of tens of thousands of troops, including militias locally recruited and equipped by the government. Consistent aerial bombardment resulted in a major humanitarian crisis in the southern part of Blue Nile, where almost 30 per cent of the state's population was displaced.

The **SPLM–N in Blue Nile**, technically known as the SPLM–N's 2nd Division, is the former SPLA 10th Division. Despite the rebels' initial victories, the military balance of the conflict appears to be largely in favour of the government camp, which has succeeded in confining the rebel movement to the southern

part of the state and re-establishing its authority over many of the strategically important locations that were temporarily controlled by the SPLM–N. In contrast to what has been documented in South Kordofan, SPLM–N in Blue Nile captured only limited stockpiles of military hardware from SAF. It operates in complete isolation from the other components of the SRF, including the SPLM–N in South Kordofan.

Darfur

After more than a decade of rebellion, proxy arming, and shifting alignments between the GoS and both Arab and non-Arab populations in the region, the Darfur conflict continues despite two peace agreements—the Darfur Peace Agreement of 2006 and the Doha Document for Peace in Darfur in 2011. While the conflict has evolved since 2003, widespread violence, massive displacement, and aerial bombardment remain dominant themes. In 2013, new violence displaced more than 450,000 people, adding to the already 1.4 million internally displaced people throughout Darfur (UNSC, 2014a, p. 46).

Initially, the **Liberation and Justice Movement**, an alliance with no military presence in Darfur, was the only group to sign the Doha Document for Peace in Darfur; by April 2013, the only other group to sign on was a JEM splinter group. The agreement has little legitimacy in Darfur and abroad.

The major rebel movements, including the **SLA–MM**, the only rebel group to have signed the 2006 Darfur Peace Agreement, the **SLA–AW**, and the mainstream **JEM** have repeatedly rejected participation in the Doha process. The SLA–MM's rapprochement with the Fur-dominated SLA–AW and JEM has taken place under the **SRF** banner. The Darfur movements have conducted several joint operations against government forces in Darfur and show no sign of giving up their fight.

South Sudan

South Sudan was the location of much of the fighting during the second Sudanese civil war (1983–2005), in which both sides armed Southern tribal militias, and the rebellion split numerous times, with some factions returning to the government only to rebel once again. In the latter phases of the war, much of

the conflict was intra-Southern, with pro-government fighting conducted by a patchwork of Khartoum-supported Southern commanders and militias.

Following the signing of the CPA, President Salva Kiir of South Sudan attempted to persuade rival militia commanders and their forces to integrate into the Southern army. Many commanders took advantage of intergration offers during the six-year interim period established by the CPA and subsequent Juba Declaration, but then rebelled against the Southern government as the official date of independence drew closer.

Following elections in 2010 and after South Sudan's independence in July 2011, a number of insurgent groups formed in opposition to the SPLM/A. By 2013, the SPLA was attempting to contain insurgencies in Greater Upper Nile[25] while simultaneously working to integrate the forces of commanders who had accepted amnesty, surrendered, or died. In December 2013 and January 2014, however, dynamics among Southern militias appeared to shift after widespread civil conflict erupted between President Salva Kiir and political opposition leader Riek Machar, with the latter drawing a number of dissident commanders, as well as thousands of SPLA soldiers, to his side in what became known as the **SPLA in Opposition**.

While the situation was in flux at the time of writing, the main insurgent militias that challenged the SPLA and the GRSS in 2011–13 are described below.[26]

South Sudan Democratic Movement/Army (SSDM/A)–Cobra (David Yau Yau). The SSDM/A–Cobra faction has been loosely affiliated with the broader SSDM/A movement since 2010, when George Athor was overall commander. The movement fractured after Athor's death in December 2011, with some commanders defecting. Yau Yau, a Murle civilian from the Ngarotti clan, first rebelled after the 2010 elections, when he failed to gain a seat in the state legislature. In the first rebellion, Yau Yau had few troops; about 300 received presidential amnesty when he surrendered in 2011. After the amnesty, Yau Yau and his commanders were given accommodation in Juba as they awaited their integration package from the SPLA; meanwhile, most of his troops were taken to Owiny-Kibul in Eastern Equatoria, and later to Mapel in Western Bahr el Ghazal, where they integrated into the SPLA.

In April 2012, however, Yau Yau went to Khartoum and defected again. In July, he and about 41 others, including Arzen Kong Kong and a number of

SAF commanders who had been affiliated with Sultan Ismail Konyi during the civil war, returned to Pibor county by foot through Blue Nile. There is evidence that Khartoum supplied significant quantities of weapons to Yau Yau's forces by airdrop in late 2012 and early 2013. One of Yau Yau's commanders, James Kuburin, surrendered to the SPLA with 280 soldiers on 4 December 2012, fully armed with Sudanese-supplied weapons (Small Arms Survey, 2013b).

When conflict erupted in South Sudan in December 2013, Yau Yau was already making progress towards a peace deal with the government in Juba. On 31 January 2014, the SSDM/A–Cobra faction signed a peace deal with the government, solidifying a ceasefire agreement that had been reached a few weeks earlier (Al Jazeera, 2014). The peace agreement was concluded in late March (*Sudan Tribune*, 2014).

SSDM/A–Upper Nile. Johnson Olony, a Shilluk from Panyakang county in Upper Nile, was one of Robert Gwang's deputies until Gwang integrated into the SPLA in late 2010. The Shilluk insurgencies were initially driven by disputes between the Shilluk community and the government of Upper Nile over land and county boundaries; they were galvanized by the 2010 disarmament campaign in which the SPLA 7th Division reportedly committed large-scale abuses. Olony took his men across the border into South Kordofan and aligned with the SSDM/A under Athor. After Athor's death in December 2011 and a peace deal signed by his successor, Peter Kuol Chol Awan, in early 2012, Olony claimed overall leadership of the SSDM/A until Yau Yau was announced leader in April 2013.

In early June 2013 Olony officially accepted the presidential amnesty and moved with 3,000 troops into Upper Nile. He travelled to Juba to negotiate terms with the SPLA, while the majority of his troops remained in Kodok in Fashoda county, where they awaited integration into the SPLA until the conflict erupted in December. In a 6 June 2013 statement, Olony stated that he had received support from Khartoum in his insurgent activities (Small Arms Survey, 2013d, p. 7). In late 2012 and early 2013, Olony's troops made few forays into South Sudan, and a number of sources reported that they were being used by Sudan to fight the SPLM–N in South Kordofan.

Olony has also been closely linked with Alyuak Ogat Akol, the former commissioner of Manyo county, and the two militias were stationed together for

much of the rebellion. In June 2013, Ogot's men attacked Wadakona in northern Upper Nile. In late September 2013, he accepted a presidential amnesty (Buay, 2013).

From December 2013, Olony fought alongside the SPLA, helping to secure Fashoda county. His forces were involved in the failed defence of Malakal in February 2014. Olony's troops defended the south of the city, and Olony himself was injured. Among other forces, Olony engaged the same SPLA troops that terrorized Shilluk communities along the west bank of the Nile following the 2010 election (Small Arms Survey, 2014c).

South Sudan Defence Forces (SSDF) and affiliates. Gordon Kong, the longtime leader of the SSDF in eastern Upper Nile, re-emerged in 2011 after a few years of dormancy following the signing of the CPA. Two of his commanders, Maj.-Gen. John Duit Yiech and Brig.-Gen. James Duoth Lam, defected to the SPLA in May 2012, with 250 of Kong's troops, although the SSDF disputes that figure. Kong has been based in Khartoum, while his troops have been coordinating with a number of other commanders along the Upper Nile–Blue Nile border. At this writing, he was reportedly under house arrest and the status of his forces was not clear, although he supposedly accepted presidential amnesty in late September 2013 (Buay, 2013). They were based in Blue Nile along the eastern border of Upper Nile, along with a number of commanders such as Muntu Mutallah Abdallah, Mohamed Chol Amir, Kamal Lamal, and James Bogo. It is unclear how those men fall within the SSDF command structure, but it has been reported by the SPLM–N, as well as SPLA officers in Upper Nile, that they were all coordinating closely with SAF in Blue Nile against the SPLM–N and along the Upper Nile border.

South Sudan Liberation Movement/Army (SSLM/A). Peter Gadet, a Bul Nuer from Mayom county, Unity, defected from the SPLA in March 2011 and went into rebellion against the government under the banner of the SSLM/A. In so doing, he took other militia groups under his wing, including those of Kolchara Nyang, James Gai Yoach, and Matthew Puljang, who were fighting in Unity, as well as Bapiny Monituel and Carlos Kuol, who were in Khartoum. In August 2011, Gadet signed a peace agreement with the government and was integrated into the SPLA.

Table 3 **Selected non-state armed groups in Sudan and South Sudan, January 2014**

State or region	Armed group	Location	Strength	Status as of January 2014
Darfur, Sudan	Justice and Equality Movement (JEM)–Darfur	North-western Darfur to south-eastern Darfur	100 vehicles	Active
	Sudan Liberation Army–Minni Minawi	South Darfur (including east Jebel Marra and Nyala area), East Darfur, North Darfur (Shangal Tobay area, Abu Gamra)	250 vehicles	Active
	Sudan Liberation Army–Abdul Wahid	Jebel Marra, North Darfur (Ain Siro, Jebel Meidob)	50 vehicles, ability to mobilize foot soldiers	Active
South Kordofan, Sudan	Sudan People's Liberation Movement–North (SPLM–N) 1st Division	Southern Nuba Mountains south of Jaw, including the strategic road from South Sudan	<20,000 troops	Active
	JEM–South Kordofan	Moving between SPLM–N-controlled areas in the Nuba Mountains and Missiriya areas in West Kordofan as well as northern Abyei	150 vehicles	Active
Blue Nile, Sudan	SPLM–N 2nd Division	Southern part of Blue Nile from Deim Monsour in the east to the Upper Nile border west of Kubra	<10,000 troops	Active

State or region	Armed group	Location	Strength	Status as of January 2014
Greater Upper Nile, South Sudan*	South Sudan Democratic Movement/ Army (SSDM/A)–Athor**	Jonglei state	No active troops	Athor killed in December 2011; his troops were integrating into the SPLA as of late 2013
	SSDM/A–Yau Yau	Pibor county, Jonglei state	500–1,000 core troops; can mobilize 3,000–6,000 Murle youths	Signed peace deal with government in January 2014
	SSDM/A–Olony***	Fashoda county, Upper Nile, with affiliates in South Kordofan, Sudan	<3,000 troops	Accepted amnesty; aligned with SPLA in Upper Nile
	South Sudan Defence Forces	Multiple factions in rear bases in Bwat, Blue Nile, Sudan	<1,000 troops	Active
	South Sudan Liberation Movement/ Army	Mayom, Unity	<3,000 troops	Accepted amnesty and awaiting integration; aligned with SPLA in Unity
	Lou Nuer (White Army)	Jonglei	Can mobilize up to 8,000 troops	Active
	Murle militia	Jonglei	Usually attack in small groups	Active

Notes:

* The Greater Upper Nile region of South Sudan includes Jonglei, Unity, and Upper Nile states.
** Although Athor's faction is no longer active, it is included here because of its importance in the development of the more recent branches of the SSDM/A (Yau Yau and Olony).
*** Also known as the SSDM/A–Upper Nile faction.

Sources: Gramizzi (2013, pp. 40–44); Gramizzi and Tubiana (2013, pp. 27–32); Small Arms Survey (2013d, p. 2; 2014b; 2014c)

After Gadet's reintegration, a number of SSLM/A breakaway militia units remained active along the South Kodofan–Unity border. James Gai Yoach assumed leadership of the remnants of the SSLM/A after Peter Gadet rejoined the SPLA. A leadership shuffle reportedly took place in early August 2012, with fighting between Kolchara Nyang and Matthew Puljang in Nyama, which resulted in the death of Kolchara. In late September 2011, James Gai Yoach was arrested in Khartoum and Bapiny took over command. The SSLM/A accepted amnesty in April 2013 and began negotiating political and military integration with the SPLM/A.

When conflict broke out in December 2013, the SSLM/A sided with the SPLA against the rebelling SPLA forces in Unity. Gadet, on the other hand, defected once again from the SPLA, joining forces with Riek Machar's SPLA in Opposition, and becoming its overall military commander. He, along with thousands of Lou Nuer youths from Jonglei, inflicted heavy casualties on the SPLA in repeated battles in Jonglei's capital, Bor (Small Arms Survey, 2014a).

IV. Arms and ammunition documented among armed groups

Decades of conflict have made Sudan and South Sudan a staging ground for the supply and illicit circulation of weapons and ammunition. While the majority of weapons in state stockpiles and in civilian possession are generations old, field research has documented an influx of new weapon types and recently manufactured ammunition. Foreign weapons still predominate, but as Sudan has bolstered its arms manufacturing sector over the past few decades—with support from China and Iran, and previously from Bulgaria—more and more Sudanese equipment has found its way onto the battlefield.

Since old weapons that have been circulating in the region for decades are difficult to trace, this *Working Paper* focuses on identifiable patterns of more recently manufactured weapons and ammunition; it also considers materiel that is distinct from former Eastern Bloc equipment, which is ubiquitous throughout East Africa and the Horn region. This section examines the primary manufacturers of weapons observed in Sudan and South Sudan, identifying specific models of weapons and production lots of ammunition that proliferate across the conflict areas of Sudan and South Sudan.

Former Eastern Bloc materiel

Field inspections have revealed that former Eastern Bloc weapons are ubiquitous among armed actors in Sudan and South Sudan. These weapons appear to date from the 1950s onwards. Given that most governments do not keep arms trade records for more than 20 years, tracing the chain of custody of this equipment with any precision is almost impossible. Shipments from the region continued through the CPA period. For example, South Sudan covertly procured several consignments of tanks, small arms, light weapons, and their associated ammunition from Ukraine by transhipping them through Kenya and Uganda (Lewis, 2009, pp. 35–44).

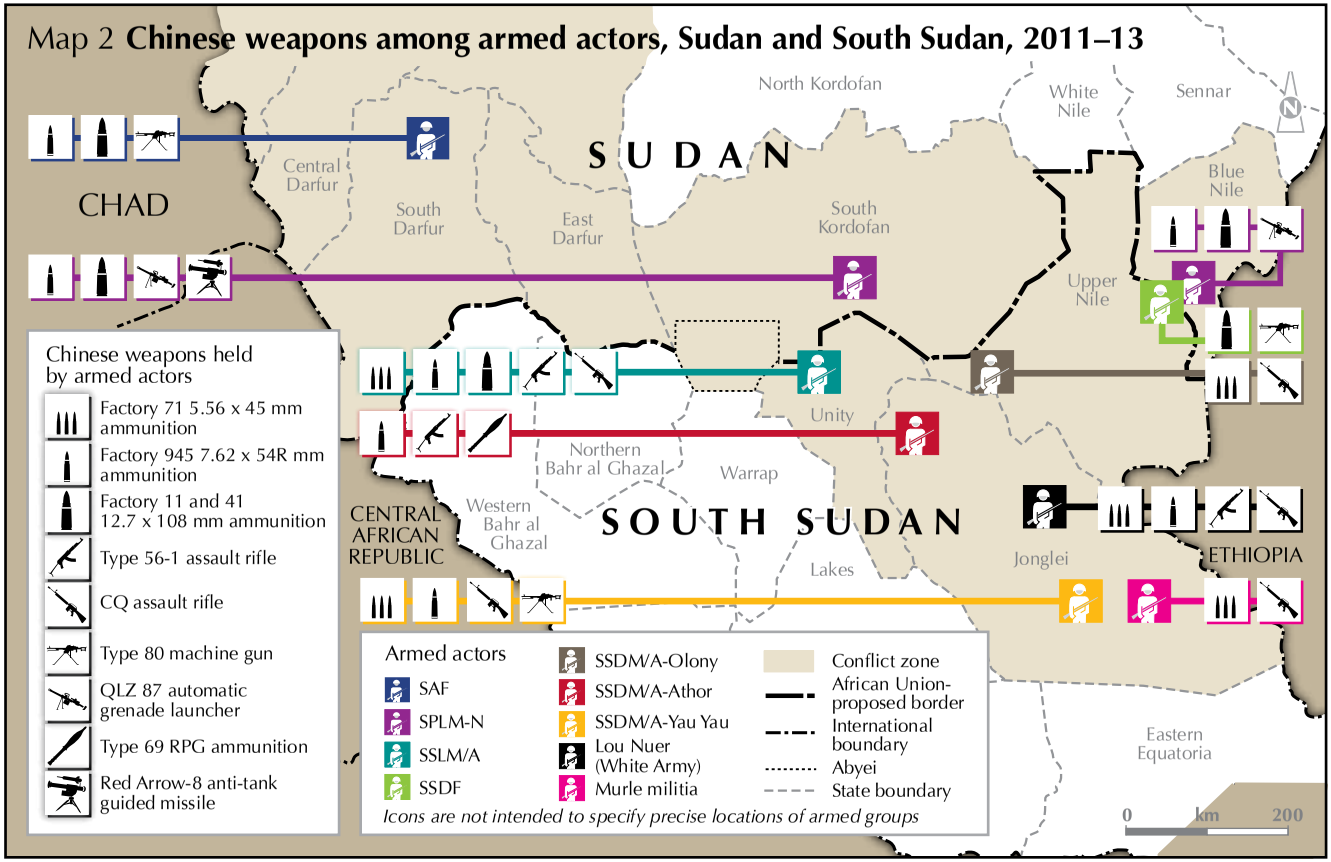
As a result of their long presence in the region, Eastern Bloc weapons and ammunition have reached non-state actors' hands by many routes. They have been accidentally leaked and deliberately supplied by Sudanese and South Sudanese state forces; they also flowed across borders in response to the Sudanese civil war and conflicts in Ethiopia, Somalia, and Uganda. These weapons have long been featured at local arms markets in the region and are staples of the small-scale 'ant trade'.

In contrast to the often old and weathered former Eastern Bloc weapons in long-term circulation, large quantities of seemingly new—and, in some cases, still wrapped—Bulgarian PG-7M (see Photos 1 and 2), PG-7L, PG-7PM expelling charges, and PG-9 ammunition were recently discovered in the stockpiles of the SSLM/A in South Sudan and in SAF stockpiles captured by the SPLM–N in South Kordofan (Gramizzi and Tubiana, 2013, p. 36). In a letter to the Small Arms Survey, the Bulgarian government confirms issuing export permits to Sudan in 1996, 1997, and 1998 for, among other items, '40 mm ammunition for anti-tank grenade launchers'.[27] Although this ammunition dates from the 1970–90s, its good condition indicates a short chain of custody between place of manufacture and the site where it was documented.

Photos 1 and 2: Unopened Bulgarian PG-7Ms that the SPLM–N seized between 30 June and 1 July 2011 from SAF in al Hamra, South Kordofan, Sudan, May 2012. © Claudio Gramizzi

Chinese weapons and ammunition

Over the past decade, Chinese military equipment has become increasingly common in Sudan and South


Map 2 Chinese weapons among armed actors, Sudan and South Sudan, 2011–13
CHAD
SUDAN
SOUTH SUDAN
CENTRAL AFRICAN REPUBLIC
ETHIOPIA
North Kordofan
White Nile
Sennar
Blue Nile
Central Darfur
South Darfur
East Darfur
South Kordofan
Upper Nile
Unity
Northern Bahr al Ghazal
Warrap
Western Bahr al Ghazal
Lakes
Jonglei
Eastern Equatoria
Chinese weapons held by armed actors
Factory 71 5.56 x 45 mm ammunition
Factory 945 7.62 x 54R mm ammunition
Factory 11 and 41 12.7 x 108 mm ammunition
Type 56-1 assault rifle
CQ assault rifle
Type 80 machine gun
QLZ 87 automatic grenade launcher
Type 69 RPG ammunition
Red Arrow-8 anti-tank guided missile
Armed actors
SAF
SPLM-N
SSLM/A
SSDF
SSDM/A-Olony
SSDM/A-Athor
SSDM/A-Yau Yau
Lou Nuer (White Army)
Murle militia
Conflict zone
African Union-proposed border
International boundary
Abyei
State boundary
Icons are not intended to specify precise locations of armed groups
0
km
200

Sudan, especially among SAF and its allied militias. While customs data is patchy and does not reflect the full extent of transfers between importing and exporting states, in 2001–12 China accounted for 58 per cent of reported imports to Sudan of small arms and light weapons, their ammunition, and 'conventional weapons'. New varieties of Chinese weapons and ammunition are far less common in SPLA stockpiles, yet because Comtrade data for South Sudan is not yet available, estimating the new state's share of Chinese-made weapons remains difficult.

Field inspections in Sudan and South Sudan have revealed a large variety of Chinese equipment, including assault rifles, general-purpose and heavy machine guns, RPG-7-pattern launchers, automatic grenade launchers, anti-tank missiles, various types of rockets, and small-calibre ammunition (see Map 2 and Table 4). This section examines Chinese equipment that has been identified across Sudan and South Sudan's conflict arenas.

Small-calibre ammunition

By far the most abundant of all military equipment circulating in Sudan and South Sudan is Chinese-manufactured small-calibre ammunition. This includes 5.56 × 45 mm, 7.62 × 39 mm, 7.62 × 54R mm, and 12.7 × 108 mm cartridges. The varieties of ammunition of these calibres documented in Sudan and South Sudan were produced at six factories in China between 1967 and 2011 (see Table 4). Since small-calibre ammunition is consumed at higher rates than other types of ammunition, it requires constant resupply. With the exception of most of the 7.62 × 39 mm ammunition, the Small Arms Survey has observed newly manufactured Chinese small-calibre ammunition with several warring parties throughout Sudan and South Sudan. In most cases, this ammunition appears to derive from SAF stockpiles.

The two most common varieties of ammunition are Factory 945 7.62 × 54R mm and Factory 41 12.7 × 108 mm. Between 2011 and 2013, Small Arms Survey researchers observed large quantities of these varieties with the SPLM–N in South Kordofan and Blue Nile as well as with the SSDM/A (Athor and Yau Yau) and SSLM/A in South Sudan. The UN Panel of Experts on Sudan has also repeatedly documented these types of ammunition in wide use throughout Darfur, in violation of Security Council Resolution 1591 (Gramizzi, Lewis, and Tubiana, 2012; UNSC, 2009, pp. 37–39; 2011a, p. 23). Survey researchers documented

Factory 945 7.62 × 54R ammuntion manufactured in each year from 2006 through 2011, and Factory 41 12.7 × 108 mm rounds manufactured in 1991 and in each year from 2006 through 2010.

Factory 41 12.7 × 108 mm ammunition with the date mark '10', denoting production in 2010, was documented in South Kordofan, reportedly captured in the battles of al Hamra in June and July 2011 by SPLM–N and captured in Jaw by JEM in February 2012. Identical rounds were observed in Darfur at the SAF military camp of Shangal Tobay, Darfur, in May 2011.[28] In all cases the ammunition was contained in Sudanese-manufactured boxes. Similarly, the presence of 12.7 × 108 mm rounds—wrapped in black polyethelene bags, each containing four rounds—identical to those seen in Darfur and South Kordofan were also documented in an SPLM–N garrison near the frontline in Blue Nile (Gramizzi, Lewis, and Tubiana, 2012). Although local SPLM–N officers referred to them as 'part of SPLM–N stockpiles from before the war', the black bags were contained in Sudanese-manufactured wooden boxes identical to those captured from SAF in South Kordofan and observed in Darfur. Hundreds of samples of the same rounds were also observed with the SSLM/A in Unity state in May 2013 (see Photo 3), but in what appeared to be Chinese packaging.

The SPLA captured Factory 945 7.62 × 54R mm ammunition with the date mark '09', denoting production in 2009, from the SSDM/A under the command of George Athor in March 2011 (see Photo 4). Like the 12.7 × 108 mm ammunition, it was repackaged in black polyethelene bags in a Sudanese box. After their defection to the SPLA, Athor's SSDM/A troops handed over the same variety of ammunition, although dated 2010, to the SPLA. These rounds, however, were contained in a Chinese-manufactured box with the contract number '10XSD14E0128STC/SD' (see Photos 5 and 6), indicating that in 2010 ('10') the Xinshidai ('XSD')[29] company of China signed a contract

Photo 3: Factory 41 12.7 × 108 mm ammunition produced in 2010 and documented with the SSLM/A in Unity, South Sudan, May 2013. © Jonah Leff

Photo 4: A Factory 945 7.62 × 54R mm cartridge produced in 2009 and found in Sudanese packaging. The SPLA captured the rounds from Athor's SSDM/A in March 2011. Jonglei, South Sudan, April 2011. © Jonah Leff

Photos 5 and 6: A Factory 945 7.62 × 54R mm cartridge produced in 2009 and found in a Chinese box with the contract number '10XSD14E0128STC/SD'. Athor's SSDM/A had handed the box over to the SPLA. Jonglei, South Sudan, Septemnber 2012. © Jonah Leff

for the delivery of the ammunition to the Sudan Technical Center ('STC') in Sudan ('SD').

This shipment appears to have been part of a consignment of 6,998 cases, each containing 1,000 rounds, totalling nearly 7 million rounds of 7.62 × 54R mm ammunition that China supplied to Sudan after 2010.[30] In May 2012, Survey researchers documented five boxes of 7.62 × 54R mm ammunition that the SPLM–N captured from SAF; they bore the same contract number (see Photo 7), meaning that all six boxes were part of the same consignment that was supplied from China to Sudan.

With the re-emergence of David Yau Yau in Jonglei in late 2012 came an influx of weapons into the state, in particular a type of assault rifle never before documented in South Sudan. Whereas former Khartoum-backed rebels wielded mostly Chinese-produced Type 56-1 rifles, Yau Yau's troops were supplied with Chinese-manufactured CQ rifles, a copy of the US M16, as discussed below. Visually and mechanically distinct from Kalashnikov-pattern rifles, CQ rifles are smaller in calibre (5.56 × 45 mm) than Type 56-1s.

During interviews held in February 2013, militiamen formerly under David Yau Yau in Jonglei revealed that Sudan's

Photo 7: Five boxes of 7.62 × 54R mm ammunition with the contract number '10XSD14E0128STC/SD'. The SPLM–N seized the box from SAF between 30 June and 1 July 2011 in al Hamra. South Kordofan, Sudan, May 2012. © Claudio Gramizzi

National Intelligence and Security Service (NISS) had orchestrated the delivery of these weapons and their ammunition through several airdrops between August 2012 and January 2013. They pointed out that their CQ rifles were all loaded with one variety of Chinese-manufactured 5.56 × 45 mm ammunition produced by Factory 71 in 2008 at the Chongquing Changjiang Electrical Group factory.

This was the first time this variety of ammunition had been documented by outside observers in either Sudan or South Sudan. Subsequently, the same variety of ammunition was found to be present with SSLM/A forces in Unity state in May 2013, with additional equipment that the SPLA seized from Yau Yau in 2013, as well as with Olony's fighters in Upper Nile state. Several samples of the ammunition were also observed with Murle fighters during an attack on the Lou Nuer in Walgak, Jonglei state, in July 2013.

Table 4 illustrates a selection of the types, years of manufacture, and custodians of small-calibre Chinese ammunition in Sudan and South Sudan documented between 2011 and 2013.

Assault rifles

Beginning in 2011, Southern insurgents began using seemingly new Chinese-manufactured assault rifles, which were distinct from the mostly weathered rifles with which they had defected from the SPLA. During a field visit to Rubkhona, Unity state, South Sudan, in April 2011, Small Arms Survey researchers documented hundreds of weapons that the SPLA had seized from the SSLM/A only weeks earlier. Among the equipment were 150 seemingly brand-new Chinese-manufactured Type 56-1 assault rifles (similar in construction to various Kalashnikov assault rifles with a folding metal stock) (see Photo 8), which corroborated video footage proportedly showing hundreds of the same rifles with SSLM/A forces posted to the Internet months before (BolKol1000, n.d).

Table 4 **Selected Chinese ammunition documented in Sudan and South Sudan, 2011–13***

Ammunition type	Factory	Year of manufature	User	Location	Date viewed
5.56 × 45 mm	71	2008	Murle militia	Jonglei, South Sudan	July 2013
			SSDM/A (Olony)	Upper Nile, South Sudan	July 2013
			SSDM/A (Yau Yau)	Jonglei, South Sudan	September 2012, February and July 2013
			SSLM/A	Unity, South Sudan	May 2013
7.62 × 39 mm	31	1997	SPLM–N	Blue Nile, Sudan	December 2012
		1975	SPLM–N	Blue Nile, Sudan	December 2012
			SSDM/A (Athor)	Jonglei, South Sudan	September 2012
		1974	SPLM–N	South Kordofan, Sudan	May 2012
			SSDM/A (Athor)	Jonglei, South Sudan	September 2012
			White Army	Jonglei, South Sudan	February 2012
	61	2011	SSDM/A (Yau Yau)	Jonglei, South Sudan	February 2013
		1977	SSLM/A	Unity, South Sudan	April 2011
		1975	SSDF (John Duit)	Jonglei, South Sudan	September 2012
			SSLM/A	Unity, South Sudan	May 2013

Ammunition type	Factory	Year of manufature	User	Location	Date viewed
7.62 × 54R mm	945	2011	SSDM/A (Yau Yau)	Jonglei, South Sudan	February 2013
		2010	SPLM–N	South Kordofan, Sudan	May 2012
			SPLM–N	Blue Nile, Sudan	December 2012
			SSDM/A (Athor)	Jonglei, South Sudan	September 2012
			SSDM/A (Yau Yau)	Jonglei, South Sudan	February 2013
			SSLM/A	Unity, South Sudan	May 2013
		2009	SPLM–N	South Kordofan, Sudan	May 2012
			SSDM/A (Athor)	Jonglei, South Sudan	April 2011
			SSDM/A (Yau Yau)	Jonglei, South Sudan	February 2013
			SSLM/A	Unity, South Sudan	May 2013
		2008	White Army	Jonglei, South Sudan	February 2012
		2007	SPLM–N	Blue Nile, Sudan	December 2012
		2006	SSDM/A (Yau Yau)	Jonglei, South Sudan	February 2013
	61	1990	SPLM–N	Blue Nile, Sudan	December 2012
		1982	SPLM–N	Blue Nile, Sudan	December 2012
		1980	SPLM–N	Blue Nile, Sudan	December 2012
		1978	SPLM–N	Blue Nile, Sudan	December 2012
		1977	SPLM–N	Blue Nile, Sudan	December 2012

Ammunition type	Factory	Year of manufature	User	Location	Date viewed
	71	1978	SPLM–N	Blue Nile, Sudan	December 2012
		1970	SPLM–N	Blue Nile, Sudan	December 2012
		1967	SPLM–N	Blue Nile, Sudan	December 2012
12.7 × 108 mm	41	2010	JEM[31]	Unity, South Sudan	May 2012
			SPLM–N	Blue Nile, Sudan	December 2012
			SPLM–N	South Kordofan, Sudan	May 2012
			SSLM/A	Unity, South Sudan	May 2013
		2009	SSDM/A (Athor)	Jonglei, South Sudan	April 2011
			SSLM/A	Unity, South Sudan	May 2013
		2008	SAF[32]	South Kordofan, Sudan	May 2012
		2007	SPLM–N	Blue Nile, Sudan	December 2012
		2006	SPLM–N	South Kordofan, Sudan	May 2012
		1991	SPLM–N	Blue Nile, Sudan	December 2012
	11	2010	SPLM–N	Blue Nile, Sudan	December 2012
			SPLM–N	South Kordofan, Sudan	May 2012
			SSDF (John Duit)	Jonglei, South Sudan	September 2012
		2009	SSDF (John Duit)	Jonglei, South Sudan	September 2012
		2007	SAF	South Darfur, Sudan	April 2013

Notes: * Photos of the headstamps available from the Small Arms Survey.

Although the factory codes on the rifles seen in Bentiu had been removed, other distinguishing features, including the fire selector marks and the type of receiver, revealed that the rifles were Chinese. Since the serial numbers were in near consecutive order, the rifles were probably part of one consignment exported from China. All of the rifles were loaded with identical Sudanese-manufactured 7.62 × 39 mm ammunition. Similar rifles were also present in stockpiles that the SPLA seized from George Athor's forces in March 2011 in Jonglei (see Photo 9). Later the same year, a UN mission observer witnessed the same rifles with dozens of Lou Nuer youths whom Athor had armed for recruitment purposes (Small Arms Survey, 2012b, p. 9; see Photo 10). Likewise, following a Lou Nuer attack in Pibor county in the final days of December 2011, Lou Nuer youths were seen brandishing the same Type 56-1 rifles as they returned to Akobo county (see Photo 11).[33]

Photo 8: Type 56-1 rifles that the SPLA seized from the SSLM/A in April 2011. Unity, South Sudan, April 2011. © Jonah Leff

Photo 9: A Type 56-1 rifle that the SPLA seized from Athor's SSDM/A in March 2011. Jonglei, South Sudan, April 2011. © Jonah Leff

As noted in the small-calibre ammunition section, above, Southern insurgents began appearing with Chinese-manufactured CQ assault rifles at the end of 2012 (see Photo 12). In May 2013, after the SSLM/A accepted President Kiir's amnesty, the Small Arms Survey documented hundreds of CQ rifles with its forces (see Photo 13). It is not clear why the SSLM/A did not come with the Type 56-1 rifles with which they had been equipped two years earlier; perhaps Khartoum opted to provide CQ rifles and ammunition of a calibre uncommon in South Sudan as a way of controlling rebel stockpiles. During fieldwork conducted in July 2013, researchers encountered

Photos 10 and 11: Type 56-1 rifles with Lou Nuer youths, Jonglei, South Sudan, August 2011 (top) and January 2012 (bottom). © Confidential

additional CQ rifles that the SPLA had captured from Yau Yau's forces earlier that year. Similar rifles were also observed with Olony's fighters in Lul, Upper Nile. In all cases, factory marks on the left-hand side of the magazine housing had been removed in an identical fashion: by milling (see Photo 14).

Sudan's Military Industry Corporation (MIC) claims to produce a copy of the Chinese CQ rifle, so it is possible that Sudan received surplus CQs as part of a licensing agreement, but that it chose not to distribute them to its own forces. The Small Arms Survey has not observed CQ rifles in service with SAF, its allied forces, or the SPLA.

Much like Type 56-1 rifles, which proliferated throughout South Sudan, CQ rifles appeared in the hands of tribal militias. Together with Factory 71 5.56 × 45 mm ammunition, CQ rifles were reportedly observed among the Lou Nuer, who attacked Murle villages in Pibor county in April and July 2013. It is not evident how these CQs—which probably originated with Yau Yau's fighters—made their way to the Lou Nuer, although reports suggest that the SPLA may have armed the Lou Nuer with CQs they had captured from the Murle as part of their counterinsurgency campaign against Yau Yau.[34]

Photo 12: A CQ rifle that the SPLA captured from Yau Yau's SSDM/A. Jonglei, South Sudan, July 2013. © James Bevan

Photo 13: CQ rifles among other weapons with the SSLM/A. Unity, South Sudan, May 2013. © Jonah Leff

Photo 14: A CQ rifle with markings deliberately removed. Jonglei, South Sudan, February 2013. © James Bevan

Type 80 machine guns

The Chinese-manufactured Type 80 general-purpose machine gun is a copy of the Soviet/Russian PKM (Jane's, 2002, p. 335). In late 2011, the Small Arms Survey received documentation of a Type 80 machine gun that a small faction of the SLA had captured from Sudanese forces in North Darfur in 2009 (see Photos 15 and 16). In May 2012, John Duit's forces handed over a pair of Type 80 machine guns with the serial numbers 268317 and 267782 (see Photos 17, 18, and 19). The close proximity of serial numbers suggests that they may have been part of the same original consignment. The Survey observed similar Type 80 machine guns with Yau Yau's forces in February and July 2013, but in both instances the markings had been deliberately removed (see Photos 20 and 21).

QLZ 87 automatic grenade launchers and ammunition

The QLZ 87 (also known as Type 87) 35 mm automatic grenade launcher (AGL) was developed by the China North Industries Corporation, or NORINCO, during the late 1980s and entered into service with China's military in the mid-1990s. It fires a variety

Photos 15 and 16: A Type 80 machine gun (top) and its markings (bottom). The SLA had seized the weapon from SAF in 2009. Darfur, Sudan. © Confidential

Photos 17, 18, and 19: Type 80 machine guns and their markings (opposite bottom and above). John Duit's forces handed these weapons over to the SPLA in May 2012. Jonglei, South Sudan, September 2012. © Jonah Leff

Photos 20 and 21: A Type 80 machine gun (top) with markings removed (bottom). Yau Yau's SSDM/A forces handed this weapon over to the SPLA. Jonglei, South Sudan, February 2013. © James Bevan

of 35 × 32SR mm grenades and comes in two configurations: the standard launcher for a single soldier and the tripod-mounted heavy variant intended for a team of three (Sinodefence, 2006).

The first sighting of QLZ 87 AGLs in Sudan was in Darfur in February 2006, among Khartoum-backed Chadian opposition fighters (AI, 2006, p. 12). In May 2009, the UN Panel of Experts viewed one in the possession of another Chadian armed opposition group, which Sudan was purportedly supplying with arms and ammunition at the time (UNSC, 2009, p. 34). The Panel subsequently documented Chinese-manufactured Type 87 ammunition in Tukumare village in North Darfur in May 2011; it bore a 2007 manufacture date, suggesting recent supply (Gramizzi, Lewis, and Tubiana, 2012).

The Small Arms Survey team observed a total of three QLZ 87 AGLs in South Kordofan and Blue Nile in May and December 2012, respectively. According to marking codes visible on various parts of the launchers, they were all manufactured by the same producer, identified by the code '9656'. The relatively close sequence of serial numbers suggests that these three launchers were most likely part of a single consignment from China. The SPLM–N reportedly captured QLZ 87 launchers from SAF during the battles in al Hamra, South Kordofan, in June and July 2011 (serial number '141169', as shown in Photos 22 and 23) and during the unsuccessful attempt to take control of Tolodi, South Kordofan, in April 2012 (serial number '141807', as shown in Photos 24 and 25).

Researchers also documented several rounds of DFJ87-35 ammunition for QLZ 87 AGLs produced in 2007, 2008, 2009, 2010, and 2011 in South Kordofan (see photo Photo 26); however, no such ammunition was observed in Blue Nile despite the presence of a QLZ 87 launcher (serial number '141010', as shown in Photos 27 and 28), which was reportedly captured during the battle fought in Surkum in September 2012.

Survey researchers also documented a QLZ 87 box that the SPLM–N had seized from SAF during battle in al Hamra, South Kordofan, in July 2011. The box was labelled with markings revealing that China's Xinshidai Company sold a total of 500 QLZ 87 sets to Sudan's Yarmouk Industrial Complex in 2008 (see Photo 29).

Survey researchers have not documented any QLZ 87 AGLs or its associated ammunition in South Sudan.

Photos 22 and 23: A QLZ 87 launcher (top) with its markings (bottom). The SPLM–N captured this launcher from SAF between 30 June and 1 July 2011 in al Hamra, South Kordofan. May 2012. © Claudio Gramizzi

Photos 24 and 25: A QLZ 87 launcher (top) with its markings (bottom). The SPLM–N captured this launcher from SAF in October 2011 in Tolodi, South Kordofan. May 2012. © Claudio Gramizzi

Photo 26: DFJ87-35 ammunition that the SPLM–N captured from SAF in October 2011 in Tolodi, South Kordofan. May 2012. © Claudio Gramizzi

Photos 27 and 28: A QLZ 87 launcher (top) with its markings (bottom). The SPLM–N reportedly captured this weapon from SAF in September 2012 in Surkum, Blue Nile. December 2012. © Claudio Gramizzi

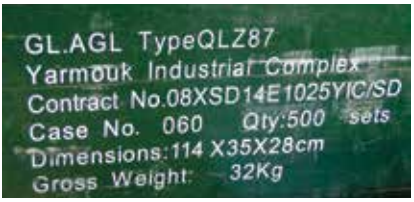


Photo 29: A QLZ 87 box with markings indicating its supply from China to Sudan. The SPLM–N seized this box from SAF in July 2011 in al Hamra, South Kordofan. May 2012. © Claudio Gramizzi

Ammunition for rocket-propelled grenades (RPGs)

Chinese-manufactured Type 69 40 mm HEAT[35] ammunition (a copy of the PG-7 rocket) for RPG-7s is not uncommon in conflict zones throughout Africa; it is prevalent in the stockpiles of Sudanese and South Sudanese armed actors. In particular, Survey researchers have documented hundreds of Type 69 rounds in South Sudan.

In its 2011 report, the UN Somalia and Eritrea Monitoring Group documented a Chinese-manufactured Type 69 rocket that the SPLA seized from George Athor's forces during fighting in Fangak county, Jonglei, in early 2011. The SPLA captured a number of rockets bearing the lot number '8-91-93', with '8' representing the batch number, '91' the year of production, and '93' the factory code (UNSC, 2011b, p. 89; see Photo 30). Eritrea reportedly supplied dozens of newly sealed identical rounds (see Photo 31) with matching lot numbers

Photo 30: A Type 69 rocket with the lot number 8-91-93. The SPLA captured the rocket from Athor's SSDM/A in February 2011. Jonglei, South Sudan, March 2011. © Confidential

Photo 32: Type 69 rockets with the lot number 2-92-73. Athor's SSDM/A handed these weapons over to the SPLA in February 2012. Jonglei, South Sudan, September 2012. © Jonah Leff

Photo 31: These Type 69 rockets with the lot number 8-91-93 were captured from the ONLF in Somaliland in September 2010. © Confidential

Photo 33: Type 69 rockets with the lot number 2-92-73. In September 2010, these weapons were captured from the ONLF in Somaliland. October 2010. © Confidential

to the Ogaden National Liberation Front (ONLF) troops, who were en route to attack Ethiopia when they were stopped by Somaliland security forces in September 2010.

Although it is unclear how Athor obtained these rounds, he maintained a close relationship with President Isaias Afwerki of Eritrea over many years and reportedly visited Asmara at least three times in 2010–11 (UNSC, 2011b, pp. 328–35). Jonglei representatives also allege that Athor purchased weapons from Thokwath Pal Chai, a Gambella Nuer who was the leader of the Asmara-backed Ethiopian United Patriotic Front in the Gambella region of Ethiopia, which borders Jonglei (Small Arms Survey, 2012b, p. 7).

In February 2012, after Athor's death and his troops' defection with their new commander, Peter Kuol Chol Awan, the SSDM/A in Jonglei handed over large quantities of their weapons to the SPLA. In September of that year, Small Arms Survey reseachers visited Paryak to inspect the collected weapons. Among the equipment were several Type 69 rounds with the lot number '2-92-73' (see Photo 32), with '2' representing the batch number, '92' the year of production, and '73' the factory code. Like the lot number observed the previous year, this one also matched one of the four lot numbers observed with ONLF forces in their attack on Ethiopia in 2010 (UNSC, 2011b, p. 358; see Photo 33).

Without knowing to which country or countries China supplied the rockets, it is extremely difficult to trace the precise chain of custody of the items. In a letter to the UN Monitoring Group regarding the ONLF rockets, China states that 'no further information can be provided because the factory producing the weapons was closed down a long time ago' (UNSC, 2011b, p. 358). However, considering that two identical lot numbers appeared in Eritrean-supplied ONLF stockpiles and in Athor's holdings at a time when he seemed to be in close contact with Asmara, the rounds may have originated in Eritrea. Another possible scenario is that the rockets were originally supplied from China to Sudan, which transferred some of them across the border to Eritrea and others to Athor in Jonglei.

Anti-tank guided missiles and long-range rockets

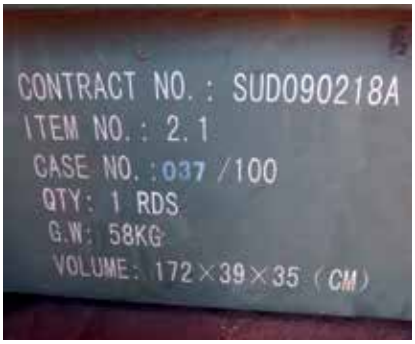
Although small-calibre weapons and ammunition comprise the bulk of Chinese-manufactured military equipment in circulation in Sudan and South Sudan,

some more advanced weapons are in use, particularly in South Kordofan and Blue Nile. Two notable examples are the Hongjian-8 (HJ-8)—or the more commonly used Red Arrow-8—anti-tank guided missiles and long-range 302 mm Weishi rockets.

Red Arrow-8 anti-tank guided missiles. On 10 December 2012, SAF, together with a smaller contingent of the paramilitary Popular Defence Forces, attacked the SPLM–N position at Daldoko, a few kilometres outside of Kadugli, South Kordofan. During the battle, the SPLM–N captured dozens of small arms, light weapons, cannons, and vehicles. Of particular interest were two Red Arrow-8 anti-tank guided missiles (see Photo 34), the most advanced and expensive weapons hitherto encountered in Sudan as part of the Survey's tracing project.

The missiles were a TF8ETEM and a TF8HTEM, both designations of the Red Arrow-8 anti-tank guided missile. The launch tube of the TF8ETEM has markings in three areas. The mark '03-09-22' is the lot number, with the '03'

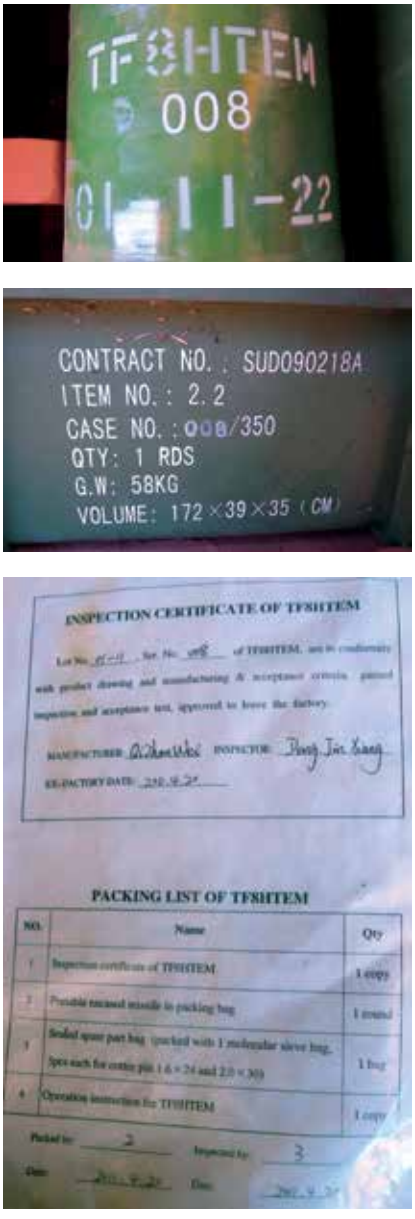
Photo 34: Red Arrow-8 anti-tank guided missiles that the SPLM–N captured from SAF in Daldoko, South Kordofan, Sudan. December 2012. © Alan Boswell



Photos 35, 36, and 37: A TF8ETEM anti-tank guided missile box (top), markings (middle), and inspection certificate (bottom). The SPLM–N captured these in Daldoko, South Kordofan. December 2012.
© Alan Boswell

representing the batch number, '09' a manufacture date of 2009, and '22' the factory of production. The contract number on the outside of its packing crate (SUD090218A) and additional markings indicate that the contract was signed between China and Sudan in 2009 as part of a total order of 100 missiles (each in a launch tube). The date of delivery is unknown. An inspection certificate found inside the crate shows that the missile was the 37th unit in a lot that was manufactured in March 2009. The missile was inspected on 10 June 2009 (see Photos 35, 36, and 37). Consequently, the missile was supplied to Sudan sometime between the date of inspection (10 June 2009) and the date it was photographed (December 2012).

The TF8HTEM also has markings in three areas. The '01' in lot number '01-11-22' indicates the batch number, '11' represents a manufacture date of 2011, and '22' the factory of production. The contract number on the packing crate is identical to that of the TF8ETEM, but with a total order of 350 missiles. The inspection certificate found inside the crate reveals that the missile was the 8th unit in a lot that was manufactured in January 2011 (see Photos 38, 39, and 40). The missile was thus supplied to Sudan sometime between the date of inspection (20 April 2011) and the date it was photographed (December 2012).



Photos 38, 39, and 40: TF8HTEM anti-tank guided missile markings (top), box (middle), and inspection certificate (bottom). Daldoko, South Kordofan, December 2012. © Alan Boswell

The timing of these two consignments, totalling 450 missiles combined, may suggest that Sudan purchased the missiles from China for potential use against the South Sudanese military and its newly procured fleet of tanks that arrived around the same time as the order, rather than for an internal counterinsurgency against rebel groups.

WS-1 long-range rockets. The Small Arms Survey researchers inspected remnants of 302 mm WS-1 (Weishi-1) long-range rockets used by SAF in both South Kordofan and Blue Nile in late 2011 and early 2012. Photos 41 and 42 show remains of rockets that reportedly landed in Kauda, South Korodfan, in December 2011. Parts of rockets reportedly fired in Wadaka, Blue Nile, in October 2011 and Mayak, Blue Nile, in November 2011 were also observed (see Photo 43). Much like SAF's aerial bombardment, the use of these long-range rockets has produced limited casualties; however, they have spread fear across the civilian population, resulting in large-scale displacement, the interruption of farming activities, and the emergence of a severe humanitarian crisis and food insecurity in South Kordofan and Blue Nile. After the Small Arms

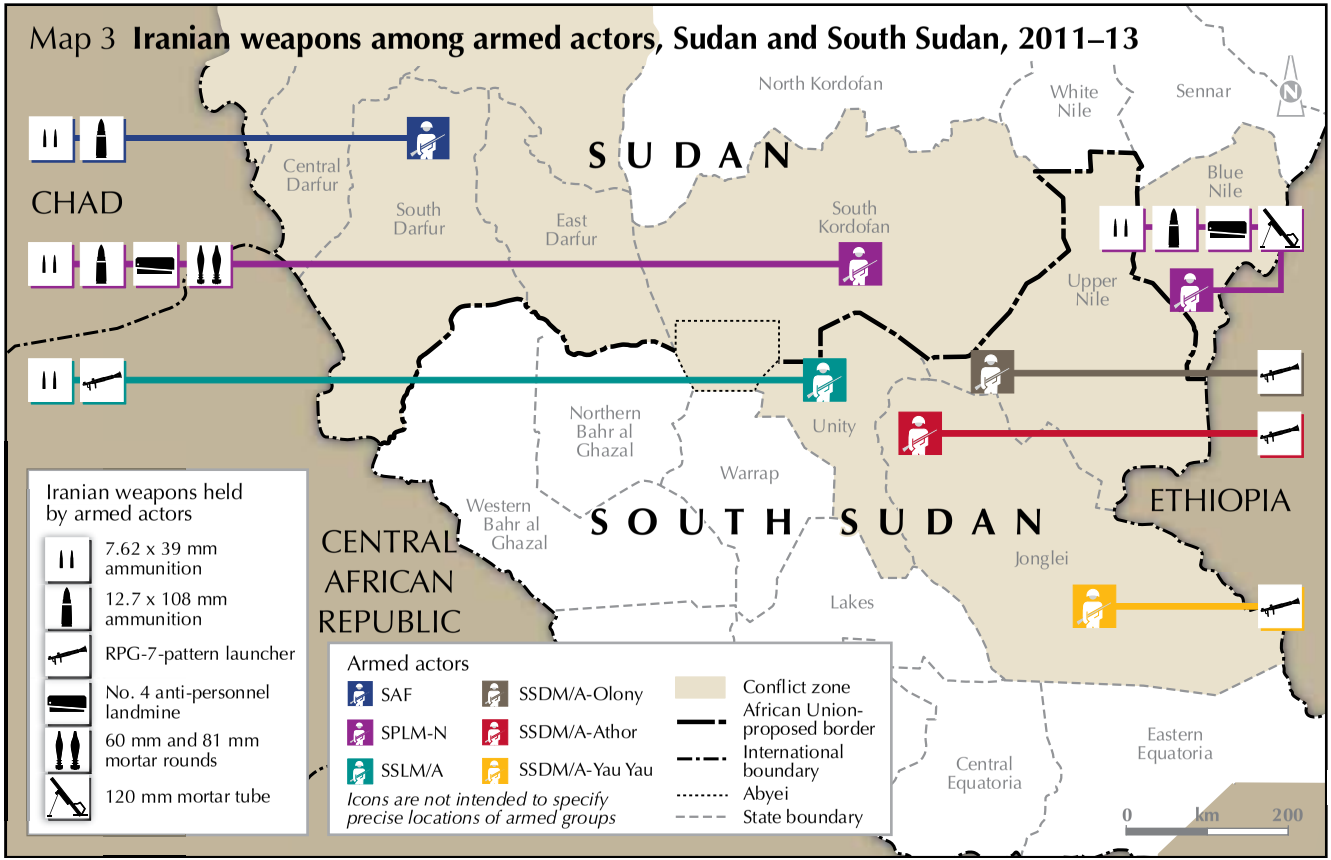
Photos 41 and 42: Weishi rocket remains, Kauda, South Kordofan, December 2011. © Confidential

Photo 43: Weishi rocket remains, Mayak, Blue Nile, December 2012. © Claudio Gramizzi

Survey and others reported on the use of these rockets in April 2012, Sudan apparently ceased using them.

Iranian weapons and ammunition

Iran has been a significant exporter of weapons to Sudan since at least the 1990s.[36] Whereas China's military relationship with Sudan centres on oil and other economic interests, Iran's role in Sudan's defence industry is primarily ideological. Military ties between Iran and Sudan have grown strong over the years. As stated above, according to UN Comtrade, Iran represented 13 per cent of Khartoum's self-reported arms imports from 2001 to 2012. In January 2007, the two countries signed a mutual defence agreement, which reportedly


Map 3 Iranian weapons among armed actors, Sudan and South Sudan, 2011–13
SUDAN
SOUTH SUDAN
CHAD
CENTRAL AFRICAN REPUBLIC
ETHIOPIA
North Kordofan
White Nile
Sennar
Blue Nile
Upper Nile
Unity
Warrap
Northern Bahr al Ghazal
Western Bahr al Ghazal
Lakes
Jonglei
Central Equatoria
Eastern Equatoria
Central Darfur
South Darfur
East Darfur
South Kordofan
Iranian weapons held by armed actors
7.62 x 39 mm ammunition
12.7 x 108 mm ammunition
RPG-7-pattern launcher
No. 4 anti-personnel landmine
60 mm and 81 mm mortar rounds
120 mm mortar tube
Armed actors
SAF
SPLM-N
SSLM/A
SSDM/A-Olony
SSDM/A-Athor
SSDM/A-Yau Yau
Icons are not intended to specify precise locations of armed groups
Conflict zone
African Union-proposed border
International boundary
Abyei
State boundary
0
km
200

paved the way for the sale of weapons, including Iranian missiles, RPGs, unmanned aerial vehicles, and 'other equipment' (*Sudan Tribune*, 2007a; 2007b).

There is also emerging evidence that Iran has played a significant role in supporting Sudan's weapons manufacturing sector, as discussed below; moreover, the country uses the Yarmouk Industrial Complex as a production and onward supply hub for Iranian and Iranian-designed weapons (Conflict Armament Research, 2012b, p. 26). Map 3 summarizes the types of Iranian weapons observed among various armed actors in Sudan and South Sudan.

Small-calibre ammunition

Small-calibre ammunition produced at Iran's Defense Industries Organization has appeared with SAF and Khartoum-backed forces in Darfur, South Kordofan, and Blue Nile, with the SSLM/A in Unity, and with pastoralists in Eastern Equatoria, South Sudan.

In 2008, the Sudan Panel of Experts observed Iranian ammunition in Darfur, where they consisted of 7.62 × 39 mm, 7.62 × 54R mm, and 12.7 × 108 mm cartridges with dates of manufacture ranging from 2001 to 2004.[37] That same year, investigators also documented Iranian 7.62 × 39 mm rounds manufactured in 2003 with pastoralist communities in Eastern Equatoria, South Sudan; these had leaked from Kenyan national stockpiles across the border (Conflict Armament Research, 2012b, pp. 19, 24). Although Iranian ammunition is more often found in Sudan, the Survey documented samples of 7.62 × 39 mm ammunition produced in 2002 that the SPLA had captured from the SSLM/A in Unity in April 2011 (see Photo 44).

In May and December 2012, fieldwork uncovered Iranian-manufactured 12.7 × 108 mm ammunition in South Kordofan and Blue Nile. Rounds observed in South Kordofan, reportedly captured from SAF stockpiles during the battle in al Ihemirin in August 2011, appear to have been manufactured in 1998 (see Photo 45), while those observed in Blue Nile were reportedly captured from SAF facilities in Kurmuk on 4 September 2011. The Blue Nile sample bears a production date of 1994 and is contained in green plastic bags bearing a Farsi inscription that reads 'Small-calibre ammunition manufacturing industry group' (upper line) and 'Factory for manufacturing DShK [12.7 × 108 mm] ammunition' (lower line) (see Photos 46 and 47).

Photo 44: 7.62 × 39 mm ammunition produced in 2002, captured by the SPLA from the SSLM/A in April 2011. Unity, April 2011. © Jonah Leff

Photo 45: 12.7 × 108 mm ammunition produced in 1998, reportedly captured by the SPLM–N from SAF in August 2011 in al Ihemirin, South Kordofan. May 2012. © Claudio Gramizzi

Photos 46 and 47: 12.7 × 108 mm ammunition produced in 1994 (top) along with packaging with Farsi markings (bottom). The SPLM–N reportedly captured these rounds from SAF in September 2011 in Kurmuk, Blue Nile. December 2012. © Claudio Gramizzi

Suspected Iranian RPG-7-pattern launchers

Dozens of RPG-7-pattern launchers resembling Iranian design have appeared with rebels in South Sudan. Iranian-produced RPG-7-pattern launchers have two distinct grips that set them apart from those of other manufacturers.[38] They have a moulded pistol grip similar to that of Germany's Heckler & Koch G3 rifle grip, and a second cylindrical-type grip directly behind the forward pistol grip assembly. Unlike Iranian RPG launchers found in other conflict arenas, these launchers usually do not bear any markings, rendering

Photo 48: RPG-7-pattern launchers that the SPLA seized from the SSLM/A in Unity in April 2011. © Jonah Leff

Photo 49: An RPG-7-pattern launcher that Athor's SSDM/A handed over to the SPLA in February 2012 in Jonglei. September 2012. © Jonah Leff

Photo 50: An RPG-7-pattern launcher documented with the SSLM/A in Unity, May 2013. © Jonah Leff

Photo 51: An RPG-7-pattern launcher that the SPLA seized from Yau Yau's SSDM/A in Jonglei. July 2013. © James Bevan

the origin difficult to ascertain. Since these features are distinctly Iranian, however, the launchers are probably Iranian-produced.[39]

The Small Arms Survey first documented eight of these launchers in April 2011 among weapons that the SPLA had captured from the SSLM/A under Peter Gadet in Unity state (see Photo 48). Additional launchers of this type were in a sample of weapons that Athor's militia handed over to the SPLA in February 2012 (see Photo 49). Survey researchers also observed similar RPG launchers with SSLM/A forces in May 2013, after the group had accepted amnesty in Unity state (see Photo 50), with weapons seized from Yau Yau's fighters in July 2013 (see photo Photo 51), and with Johnson Olony's men in July 2013 in Upper Nile.[40] In all cases, the trigger assembly, where RPGs are most commonly marked, features no identifiable marks.

Landmines

Both Sudanese forces and the SPLA laid large numbers of landmines during the civil war period. Sudan signed the Anti-Personnel Mine Ban Convention, known as the Ottawa Treaty, in 1997 and ratified it in 2003, banning the use, stockpiling, production, and transfer of landmines (UN, n.d.).

Photos 52 and 53: No. 4 landmines (left) in a box with Sudanese markings (right) that the SPLM–N reportedly captured from SAF in February 2012 in Toroji, South Kordofan. May 2012. © Claudio Gramizzi

While intense efforts are under way to remove these landmines, most of which are in South Sudan, there have been a number of cases of newly planted and captured mines. The majority of these mines have been of Chinese and Soviet/Russian origin, but in one case the Small Arms Survey identified Iranian landmines. In February 2012, the SPLM-N reportedly recovered dozens of No. 4 anti-personnel mines (copied from the Israeli No. 4 mine) from SAF when it took control of Toroji town, South Kordofan (see Photos 52 and 53). The mines have Farsi markings, suggesting Iranian production. They are contained in crates intended for M-6 fuzes with markings from the Yarmouk Industrial Complex, which indicates that the mines were most likely repackaged by Sudanese state forces.

In December 2012, while inspecting equipment in Belila, Blue Nile, Survey researchers documented roughly a dozen No. 4 landmines that the SPLM–N reportedly captured from SAF during the civil war.[41]

Unmanned aerial vehicles

As part of its defence agreement with Iran, Sudan purchased an unknown number of Ababil-3 unmanned aerial vehicles (UAVs). UN personnel first observed UAVs of this type in Darfur in May 2008, and the Sudan Panel of Experts sighted one in August of the same year. According to the Panel's 2008 report, Sudan imported between three and five UAVs for use in Darfur, and the commander of the Western Military Region confirmed that Sudan had

deployed UAVs to Darfur for security operations in 2008 (UNSC, 2008, pp. 29–30). In 2009, the Panel obtained video surveillance footage from a UAV that was flying in Sudan between May and August 2008 (UNSC, 2009, pp. 48–49). All of the UAVs that have been observed in Darfur appear to be identical to the Iranian Ababil-3.

On 13 March, JEM shot down an Ababil-3 UAV in Jaw, South Kordofan. Photos taken at the crash site reveal that the UAV contained a registration sticker from the 'Iran Aviation Manufacturing Ind Co.' and part of the engine appears to have been manufactured by the Irish company Tillotson.

On 5 December 2012, an unidentified UAV crashed in Omdurman just on the outskirts of Khartoum, but security forces sealed off the area before anyone else could access it (SUNA, 2012).

Photos 54 and 55: 60 mm and 81 mm mortar rounds that the SPLM–N captured from SAF between 30 June and 1 July 2011 in al Hamra, South Kordofan. May 2012. © Claudio Gramizzi

Photos 56 and 57: A 120 mm mortar tube that the SPLM–N captured from SAF in September 2011 in Blue Nile. December 2012. © Claudio Gramizzi

Mortars

Although the majority of documented mortar rounds and tubes in Sudan and South Sudan have been of Bulgarian, Chinese, or Sudanese origin, some Iranian makes were identified. In May 2012, the Small Arms Survey documented several 60 mm and 81 mm mortar rounds with Farsi markings; the SPLM–N had captured these from SAF in South Kordofan (see Photos 54 and 55). The 60 mm rounds are hybrid assembly, fitted with Chinese-manufactured MP-5B point-detonating fuzes. In December 2012, a 120 mm mortar tube bearing Iranian markings was also observed in SPLM–N-controlled areas of Blue Nile, after it had been captured from SAF in September 2011 (see Photos 56 and 57).

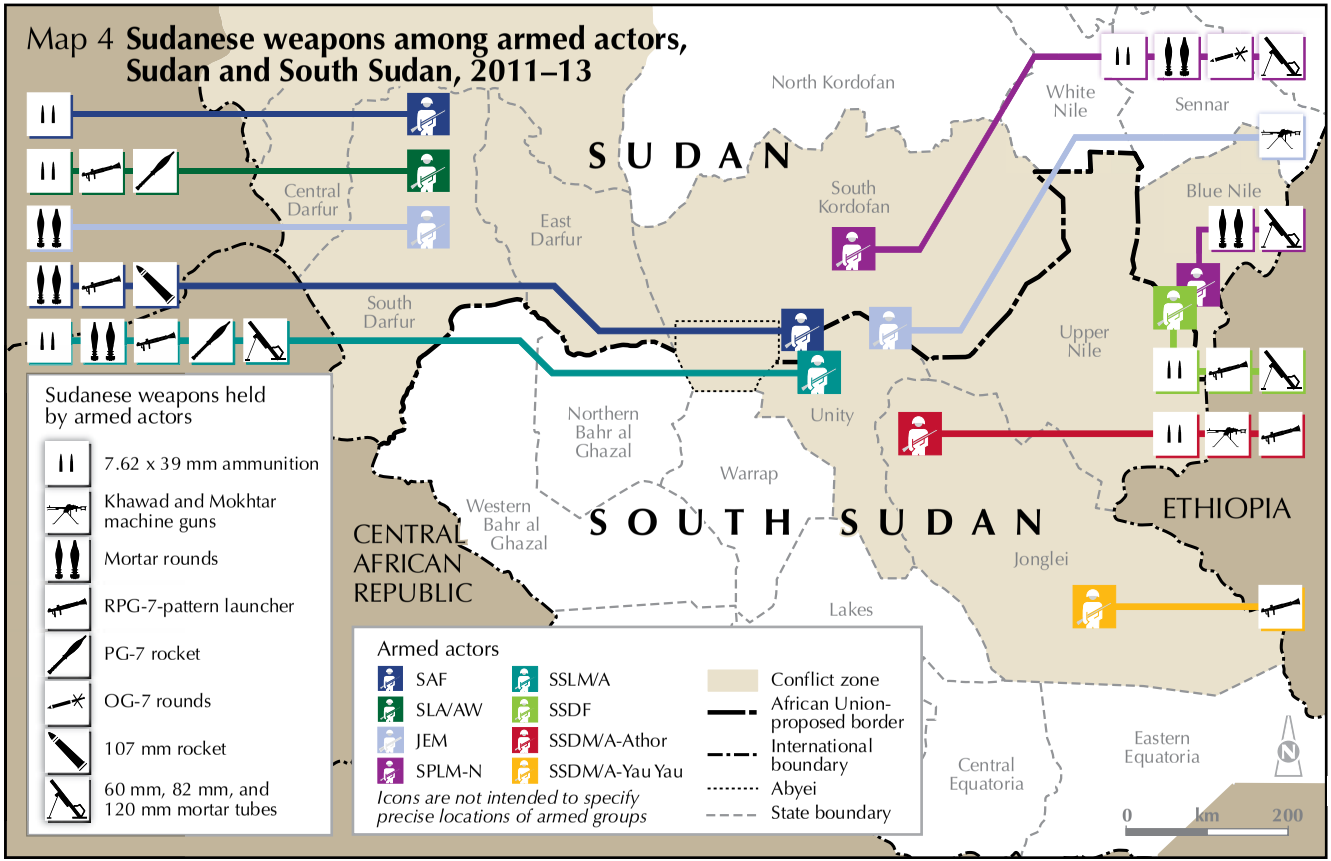
Sudanese weapons and ammunition

Sudan has become a significant arms manufacturer in Africa. While it is unclear to what extent Sudan exports on the global market,[42] considerable quantities of Sudanese-produced arms and ammunition have been observed with Sudanese forces and Khartoum-backed Southern insurgents (see Map 4), as well as in several other conflict zones outside of Sudan and South Sudan. According to Sudan's Military Industry Corporation website and samples at the MIC booth at the 2013 IDEX weapons convention in Abu Dhabi, Sudan manufactures a broad range of small arms, conventional weapons, ammunition, and military vehicles (MIC, 2007). Most of these systems seem to be copies of products manufactured in other countries, as discussed below.

The Small Arms Survey has documented a small portion of the weapons that the MIC claims to manufacture, including machine guns, mortars, various rockets, and small arms ammunition. Due to limited information regarding the MIC's manufacturing capabilities, it is unclear whether Sudan fully manufactures these items, assembles them, simply remarks foreign-made weapons, or a combination of the three.

Small arms ammunition

Sudan began manufacturing small arms ammunition in the 1950s (Serge and Regenstreif, 1995, p. 60). Although the MIC purports to produce a full range of small arms ammunition,[43] the Small Arms Survey has only documented


Map 4 Sudanese weapons among armed actors, Sudan and South Sudan, 2011–13
SUDAN
SOUTH SUDAN
ETHIOPIA
CENTRAL AFRICAN REPUBLIC
North Kordofan
White Nile
Sennar
South Kordofan
Blue Nile
Central Darfur
East Darfur
South Darfur
Upper Nile
Unity
Northern Bahr al Ghazal
Warrap
Western Bahr al Ghazal
Jonglei
Lakes
Central Equatoria
Eastern Equatoria
Sudanese weapons held by armed actors
7.62 x 39 mm ammunition
Khawad and Mokhtar machine guns
Mortar rounds
RPG-7-pattern launcher
PG-7 rocket
OG-7 rounds
107 mm rocket
60 mm, 82 mm, and 120 mm mortar tubes
Armed actors
SAF
SLA/AW
JEM
SPLM-N
SSLM/A
SSDF
SSDM/A-Athor
SSDM/A-Yau Yau
Icons are not intended to specify precise locations of armed groups
Conflict zone
African Union-proposed border
International boundary
Abyei
State boundary
0
km
200

Sudanese-manufactured 7.62 × 39 mm, 7.62 × 51 mm, and 7.62 × 54R mm with forces in Darfur, South Kordofan, and Blue Nile as well as with Southern insurgents in South Sudan.[44] Sudanese ammunition has also appeared with civilians, rebels, and forces that backed ousted president Laurent Gbagbo in Côte d'Ivoire; in rebel-held stockpiles in the DRC;[45] with non-state armed groups in Libya; with arms dealers in Mogadishu;[46] and in the possession of Syrian rebels (Anders, 2014; UNSC, 2014b, p. 23; Chivers and Schmitt, 2013).

Sudanese-manufactured ammunition has evolved over the years, both in composition and in headstamp configuration. From the 1950s to the 1980s Sudan's headstamps featured Arabic markings; in the 1990s, they began to feature alphanumeric codes.[47] Sudanese ammunition characteristically bears three- and four-entry headstamp codes, although the Small Arms Survey has primarily documented the three-entry variety. Introduced around the year 2000, Sudan's three-entry numerical headstamp codes are unique in that the first digit—ordinarily a '1', '2', or '3'—probably indicates the batch number of the cartridge case production run, the second number denotes the case length (calibre), and the third one reveals the year of manufacture (Bevan, 2012; Small Arms Survey, 2011). The most commonly observed type of Sudanese ammunition in Sudan and South Sudan is 7.62 × 39 mm with three-entry headstamps (see Table 5). In particular, the Survey documented thousands of rounds of 7.62 × 39 mm ammunition with the headstamp '1_39_10' (see Photo 58)—with '1' probably denoting the batch, '39' the case length, and '10' the year of manufacture (2010).

Photo 58: A 7.62 × 39 mm cartridge with the headstamp '1_39_10'. The SPLA captured the ammunition from the SSLM/A in April 2011 in Unity. © Jonah Leff

Between 2011 and 2013, Survey researchers observed large quantities of '1_39_10' ammunition with Southern insurgent groups. For example, when the SPLA captured more than 150 Chinese-manufactured Type 56-1 assault rifles from the SSLM/A in Unity state in April 2011, the rifles were loaded with a single variety of

'1_39_10' 7.62 × 39 mm ammunition, totalling about 4,000 rounds. Subsequently, the Survey documented the same type of ammunition, but in much smaller quantities, with Athor's SSDM/A in February 2011 and with the SSDF in Jonglei state in September 2012.

Identical cartridges have also appeared in conflicts in Côte d'Ivoire, Somalia, and Syria. The case of Côte d'Ivoire is particularly striking.[48] Tens of thousands of rounds of Sudanese 7.62 × 39 mm ammunition produced in 2009–11 were observed in their original packaging, as described below. Revealing Sudan's poor marking practices, the lot number is at times indecipherable, especially with respect to ammunition dated 2009 (see Photo 59). In May 2013, C.J. Chivers documented a handful of '1_39_10' rounds with the Soqour al-Sham rebel group in Idlib, Syria. In August the same year, the *New York Times* reported that Sudan had supplied weapons to rebels in Syria via Turkey with Qatari support (Chivers and Schmitt, 2013). The Survey has been unable to verify whether this ammunition was delivered as part of the consignment of weapons. In June 2013, the Survey documented hundreds of rounds of '1_39_10' ammunition with an arms dealer in Mogadishu, where it was being sold for USD 0.90 per unit.

Sudanese-manufactured 7.62 × 39 mm rounds with different batch numbers and years of manufacture ranging from 2003 to 2012 have been documented in Côte d'Ivoire, the DRC, Libya, Sudan, Somalia, South Sudan, and Syria.

Photo 59: 7.62 × 39 mm cartridges produced in 2009 with poorly marked headstamps. The SPLA captured this ammunition from the SSLM/A in April 2011 in Unity. © Jonah Leff

Table 5 **Three-entry 7.62 × 39 mm Sudanese ammunition documented in conflict zones, 2011–13**

Year of manufacture	Headstamp code	Location	User	Date viewed
2012	1_39_012	Sudan: North Darfur	SAF	April 2013
	1_39_12	Libya: Tripoli	Unidentified non-state armed group	November 2013
		Sudan: North Darfur	SAF	April 2013
		Syria: Idlib	Syrian rebels	March 2013
	2_39_012	Sudan: South Kordofan	SPLM–N	May 2012
2011	1_39_011	Côte d'Ivoire	Gbagbo forces	February 2013
	2_39_011	Libya	Non-state armed group	2012
		South Sudan: Unity	SSLM/A	May 2013
		Sudan: South Kordofan	SPLM–N	May 2012
		Syria: Idlib	Syrian rebels	March 2013
	–_39_011	South Sudan: Unity	SSLM/A	May 2013
2010	1_39_10	Côte d'Ivoire	Gbagbo forces/non-state actors	November 2011
		Somalia: Mogadishu	Arms dealer	June 2013
		South Sudan: Jonglei	SSDM/A (Athor)	February 2011
			SSDF	September 2012
		South Sudan: Unity	SSLM/A	April 2011
		Syria: Idlib	Syrian rebels	March 2013

Year of manufacture	Headstamp code	Location	User	Date viewed
2009	2_39_09	Côte d'Ivoire	Gbagbo forces/non-state actors	November 2011
		South Sudan: Unity	SSLM/A	April 2011
	3_39_09	Côte d'Ivoire	Gbagbo forces/non-state actors	November 2011
		Somalia: Mogadishu	Arms dealer	September–November 2013
		South Sudan: Jonglei	SSDF	September 2012
	–_39_09	Somalia: Mogadishu	Arms dealer	July–November 2013
		South Sudan: Jonglei	SSDF	September 2012
		South Sudan: Unity	SSLM/A	April 2011, May 2013
2008	1_39_08	DRC: North Kivu	M23 rebels	Mid-2013
	2_39_08	Côte d'Ivoire	Gbagbo forces/non-state actors	November 2011
2007	1_39_07	DRC: North Kivu	M23 rebels	Mid-2013
	2_39_07	Côte d'Ivoire	Gbagbo forces/non-state actors	November 2011
		DRC: North Kivu	M23 rebels	Mid-2013
2006	2_39_06	DRC: North Kivu	M23 rebels	Mid-2013
2004	3_39_04	Sudan: North Darfur	SLA–AW	June 2011
2003	4_39_03	Sudan: North Darfur	SLA–AW	June 2011

Sources: Anders (2014); Jenzen-Jones (forthcoming); UN (2014b, pp. 22–23); HSBA and Small Arms Survey fieldwork; author correspondence with a researcher in the DRC

Machine guns

Sudan's MIC claims to produce general-purpose and heavy machine guns, which appear to be identical to those manufactured by China. According to the MIC website, the company produces a general-purpose machine gun called the Mokhtar and a heavy machine gun called the Khawad (MIC, n.d.b); these are copies of the Chinese Type 80 and Type 85 machine guns, respectively.[49] It is not clear whether Sudan manufactures these weapons under licence from China or whether it assembles them in Khartoum. The Sudanese factory markings are distinct from those applied by China.

The Small Arms Survey documented Sudanese machine guns in stockpiles that the SPLA had seized from George Athor's forces in Jonglei state in March 2011. The markings and construction of the weapons were identical to those on display at the 2013 IDEX convention (see Photos 60–63). The Khawad in

Photos 60 and 61: A Khawad machine gun (top) and its markings (bottom) viewed at the IDEX convention, Abu Dhabi, United Arab Emirates, February 2013.
© Confidential

Photos 62 and 63: A Mohktar machine gun (top) and its markings (bottom) viewed at the IDEX convention, Abu Dhabi, United Arab Emirates, February 2013.
© Confidential

Photos 64 and 65: A Khawad (top) with its markings (bottom). The SPLA captured this heavy machine gun from Athor's SSDM/A in March 2011. Jonglei, April 2011. © Jonah Leff

Photos 66 and 67: A Mokhtar (top) with its markings (bottom). The SPLA captured this general-purpose machine gun from Athor's SSDM/A in March 2011. Jonglei, April 2011. © Jonah Leff

Athor's holdings was marked with what appears to be a 2010 manufacture date (see Photos 64 and 65). While the marks on the Mokhtar have been partially scratched off, they still correspond to Sudanese marking conventions (see Photos 66 and 67). In South Sudan, Small Arms Survey researchers documented identical machine guns whose markings had been fully removed, which made it difficult to identify them as Sudanese or Chinese, since the construction and furniture of the weapons were not visually distinct.

In May 2012, a Survey researcher observed a Khawad that JEM had reportedly captured from SAF during a battle in Jaw in February 2012. According to the markings, the machine gun appears to have been produced in 2010 (see Photos 68 and 69).

Photos 68 and 69: A Khawad that JEM captured from SAF in February 2012 in Jaw, Unity. May 2012. © Claudio Gramizzi

Mortars

Mortar ammunition. Sudanese-manufactured 60 mm, 82 mm, and 120 mm mortar rounds proliferate widely throughout Sudan and South Sudan. The Small Arms Survey has documented them with a number of armed groups in each country. These rounds closely resemble Bulgarian types. The Bulgarian manufacturer, Arsenal Joint Stock Company, does not currently manufacture 60 mm rounds with the same designation, but it does produce identical 82 mm and 120 mm mortar rounds.[50] Bulgaria reports having authorized licences for the export of manufacturing equipment for the production of 82 mm and 120 mm mortar rounds to Sudan between 1996 and 1998.[51] The Sudanese use the following names for the three rounds: 'Nimir 60 mm (HE)',[52] 'Aboud 82 mm (HE)', and 'Ahmed 120 mm (HE)' (MIC, n.d.a). According to documents from Yarmouk that were viewed by Small Arms Survey researchers and that correspond to markings on the rounds and shipping boxes, the MIC's mortar rounds are manufactured in Workshop 116 at Factory A10. Most Sudanese mortar rounds observed by Survey researchers tend to be hybrids, often containing Chinese-manufactured fuzes and Bulgarian ignition charges, although Sudanese charges were documented as well, as discussed below.

Small Arms Survey researchers first sighted Sudanese-manufactured 120 mm mortar rounds with JEM, whose forces reportedly captured at least six rounds

Photo 70: 120 mm mortar rounds that JEM reportedly captured from SAF in April 2009 in Kornoy, North Darfur. © Confidential

Photo 71: 60 and 82 mm mortar rounds that the SPLA seized from the SSLM/A in May 2011, Unity. © Confidential

Photo 72: An 82 mm ignition charge manufactured in 2007 that the SPLA seized from the SSLM/A in May 2011 in Unity. © Confidential

from SAF in 2009 (see Photo 70). At the time, arms experts were unable to identify their origin. According to the markings on the rounds and the boxes, they were manufactured in 2001, 2004, and 2006 at Workshop 116.

In May 2011, fieldwork revealed two Sudanese-manufactured 60 mm and five 82 mm mortar rounds that the SPLA had seized from the SSLM/A in Unity state (see Photo 71). Their markings, which were similar to those of the 120 mm rounds observed in Darfur, indicated that they had been produced at Workshop 116 in 2010. The 82 mm rounds were fitted with Sudanese-manufactured mortar ignition charges produced in 2007 (see Photo 72).

In 2011–12 investigators documented large quantities of Sudanese-manufactured 82 mm mortar ammunition in South Kordofan and Blue Nile; the SPLM–N had reportedly seized the rounds from SAF in battle (see Photos 73 and 74). These were identical to the 82 mm rounds with the SSLM/A and ranged in manufacture date from 2006 to 2011. Similar 60 mm and 120 mm rounds were observed, although they were less numerous. Likewise, during their attack on Hejlij in April 2012, the SPLA and JEM seized several boxes of Sudanese-produced 60 mm (see Photo 75), 82 mm, and 120 mm mortar ammunition from a SAF depot.

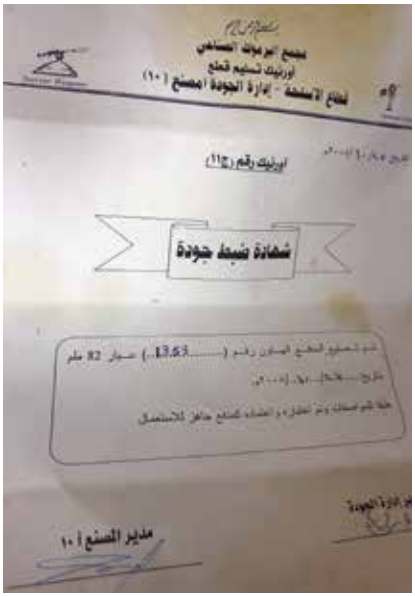
Photo 73: 82 mm mortar rounds that the SPLM–N reportedly captured from SAF between 30 June and 1 July 2011 in al Hamra, South Kordofan. May 2012. © Claudio Gramizzi

Photo 74: 82 mm mortar rounds that the SPLM–N reportedly captured from SAF in Blue Nile. October 2011. © Jared Ferrie

Photo 75: 60 mm mortar round that JEM and the SPLA captured in Hejlij, South Kordofan, in April 2012. © Confidential

In late 2012, the Small Arms Survey received documentation of dozens of Sudanese-manufactured 82 mm mortar rounds that Sudan reportedly supplied to the then Somali Transitional Federal Government (TFG). The rounds were part of a larger consignment of weapons that the UN claims Sudan supplied to the TFG in violation of the UN arms embargo on Somalia (UNSC, 2013b, p. 289). The mortar casings were manufactured on 27 October 2008; they were filled in 2010 in Workshop 116 at Factory A10 of the Yarmouk Industrial Complex in Khartoum, according to the container's quality control certificate and markings on the rounds (see Photos 76 and 77).[53] Since the mortar rounds were documented in January 2011, they must have been supplied to Somalia sometime in 2010. Prior to receiving the manufacturer's packing slip, which details the production and origin of the mortar ammunition, the Small Arms Survey was not able to verify that the rounds previously documented were of Sudanese manufacture.

Further confirming the origin of the mortar ammunition, Survey researchers documented Sudanese-manufactured 60 mm, 82 mm, and 120 mm mortar rounds that were on display at the 2013 IDEX weapons convention



Photos 76 and 77: A Yarmouk Industrial Complex quality control certificate (top) for 82 mm mortar rounds (bottom), documented with the TFG, Mogadishu, Somalia, January 2011. © Confidential

Photo 78: A 120 mm mortar round at the IDEX convention, Abu Dhabi, United Arab Emirates, February 2013. © Confidential

(see Photo 78). According to the markings, the rounds were manufactured in 2012 in Workshop 116. Although the rounds are painted in a colour distinct from those documented previously, their construction and marking configurations are identical to those observed in Sudan and South Sudan.

During an inspection of weapons with the SSLM/A in Unity state in May 2013, a Survey researcher noted large quantities of Sudanese-produced 60 mm and 82 mm mortar ammunition in their original packaging. The markings on the rounds and crates reveal that the 60 mm and 82 mm rounds were manufactured in 2008 and 2012, respectively (see Photos 79–82). Given their 2012 production date, the 82 mm rounds were probably supplied to the SSLM/A not long before they accepted amnesty in April 2013. Like the 120 mm mortar ammunition boxes observed with JEM in 2009 and the 82 mm mortar rounds in Mogadishu, the 60 mm mortar ammunition boxes are green. The 82 mm mortar rounds manufactured from 2011 onwards are contained in similarly constructed boxes, but painted grey with more detailed markings. In all cases, the boxes are marked with the lot number, date of manufacture, and the workshop number 116.

Photos 79 and 80: 60 mm mortar rounds (top) and their packaging (bottom), documented with the SSLM/A in Unity, South Sudan, May 2013. © Jonah Leff

Photos 81 and 82: A 82 mm mortar round (top) and its packaging (bottom), documented with the SSLM/A in Unity, South Sudan, May 2013. © Jonah Leff

In April and May 2013, the UN Integrated Embargo Monitoring Unit in Côte d'Ivoire documented Sudanese-manufactured mortar rounds that had entered the country in violation of UN sanctions. Encountered at a military store, the materiel included 30 boxes of 120 mm mortar rounds manufactured in 2011 and a box of 60 mm mortar rounds manufactured in 2008 (UNSC, 2013c, pp. 9, 65–67). The markings and packaging are consistent with those described above. Further, in late 2013, dozens of Sudanese 60 mm, 82 mm, and 120 mm mortar rounds produced in 2007 were observed with stockpiles that had been abandoned by the M23 rebels in the DRC.[54] In January 2014, Seleka fighters left behind a huge cache of weapons when they fled the capital of the Central African Republic, Bangui. Among the items were dozens of 60 mm and 82 mm mortar rounds.[55] In all cases, the chain of custody of the mortars is unclear.

Mortar tubes. Although they are not as widespread as Sudanese-produced mortar ammunition, Sudanese-manufactured mortar tubes have been observed in Sudan and South Sudan. According to the MIC website, Sudan makes three types of mortar tubes: the 'Nimir 60 mm mortar', 'Aboud 82 mm mortar', and 'Ahmed 120 mm' (MIC, 2013, n.d.b).

The first Sudanese mortar tube to be documented was among weapons that the SPLA had captured from the SSLM/A under Peter Gadet in May 2011.

Photos 83 and 84: A 82 mm mortar tube (top) with serial number (bottom). The SPLA seized the tube from the SSLM/A in May 2011 in Unity state. © Confidential

Photos 85 and 86: A 120 mm mortar tube (top) with markings scratched off (bottom), documented with the SSLM/A in Unity state. May 2013. © Jonah Leff

One of the 82 mm mortar baseplates bears markings with the serial number '11055870183' but does not reveal the year of manufacture (see Photos 83 and 84). When the SSLM/A accepted amnesty two years later, they entered South Sudan with dozens of 60 mm, 82 mm, and 120 mm mortar tubes. This time all of the markings had been systematically scratched off (see Photos 85 and 86).

Survey researchers observed large quantities of Sudanese-manufactured 60 mm, 82 mm, and 120 mm mortar tubes in South Kordofan and Blue Nile;

Photos 87 and 88: This 82 mm mortar tube (top) bears the serial number '1127' (bottom) and was produced in 2007. The SPLM–N reportedly captured it from SAF in September 2011 in Blue Nile. December 2012. © Claudio Gramizzi

Photos 89 and 90: This 120 mm mortar tube (top) bears the serial number '11021861870' (bottom) and was produced in 2008. The SPLM–N reportedly captured it from SAF in June 2011 in South Kordofan. May 2012. © Claudio Gramizzi

Photos 91 and 92: A 60 mm mortar tube (top) with serial number '1102485520' (bottom). The SSDF handed it over to the SPLA in May 2012 in Jonglei. September 2012. © Jonah Leff

the SPLM–N reportedly captured this materiel from SAF.[56] In Blue Nile the Survey documented an 82 mm mortar tube that bore the serial number '1127' and was produced in 2007 (see Photos 87 and 88); the SPLM–N claimed to have captured it from SAF in Kurmuk in early September 2011. Photos 89 and 90 show a 120 mm mortar tube produced in 2008 and bearing the serial number '11021861870'; the SPLM–N representative said the group had captured this tube from SAF during a battle in al Hamra, South Kordofan, in June 2011. Around the same time, arms monitors in Côte d'Ivoire documented a similar 120 mm mortar tube with the serial number '11021861890' and markings indicating that it was produced in 2008.[57] The serial number from Côte d'Ivoire is only 20 units from the one documented in South Kordofan, indicating that the mortar tubes were probably manufactured as part of the same production run.

In September 2012, the Survey recorded a single Sudanese-produced 60 mm mortar tube that the SSDF handed over to the SPLA upon surrender in May 2012 (see Photo 91). The markings on the baseplate indicate that it was produced in 2007 and that its serial number is '1102485520' (see Photo 92).

RPG-7-pattern launchers[58]

Arms investigators have documented dozens of Sudanese-manufactured 40 mm RPG-7-pattern launchers in Sudan and South Sudan. These weapons closely resemble 'ATGL' types, manufactured by the abovementioned Bulgarian manufacturer, Arsenal Joint Stock Company. With the exception of the brown polymer sheathing, the design of the weapon is identical.[59] Sudan's RPG-7-pattern

launcher is called the 'Sinnar RPG-7 Light Anti-tank' (MIC, n.d.b); it is produced at Factory A30 of the Yarmouk Industrial Complex. Sudan also claims to produce a 'Sinnar RPG-7 Commando' version (MIC, n.d.b), which has an Iranian-style cylindrical grip in front of the trigger assembly, although Survey researchers have never encountered any. Yet Survey researchers have observed hybrid versions that seem to embody characteristics of both Bulgarian and Iranian design, as discussed below.

The first photographic evidence of a Sudanese-manufactured RPG-7-pattern launcher that the Small Arms Survey received was of one that SAF confiscated from the SLA–AW in South Darfur in 2009.[60] At the time, arms experts were not able to determine its origin based on its furniture or markings. It was similar in build to Iranian RPG-7-pattern launchers but had unusual markings on the trigger assembly, featuring the model (RPG7), factory code (A30), and serial number (DM-16-12) (see photos 93 and 94).

In March 2011, the Survey received documentation of an RPG-7-pattern launcher that the SPLA had captured from Athor's forces in Jonglei state earlier that year. Although its construction differed from that of the launcher observed in Darfur, the pattern of the markings on the trigger assembly was identical (see Photos 95 and 96). Later in 2011, investigators documented additional weapons that the SPLA had captured from Athor's men. Among the items was another RPG-7-pattern launcher. Although distinct from the one in Darfur and previously seen with Athor, this one had identical marks on the trigger assembly (see Photos 97 and 98) and matched the launcher featured on the MIC website (MIC, n.d.b).

Photos 93 and 94: An RPG-7-pattern launcher (top) and markings (bottom). SAF seized the launcher from the SLA–AW in 2009 in South Darfur. 2010.
© Confidential

In November 2011, the Survey travelled to Mapel, South Sudan, to meet with soldiers of the Malakal-based SAF

Photos 95 and 96: An RPG-7-pattern launcher (top) with markings (bottom). The SPLA seized this item from Athor's SSDM/A in February 2011 in Jonglei. March 2011. © Confidential

Photos 97 and 98: An RPG-7-pattern launcher (top) with markings (bottom). The SPLA seized this launcher from Athor's SSDM/A in Jonglei. April 2011. © Jonah Leff

Photos 99 and 100: An RPG-7-pattern launcher (top) and its markings (bottom). This item was observed with the SAF JIU as it was undergoing integration in Mapel, Western Bahr el Ghazal, in November 2011. © Jonah Leff

Photos 101 and 102: An RPG-7-pattern launcher (top) and its markings (bottom). The SSDF handed this launcher over to the SPLA in May 2012 in Jonglei. September 2012. © Jonah Leff

component of the Joint Integrated Unit (JIU) under the command of Lt. Col. Peter Wol, who had defected to the SPLA earlier that year. Among his forces' weapons was an RPG-7-pattern launcher (see Photo 99) that was identical to the second one found with Athor and to the one on the MIC website (MIC, n.d.b). Although the information contained in the markings is similar, the marking sequence and stamping style is slightly different. The marks reveal that the launcher was produced at Factory A30; its serial number is 'NY-12-35' (see Photo 100).

Several Sudanese-manufactured RPG-7-pattern launchers were observed among weapons that John Duit's SSDF handed over to the SPLA in May 2012. The construction and markings (see Photos 101 and 102) once again are identical to those captured from Athor, in the possession of the SAF JIU, and to those featured on the MIC website. The marks reveal that the launcher was manufactured at Factory A30; the item's serial number is 'UF-20-69'.

In late 2012, the Small Arms Survey received documentation of a box of nine Sudanese-manufactured RPG-7-pattern launchers in the possession of the Somali TFG (see Photo 103). These were part of the same consignment of weapons that included the 82 mm mortar rounds described above. Although the heat guards are wooden as opposed to plastic, the basic assembly and markings are consistent with Sudanese design. The launchers were manufactured at Yarmouk's Factory A30 on 8 October 2010, according to the quality control certificate (see Photo 104). Since the launchers were documented in January 2011, they were probably supplied in late 2010 or the first weeks of 2011. Like the 82 mm mortars, these RPG-7-pattern launchers

Photo 103: A box of RPG-7-pattern launchers with the TFG in Mogadishu, Somalia, January 2011. © Confidential

Photo 104: A Yarmouk Industrial Complex quality control certificate for RPG-7-pattern launchers. Mogadishu, Somalia, January 2011. © Confidential

entered Somalia in violation of the UN arms embargo (UNSC, 2013b, p. 289). Prior to receiving the Yarmouk packing slip that details the production of the launchers, the Survey researchers were not able to verify that the previously documented launchers were of Sudanese origin.

In addition to the RPG-7-pattern launchers found with George Athor's forces in Jonglei, researchers have documented Sudanese-manufactured RPG-7-pattern launchers with a number of other Southern insurgent groups. In 2013, the SPLA captured several Sudanese-produced RPG-7-pattern launchers from Yau Yau's militia in Jonglei. The construction of the launchers was consistent with Sudanese design, but the markings were deliberately removed by grinding (see Photos 105 and 106). Likewise, the SSLM/A brought dozens of Sudanese-made RPG-7-pattern launchers across the border when they accepted Kiir's presidential amnesty in April 2013. These weapons had their markings removed in a similar manner (see Photos 107 and 108).

Further corroborating that the origin of some of these launchers was Sudan, the MIC displayed one at the 2013 IDEX weapons convention (see Photo 109). This item appears to

Photos 105 and 106: An RPG-7-pattern launcher (top) with partially removed markings (bottom). The launcher was seen with defectors from the SSDM/A in Jonglei, February 2013. © James Bevan

Photos 107 and 108: An RPG-7-pattern launcher (top) with removed markings (bottom). The launcher was observed with the SSLM/A in Unity, May 2013. © Jonah Leff

Photo 109: An RPG-7-pattern launcher on display at the IDEX convention, Abu Dhabi, United Arab Emirates, in February 2013. © Confidential

match the Bulgarian-style launcher that is featured on the website of the MIC (MIC, n.d.b).

PG-7 rockets

The Survey has documented dozens of Sudanese-manufactured PG-7 rockets, although they are not as common among armed groups in Sudan and South Sudan as the Sudanese-produced RPG-7-pattern launchers discussed above. Sudan's PG-7 HEAT ammunition is called the 'Sinar PG-7V'[61] and is a licensed copy of the Bulgarian version, according to information provided by the Bulgarian Ministry of Economy and Energy.[62] The Survey first received documentation of Sudanese PG-7s along with the Sudanese-produced RPG-7-pattern launcher that SAF seized from the SLA–AW in Darfur in 2009. The marks suggested that the bombs had been produced in 2008, only one year prior to their confiscation, at a 'Workshop 101', whose location remained to be identified (see Photos 110 and 111).

Photos 110 and 111: PG-7 rockets (left) with markings (right). SAF captured these rockets from the SLA–AW in 2009 in Darfur. 2010. © Confidential

Photos 112 and 113: PG-7 rockets (top) and markings (bottom). These rockets were observed with the SSLM/A in Unity in May 2013. © Jonah Leff

Photos 114 and 115: A PG-7 rocket (top) and its markings (bottom). This item was on display at the IDEX convention in Abu Dhabi in February 2013.
© Robin Ballantyne/Omega Research Foundation

In April 2013, the SSLM/A brought with them to South Sudan hundreds of Sudanese-manufactured PG-7 rockets with markings similar to those observed in Darfur in 2009. Again, these rounds were produced at Workshop 101, but in 2009 (see Photos 112 and 113). Finally, in April 2013, the Survey confirmed that the PG-7 markings documented in Darfur and with the SSLM/A were identical to markings applied to Sudanese-manufactured PG-7 rockets on display at the IDEX convention in Abu Dhabi (see Photos 114 and 115).

OG-7 HE-fragmentation rounds

Sudan manufactures 40 mm OG-7 HE-fragmentation rounds called 'Sinar OG-7'. The Sinar OG-7 resembles Soviet/Bulgarian design and is manufactured in Workshop 101, which also makes the PG-7s. Investigators first documented OG-7 rounds in May 2012 as part of a collection of weapons that the SPLM–N captured from SAF during battle (see Photos 116 and 117). The ammunition was manufactured in 2009, according to the markings. In 2012, the Survey received documentation of one box of Sudanese-produced OG-7 rounds manufactured in 2009 that had been sighted with the Somali TFG in 2010; like the weapons

noted above, these rounds had entered Somalia in violation of the UN arms embargo on Somalia (see Photos 118 and 119). Similar to the boxes containing Sudanese-made mortar ammunition produced prior to 2011, the OG-7 boxes were painted in a forest green colour.

107 mm rocket launchers and rockets

While the majority of documented Sudanese-manufactured weapons tend to be small-calibre, the Survey has recorded several larger-calibre rocket launchers and their requisite ammunition. According to its website, the MIC manufactures an Iranian-pattern 107 mm 12-barreled multiple rocket launcher called the 'Taka 107 mm' as well as a 107 mm HE rocket called the 'Taka 107 mm Rocket' (MIC, n.d.b).

Among the Sudanese weapons with the TFG in Somalia was a 107 mm 12-barreled launcher. Its design is identical to those featured on the MIC website, yet its origin is not clear from its markings (L21-050) (see Photos 120 and 121). In the same TFG stockpile were two Sudanese-manufactured 107 mm rockets. According to the markings, the rockets were produced in 2009 and filled in Workshop 116, the same workshop

Photos 116 and 117: OG-7s (top) with markings (bottom). The SPLM–N seized these rounds from SAF between 30 June and 1 July 2011 in al Hamra, South Kordofan. May 2012. © Claudio Gramizzi

Photos 118 and 119: OG-7s with the TFG in Mogadishu, Somalia, in January 2011. © Confidential

Photos 120 and 121: A 107 mm rocket launcher (top) and its markings (bottom). This launcher was seen with the TFG in Mogadishu, Somalia, in January 2011. © Confidential

Photos 122, 123, and 124: 107 mm rockets (top), markings (middle), and a packing slip (bottom). These rockets were observed with the TFG in Mogadishu, Somalia, in January 2011. © Confidential

Photo 125: A box of 107 mm rockets left behind by SAF in Hejlij, April 2012. © Confidential

Photos 126 and 127: A 107 mm rocket (top) with its markings (bottom). This item was featured at the IDEX convention in Abu Dhabi, United Arab Emirates, in February 2013. © Confidential

Photos 128 and 129: A 107 mm rocket launcher (top) and markings (bottom). The launcher was seen with the SSLM/A in Unity, South Sudan, in May 2013. © Jonah Leff

that produces the MIC's mortar ammunition. The quality control certificate contained within the box further confirms that the rockets were produced in 2009 at Workshop 115 (see Photos 122, 123, and 124).[63]

In their attack on Hejlij in April 2012, the SPLA and JEM captured several boxes of Sudanese-manufactured 107 mm rockets. According to the markings on one box, the rockets were manufactured in 2011 at Workshop 115 (see Photo 125). The box colour confirms that the MIC appears to have switched from forest green to grey in 2011.[64]

The MIC presented a 107 mm rocket at the 2013 IDEX convention in Abu Dhabi. Although the colour of the rocket is unlike others the Survey has documented, the markings are consistent. The rocket on display appears to have been produced in 2012 in Workshop 115 (see Photos 126 and 127), which accords with those documented in the field.

In April 2013, the SSLM/A crossed from Sudan into South Sudan with more than 100 vehicles, many of which were mounted with weapons. Of these, four were mounted with 107 mm 12-barelled rocket launchers. The launchers appear identical to those featured on the MIC website and the one observed in Mogadishu. As was the case in Somalia, the markings (L22-031) did not reveal anything about their origin (see Photos 128 and 129). No Sudanese-produced 107 mm rockets were found with the SSLM/A forces. Subsequently, in July 2013, identical launchers were viewed with Johnson Olony's militia in Upper Nile.

Sudanese packaging

Chinese-manufactured ammunition found in Sudan and South Sudan is often contained in its original packaging for export, yet in some instances it has been observed repackaged in Sudanese packaging. The boxes are typically of rudimentary construction, assembled using unfinished, unpainted wood assembled with nails. There are no markings on the boxes apart from a black-and-white printed paper label that is glued onto the wood. The labels usually contain the following information: 1) lot number; 2) quantity and calibre of the ammunition; 3) dimensions of the box; and 4) date (most likely of the packaging). Inside the boxes, cartridges are contained in black polyethelene bags. The Small Arms Survey has documented Chinese-produced 7.62 × 39 mm, 7.62 × 54R mm, and 12.7 × 108 mm ammunition in Sudanese packaging.

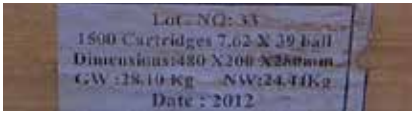
Prior to the establishment of the HSBA Tracing Desk, the UN Panel of Experts on Sudan documented Chinese ammunition in boxes, but they failed to identify the boxes as Sudanese. The Panel's 2009 report illustrates a case in which Chinese Factory 41 12.7 × 108 mm ammunition produced in 2007 was contained in a Sudanese box labelled with a 2008 packing date; the transfer of these rounds constituted a violation of the UN arms embargo on Darfur (UNSC, 2009, p. 37). In 2011, the Panel documented the remains of a similar box with a 2010 label containing Chinese-manufactured Factory 41 12.7 × 108 mm ammunition produced in 2010 (Gramizzi, Lewis, and Tubiana, 2012).

In April 2011, the Small Arms Survey identified Chinese-manufactured Factory 945 7.62 × 54R mm ammunition produced in 2009 along with suspected Sudanese-manufactured unmarked ammunition of the same calibre in a Sudanese box, which the SPLA had captured from the forces of George Athor. The rounds were contained in black polyethelene bags, but the box was mislabelled with a label for 7.62 × 39 mm ammunition, bearing a 2010 packing date (see Photos 130 and 131).

In May 2012 in South Kordofan, investigators documented several Sudanese boxes containing Chinese-manufactured Factory 41 12.7 × 108 mm ammunition produced in 2010, which was similar to rounds observed in Darfur. The label on one of the boxes revealed that the ammunition was repackaged in 2011 (see Photo 132). In all cases, the boxes contained black polyethelene bags, each holding five rounds of 12.7 × 108 mm ammunition. According to a placard advertising MIC 12.7 × 108 mm ammunition at the IDEX convention, packaging

Photos 130 and 131: An ammunition box (left) with its packing label (right). The SPLA captured the box from Athor's SSDM/A in March 2011 in Jonglei. April 2011. © Jonah Leff

Photo 132: The Sudanese ammunition box bears a label dated 2011 and contains Chinese 12.7 × 108 mm cartridges that the SPLM–N captured from SAF between 30 June and 1 July 2011 in al Hamra, South Kordofan. May 2012. © Claudio Gramizzi



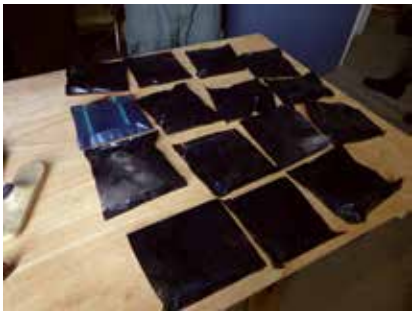
Photos 133 and 134: These two Sudanese boxes contain 7.62 × 39 mm ammunition that was packaged in 2011 and 2012. The SPLM–N captured the boxes from SAF in December 2012 in South Kordofan. © Alan Boswell

Photos 135 and 136: Chinese-manufactured 12.7 × 108 mm ammunition in a black polyethelyne bag (top) and packed in boxes (bottom) in Blue Nile, December 2012. © Claudio Gramizzi

consists of '5 cartridges packed in Airtight plastic bag'.[65] Survey researchers identified additional Sudanese boxes containing 7.62 × 39 mm ammunition in South Kordofan, but it was not possible to inspect their contents. This ammunition was packaged in 2011 and 2012 (see Photos 133 and 134). Several rounds of 12.7 × 108 mm ammunition that bore Factory 41 codes and were manufactured in 2010 were also observed in an SPLM–N garrison on the front line in Blue Nile in December 2012. Although it was described to Survey investigators as part of the movement's own stockpiles, such ammunition was packaged in black polyethelene bags and stored in tin boxes identical to those previously observed in Darfur and South Kordofan; it was repackaged in Sudanese boxes in 2010 (see Photo 135 and 136).

The Survey also received documentation of Chinese Factory 11 and Factory 41 12.7 × 108 mm ammunition in Sudanese packaging in rebel stockpiles in Côte d'Ivoire and in the DRC (Anders, 2014).[66] It is unclear what the chain of custody was for this ammunition from Sudan to the final recipient.

Although the Survey has not observed Sudanese-marked ammunition in Sudanese packaging in Sudan or



Photos 137, 138, and 139: Sudanese packaging for 7.62 × 39 mm ammunition, Côte d'Ivoire, 2012. © Holger Anders/United Nations Operation in Côte d'Ivoire

Photo 140: A Sudanese box containing Sudanese-manufactured 7.62 × 39 mm ammunition documented with an arms dealer in Mogadishu, Somalia, in November 2013. © Confidential

South Sudan, researchers have documented it in Côte d'Ivoire, the DRC, and Somalia. For instance, tens of thousands of rounds of Sudanese-manufactured 7.62 × 39 mm ammunition produced in 2009–11 were observed in Sudanese packaging in Côte d'Ivoire in 2012 (Anders, 2014; see Photos 137, 138, and 139); thousands of Sudanese 7.62 × 39 mm rounds dated 2007 and 2008 were observed in M23 rebel stockpiles in the DRC.[67] In some instances, researchers have found that Sudanese packaging may contain a single calibre, but with different headstamps. For example, in November 2013, the Survey documented two different varieties of Sudanese 7.62 × 39 mm ammunition (with headstamps 2_39_09 and 3_39_09) contained in Sudanese packaging dated 2009 with an arms dealer in Mogadishu (see Photo 140).

Regional sources: Ethiopia, Kenya, Uganda

Countries neighbouring Sudan and South Sudan have long served as sources of weapons for non-state actors. Due to the long and porous borders surrounding the two countries, weapons are easily and routinely trafficked from most, if not all, of the nine

countries bordering Sudan and South Sudan. In some instances, local traders traffic weapons on a small scale intended for civilian markets. These often comprise older-generation weapons that have been in circulation throughout the region for decades and are thus difficult to track.

In contrast, bordering states have supplied large quantities of weapons as a result of their own political and ideological interests. For example, various reports have documented Libya and Chad's military support to Darfur rebels in their opposition to Khartoum.[68] Likewise, Ethiopia, Kenya, and Uganda served as suppliers as well as transhipment points for deliveries of arms and ammunition to the SPLA prior to South Sudan's independence (Small Arms Survey, 2012b, p. 2). When the SPLA's 9th and 10th Divisions split from the greater SPLA to fight against Sudan's armed forces in South Kordofan and Blue Nile, they took significant quantities of weapons with them, but it is conceivable that support from South Sudan continued for some months into the conflict. This section showcases weapons documented with the SPLM–N that were previously under the control of neighbouring governments.

The presence of these weapons does not imply that they were deliberately transferred to Sudan (or South Sudan) or that they reflect current military support to any warring parties in the two states. At the time of writing, the Small Arms Survey could not determine the chain of custody of these selected items, nor the routes by which they were transferred to SAF and/or SPLM–N stockpiles.

In May 2012, the Small Arms Survey documented a G3A3-pattern assault rifle (see Photos 141 and 142), reportedly captured from SAF stockpiles in Heiban, South Kordofan, in June 2011. The markings on the weapon indicate that the rifle was manufactured in the United Kingdom by Enfield. Information gathered suggests that the

Photos 141 and 142: A G3A3-pattern rifle (top) with its markings (bottom). The SPLM–N reportedly captured the rifle from SAF in June 2011 in Heiban, South Kordofan. May 2012. © Claudio Gramizzi

weapon belonged to a consignment of rifles transferred to the Kenyan Armed Forces at the end of the 1970s.

During the same field visit to South Kordofan, Survey researchers viewed several Bulgarian-manufactured 82 mm mortar rounds (see Photo 143), reportedly captured from a SAF warehouse in Heiban in June 2011. According to information provided by the Bulgarian government, the rounds were manufactured in 1999 and exported during the same year, under a duly issued export licence, to the Ministry of National Defence of Ethiopia.[69]

Photo 143: Bulgarian-manufactured 82 mm mortar rounds that the SPLM–N seized from SAF in August 2011 in al Ihemir, South Kordofan. May 2012. © Claudio Gramizzi

Photo 144: Boxes containing undetermined contents with markings identifying the Ugandan Ministry of Defence as the consignee. The boxes were in the possession of the SPLM–N in Blue Nile. December 2012. © Claudio Gramizzi

Photo 145: Boxes of Bulgarian 23 mm ammunition with the SPLM–N in South Kordofan, December 2012. © Alan Boswell

Photo 146: A shipping label on a box of 23 mm ammunition held by the SPLM–N in South Kordofan, December 2012. © Alan Boswell

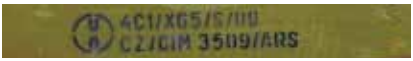


Photo 147: A UN packaging code on a box of 23 mm ammunition in the possession of the SPLM–N in South Kordofan, December 2012. © Alan Boswell

In December 2012, the Small Arms Survey documented boxes containing undetermined equipment in an SPLM–N store in Blue Nile. The boxes bear references to the Ugandan Ministry of Defence as the consignee (see Photo 144).[70] These boxes were reportedly transferred to the store, where they were observed after the SPLM–N fled Kurmuk in November 2011. During the same month, Survey researchers observed boxes of Bulgarian-manufactured 23 mm × 152B mm ammunition in South Kordofan, under the custody of SPLM–N units in Daldoko (see Photo 145).

Labels on the boxes indicate they were shipped from Bulgaria by the Kazanlak-based Arsenal JSCo. to the Ugandan Ministry of Defence (see Photo 146). According to Arsenal's website, the company sells several types of 23 × 152B mm rounds compatible with the ZU-23-2 and ZSU-23-4 cannon. The website also indicates that these rounds ship in boxes of 84 pieces with a gross weight of 55 kg, matching the weight markings on the boxes. The clean condition of the labels reveals that the boxes were most likely supplied not long before they were documented. Although the ammunition dates back to 1998, the UN packaging code on the box (see Photo 147) indicates that the box was manufactured in 2009 ('09') at the Arsenal ('ARS') plant, suggesting that the ammunition was supplied to Uganda after 2009.

It is not possible from the box markings alone to determine how the ammunition came into the SPLM–N's possession, nor when. Given the complicated regional relations and recent transitions affecting the region, two scenarios can be considered:

a. Uganda could have supplied the arms directly to the SPLM–N, probably through South Sudanese territory. This tactic would not be inconsistent with Uganda's foreign policy towards Sudan and South Sudan. Uganda regularly hosts SPLM–N leaders. President Yoweri Museveni of Uganda and President Omar al Bashir of Sudan have a long-standing mutual animus. Because Uganda confirmed to Bulgaria delivery of the ammunition on 24 March 2010, as discusssed below, the retransfer would have had to ocurr sometime between that date and the time it was documented (December 2012).
b. Uganda could have supplied the arms to the Southern SPLA, which could then have delivered them to the SPLM–N of its own accord. Since the boxes

appear to have been manufactured in 2009, this transfer could have occurred either prior to or after South Sudan's declaration of independence in July 2011. If Uganda supplied the arms to South Sudan before independence, the ammunition may have been part of the SPLM–N's arsenal while it still belonged to the SPLA (and before it became a rebel group), prior to the outbreak of South Kordofan hostilities in June 2011.[71] Given the SPLA's own limited stockpiles during the interim period, and the SPLM–N's dire need for anti-aircraft ammunition in the face of the Sudanese government's tactical air advantage, it is doubtful that the SPLM–N's mid-2011 holdings of anti-aircraft ammunition alone were sufficient to last the next 18 months of war. If Uganda supplied South Sudan's SPLA with the ammunition after independence, and South Sudan then passed it to the SPLM–N, South Sudan would have done so in violation of President Salva Kiir's repeated and insistent public assurances that South Sudan had cut all links to the SPLM–N after June 2011.[72]

In response to a letter sent to the Republic of Bulgaria, the Bulgarian Ministry of Economy, Energy and Tourism states:

> *In 2009 the Bulgarian Interministerial Commission for Export Control and Non-proliferation of [weapons of mass destruction] has issued an export licence for 23 mm anti-aircraft ammunition. The container shown on the pictures is identified as part of this delivery. For obtaining of the export licence, the applicant has presented the original of an End-User Certificate, issued by the Ministry of Defence of Uganda, which confirmed that the items would not be re-exported without the permission of the competent Bulgarian authorities. Consultations with partner countries were made prior to issuing the export licence. On 22nd January 2010 the items were exported to the [Ministry of Defence] of Uganda under the issued export licence. This fact was confirmed by a delivery verification certificate issued by the End-User which was submitted to us on 24th March 2010.*[73]

Despite Bulgaria's cooperation on the matter, and the confirmation that the ammunition was delivered to Uganda in March 2010, it is impossible to determine precisely when and how the SPLM–N came to possess it.

Unmarked ammunition

While the vast majority of ammunition bears markings that provide some information on its origins, Survey research has uncovered several examples of unmarked ammunition, meaning that no information was stamped onto the head of the cartridge where a headstamp would normally appear. It is not immediately clear if manufacturers produce unmarked ammunition to deliberately conceal its origin or because of lack of oversight or interest. In any case, the resulting lack of information makes arms monitoring more difficult. Although the Small Arms Survey and associated experts have not been able to identify the origin of several types of unmarked ammunition, information inscribed on packing slips observed in Mogadishu points to Ethiopia as one of the producers.

Unmarked 7.62 × 39 mm ammunition

The Survey has documented similar samples of unmarked 7.62 × 39 mm ammunition in Sudan and South Sudan. Common characteristics include a brass case and red sealant at the primer annulus, both of which appear to be from the same factory. The ammunition has a flat-bottom bullet rather than the more common boat-tail bullet and is made of Berdan-primed brass.[74] Twenty cartridges are contained in white cardboard packaging with blue–purple ink marks. Similar outer packaging—dark green boxes—was found in both Sudan and South Sudan.[75] The outer and inner packaging encountered in both countries appears identical to that used with unmarked 7.62 × 54R mm

Photos 148 and 149: Outer (top) and inner (bottom) packaging of unmarked 7.62 × 54R mm ammunition observed in Mogadishu, Somalia, in January 2014. © Confidential

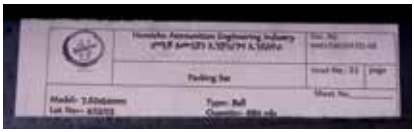
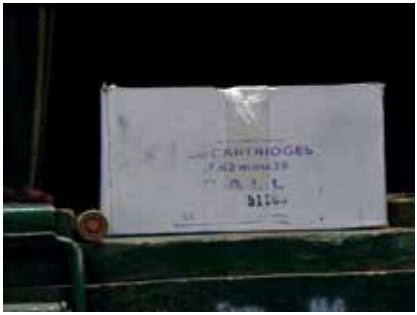


Photo 150: A packing slip denoting Ethiopian manufacture on unmarked 7.62 × 54R mm ammunition observed in Mogadishu, Somalia, in January 2014. © Confidential

ammunition that the Survey documented in Somalia in January 2014 (see Photos 148 and 149); the latter packaging featured packing slips from the Homicho Ammunition Engineering Industry (HAEI) company in Ethiopia (see Photo 150).[76] As of early 2014, the HAEI website listed South Sudan and Sudan among its foreign clients (HAEI, n.d.). For these reasons, it appears likely that HAEI also manufactured the unmarked 7.62 × 39 mm ammunition documented in Sudan and South Sudan.

The Survey first documented about 100 rounds of this unmarked 7.62 × 39 mm ammunition in April 2011 among a cache of weapons that the SPLA had seized from Athor's SSDM/A in Jonglei, South Sudan (see Photo 151). One year later, in South Kordofan, Survey investigators recorded 1,300 similar rounds in their original packaging, dated 2003, with the SPLM–N, which claimed to have captured the ammunition from SAF (see Photos 152 and 153). In September 2012, the Survey observed 1,300 rounds of the same ammunition in identical packaging dated 2001; the SPLA had collected the ammunition from Athor's SSDM/A in Jonglei (see Photos 154, 155, and 156). Two months later, the same ammunition, although

Photo 151: Unmarked brass-case 7.62 × 39 mm ammunition that the SPLA seized from Athor's SSDM/A, Jonglei, April 2011. © Jonah Leff



Photos 152 and 153: Unmarked brass-case 7.62 × 39 mm ammunition beside its inner pacakaging (top) and its outer packaging (bottom). The SPLM–N reportedly seized the ammunition from SAF in al Ihemir, South Kordofan, in May 2012. © Claudio Gramizzi

Photos 154, 155, and 156: Unmarked brass-case 7.62 × 39 mm ammunition (top) and its inner (middle) and outer (bottom) packaging. Athor's SSDM/A handed these rounds over to the SPLA in February 2012 in Jonglei. September 2012. © Jonah Leff

Photo 157: Unmarked brass-case 7.62 × 39 mm ammunition seen with the SPLM–N in Blue Nile in December 2012. © Claudio Gramizzi

in loose form, was observed in Blue Nile, Sudan, once again with the SPLM–N; like their comrades in South Kordofan, the troops claimed to have seized the ammunition from SAF (see Photo 157). The SPLM–N in Blue Nile also had several boxes identical to those documented in South Kordofan and Jonglei in their possession, but representatives claimed that they were part of their ammunition stockpile, rather than materiel captured from SAF. In July 2013, the Survey documented hundreds of rounds among weapons that the SPLA had seized from Yau Yau's SSDM/A in Jonglei, South Sudan.

Unmarked 7.62 × 54R mm ammunition

The Survey has documented unmarked 7.62 × 54R mm ammunition. One type is composed of a copper-clad steel case with unevenly applied red primer sealant and yellow neck sealant.[77] Survey researchers saw about 200 rounds of this unmarked ammunition (see Photo 158) in black polyethylene bags contained in a box of Sudanese manufacture, alongside weapons that the SPLA had seized from Athor's SSDM/A in Jonglei in March 2011. Between January 2012 and September

Photo 158: Unmarked copper-clad, steel-case 7.62 × 54R ammunition that the SPLA captured from Athor's SSDM/A in March 2011 in Jonglei. April 2011. © Jonah Leff

Photo 159: Unmarked brass-case 7.62 × 54 R mm ammunition that the SPLA captured from Yau Yau's SSDM/A in Jonglei. July 2013. © James Bevan

2013, UN monitors documented hundreds of similar unmarked 7.62 × 54R mm cartridges in Côte d'Ivoire alongside Sudanese ammunition, and some inside Sudanese packaging (UNSC, 2013c, pp. 9–10). In view of the circumstances in which this ammunition has appeared in both Côte d'Ivoire and South Sudan, as well as technical considerations including their Sudanese packaging and distinctive neck and primer sealants, it appears entirely plausible that this type of unmarked 7.62 × 54R mm ammunition is manufactured in Sudan.

In July 2013, the Survey documented a different type of unmarked 7.62 × 54R mm ammunition with a brass case and red primer sealant. Researchers observed it with ammunition that the SPLA had captured from Yau Yau's SSDM/A forces in Jonglei, South Sudan (see Photo 159).

Box 3 **Cooperation and technical assistance**

There is scant information available regarding foreign involvement in the MIC's development. Although the details have not been made public, Sudan maintains high-value defence agreements with China and Iran, countries that have reportedly provided training and sent technicians to support Sudan's weapons manufacturing sector.[78] Technicians working at the MIC are usually graduates from the Karary Academy of Technology, a university on the outskirts of Khartoum, while some are sent to Shiraz, Iran, for training. They are paid about EUR 50,000 (roughly USD 70,000) per month directly by the Sudanese consulate (Small Arms Survey, 2013c). According to an MIC technician, one of the company's complexes employs 32 Iranian and 37 Sudanese technicians, who operate machinery that was provided by China, although it is overseen by Iranians (Small Arms Survey, 2013c).

The MIC uses technical expertise from both China and Iran in the production and manufacture of various weapons and ammunition and also for the maintenance of aircraft and ground vehicles used by the Sudanese army (Siri, 2013; Ashour, 2013). A technical review of Sudanese-manufactured weapons reveals that they derive from Chinese, Iranian, and Soviet designs.

The MIC produces an assault rifle and two machine guns that are direct copies of China's CQ rifle and the Type 80 and Type 85 machine guns, respectively.[79] The 'Al Bashir' main battle tank appears to be a copy or a refurbishment of the Chinese Type 85 tank. As described above, Sudan's 'Sinnar RPG-7 Commando' launcher bears a resemblance to Iranian launchers of the same calibre (MIC, n.d.e; n.d.f); its 'Taka' 12-barrel 107 mm rocket launcher is similar to the Iranian version.[80] Sudan's small-calibre ammunition, in particular the 12.7 × 108 mm rounds featured on the MIC website and displayed at the IDEX convention (see Photo 160), appear identical to cartridges manufactured by China (MIC, 2013; n.d.a).[81] Further, the Survey has documented Factory 41 12.7 × 108 mm ammunition in the same black polyethelyne bags that Sudan uses to package its ammunition.

It is not clear whether Sudan simply repackages Chinese ammunition, or assembles cartridges that have already been marked by the Chinese. Due to Sudan's close military ties with China and Iran, it is likely that technology for the production of these weapons was supplied from the two countries, yet it is unclear whether any formal licensing agreements exist.

Over the past couple of decades, Bulgaria has taken significant steps to enhance its

Photo 160: Assorted Sudanese-manufactured ammunition at the IDEX convention, Abu Dhabi, United Arab Emirates, February 2013. © Confidential

transparency and due diligence with regard to arms sales, in line with both EU and international standards. In the 1990s, prior to becoming an EU and NATO member, Bulgaria provided technical support to Sudan during the early stages of Sudan's conventional weapons manufacturing programme. Bulgaria joined the EU embargo against Sudan in 2001 but licensed arms and technology exports to Sudan took place throughout the 1990s.[82] Bulgarian participation in Sudanese military projects has been widely acknowledged in official government statements as well as mainstream and social media.[83]

The general contractor of a military project in Yarmouk was a consortium of Bulgarian, then state-owned, defence companies, known as KAS General Partnership or KAS Engineering Consortium. KAS company members that may have taken part in the Yarmouk project include: Arkus, Arsenal, Beta, Dunarit, Metalhim Holding, Pima, Trema, Vazov Machine Building Plants, and a private company called Hubano. KAS was the general contractor of the 'engineering project' in Yarmouk, based on 'preliminary information' cited in a 25 October 2004 press release by the then Bulgarian Ministry of Economy (Republic of Bulgaria, 2004). According to a Bulgarian business newspaper, KAS was created with the purpose of building military facilities in Sudan (Aleksandrova, 1996; Ilieva, 1997).

In a letter dated 5 September 2013, the Bulgarian Ministry of Economy and Energy states that in 1996–98 it issued 17 export permits to Sudan, which covered:

> equipment and documentation for the production of conventional ammunition (82 mm and 120 mm mortar rounds, 122 mm rounds for howitzers, 40 mm rounds for anti-tank grenade launchers), including components, materials, metal working machines, technical documentation, and test samples.[84]

The letter goes on to state that KAS Engineering Consortium served as 'an authorized representative of licensed Bulgarian companies which provided export services for Sudan'. KAS's licence for export and import of weapons expired in 2000 for unknown reasons. Since Bulgaria does not maintain records that date from before 1996, it is difficult to ascertain what, if any, assistance it provided to Sudan beforehand.[85] Evidence suggests, however, that assistance may have started before then (Barzashka, 2013).

Beta, a weapons producer and a member of the KAS consortium, illegally supplied Sudan with 122 mm self-propelled 2S1 'Gvozdika' howitzers in 2001–02.[86] Furthermore, Bulgarian media reports claim that in 1997, when exports to Sudan were legal, Beta signed an annexe to an existing contract with the Sudanese Defence Ministry for the 'delivery and construction of non-standard equipment, tools, facilities and technical documentation for the production' of Gvozdika howitzers to be assembled at a military factory in Sudan (Raikov, 2004), most likely Yarmouk.[87] Before the explosion at Yarmouk on 23 October 2012, which was presumed to be a bombing carried out by Israel to prevent arms from reaching Gaza, Sudan's MIC had advertised for export a 122 mm self-propelled howitzer called the Abu Fatma. The howitzer appears to have the same technical characteristics as the Bulgarian 2S1 Gvozdika produced by Beta.[88] It is not clear why the advertisement of the Abu Fatma was discontinued and whether there was a connection to the 2012 bombing. The MIC still offers the Kalifa[89]—a 122 mm D-30 towed howitzer that uses the same ammunition as the Abu Fatma.

V. Patterns of supply to non-state actors

Since the end of the Sudanese civil war, large volumes of small arms and light weapons have continued to flow into Sudan, including from China and Iran. While these authorized transfers do not violate existing embargoes or agreements on Sudan, investigations by the Survey and others indicate that some of these newer weapons have reached non-state armed groups on both sides of the Sudan–South Sudan border since the end of the civil war.

Because non-state armed groups in Sudan and South Sudan generally do not obtain their weapons directly from foreign sources,[90] the issue of state-to-non-state group transfer is fundamental. Some of the arming has been deliberate, as in the case of Khartoum's arming of Southern rebel commanders—who subsequently passed on weapons to tribal militias—while some has been effected through battlefield capture and small-scale leakage. Non-state armed groups have also acted as suppliers to civilians, especially in South Sudan.

This section examines the three most common types of illicit sourcing to non-state actors in Sudan and South Sudan, namely: 1) direct supply from state to non-state armed groups; 2) capture of military equipment on the battlefield; and 3) supply from non-state armed groups to civilians.

State supply to non-state armed groups

To further political and ideological aims and to carry out counter-insurgency operations in its peripheral areas, the GoS has enacted a long-standing practice of arming proxy forces. The most documented cases stem from Sudan's arming of the tribal militias and armed groups during its civil war with the South and the establishment of the pro-government militias, made up of mostly Arab tribes, which were tasked with suppressing an uprising in Darfur.[91] More recently, the Small Arms Survey's tracing work repeatedly identified instances of Sudanese military support to key Southern insurgent groups, whose publicly declared aim has been to topple the Juba government. Sudan has supplied

significant quantities of military equipment to these groups by land and by air, reportedly through the NISS.[92]

Former Southern insurgents have provided detailed information about truckloads of weapons arriving from Khartoum to their rear bases in South Kordofan and Blue Nile.[93] During interviews conducted in February 2013, militiamen formerly under David Yau Yau in Jonglei, including senior-level commanders, claimed the primary source of the group's arms and ammunition were airdrops orchestrated by NISS. They gave accounts of drops taking place between August 2012 and December 2012, noting that an additional drop took place after the group's defection in January 2013. They also asserted that an airplane had flown directly from Khartoum on the night of each drop. According to the commanders, the militia groups on the ground were in direct contact with the aircraft via satellite phone and marked each drop zone with a line of fire immediately prior to the drop.

Ex-militiamen described the dropped materiel as packed in reinforced wooden boxes of uniform size and shape. Each box was said to be approximately the dimension of an ISO shipping container (1.5 m in height and about 2.4 m in width). The boxes were reportedly painted either green (containing weapons) or yellow (containing ammunition). Ex-militiamen said all of the boxes were delivered by parachute, falling roughly in a line, the length of the drop zone. Small Arms Survey researchers did not view such boxes and could not independently confirm the airdrop claims (Small Arms Survey, 2013a, p. 4). According to former members of Yau Yau's militia, the materiel delivered included DShKM-pattern heavy machine guns, RPG-7-pattern rocket launchers, Type 80 general-purpose machine guns, CQ assault rifles, and associated ammunition. The first airdrop delivered 1,300 weapons; the second delivered 2,500 weapons. It is unclear how many weapons were supplied in subsequent airdrops.[94]

Sudan's NISS supplied weapons to a number of Southern insurgent militia groups in the town of Bwat, Blue Nile, Sudan, where the SSDF and the SSDM/A Upper Nile factions were stationed. According to the groups' commanders, the NISS delivered weapons and trucks in September and October 2011. Maj. Gen. Johnson Olony's SSDM/A forces received approximately 30 vehicles, a range of small arms and light weapons, and vehicle-mounted heavy weapons, including ZU-23-2 twin-barrelled 23 × 152B mm cannons, 12-tube

107 mm rocket launchers, 82 mm mortars, and B-10- and SPG-9-pattern recoilless guns.[95]

China, which accounts for the largest percentage of Sudan's reported arms imports, is reportedly aware of the problem of retransfer in the context of the UN embargo on Darfur. In 2011, the Chinese government provided investigators with a model end-user certificate in which recipients were asked to 'guarantee that, without the written consent of the competent authority of the Chinese Government, we will not transfer the above-said items to any third party' (Gramizzi, Lewis, and Tubiana, 2012, p. 22, annexe XVIII). But China declined to provide investigators with actual, signed certificates, and Chinese Factory 41 ammunition manufactured as late as 2010 was documented in Darfur in mid-2011, seven years after the UN embargo was established (p. 15). Communication with officials in Beijing in August 2013, which was reported to the Survey, indicates that the government knows of the problem of unauthorized retransfer to Darfur and South Sudanese rebels and is increasingly frustrated with Khartoum's unauthorized supply to these groups.[96] Yet, as of early 2014, there were no indications of any change in Chinese export practices regarding Sudan.

The SPLM/A has a history of arming tribal youths to defend against insurgencies, especially in Jonglei state. In 2010 and 2011, the SPLA—under the leadership of the former Jonglei governor, Koul Manyang—supplied arms and ammunition to youths throughout the state to fight against George Athor's militia. During Yau Yau's first rebellion in 2011, the Jonglei government formed a paramilitary force called the 'SPLA Youth', comprising mostly Murle youths, to take on Yau Yau's forces. Similarly, during inter-tribal conflict in Jonglei, SPLA soldiers provided weapons and ammunition to their fellow tribesmen to supplement their firepower (Small Arms Survey, 2012b, p. 4). In an effort to stem Yau Yau's second rebellion, the SPLA allegedly supplied firearms to Lou Nuer youths prior to their attack on Pibor county in July 2013.[97] Outside initial assistance in the very early stages of the conflicts in South Kordofan and Blue Nile, the Small Arms Survey has not documented Southern military support for the SPLM–N in those states, although the GoS and several Western diplomatic sources accuse South Sudan of providing such backing.[98]

Although the Arms Trade Treaty (ATT) has introduced new international standards for arms exports, in general, it is still up to exporting states to judge whether ATT standards, such as those relating to diversion, override economic, ideological, or other factors when it comes to approving transfers (UNGA, 2013). As noted above, US and EU perspectives with respect to South Sudan have been divergent to date; following its secession, the EU decided to maintain its embargo on the entire Sudan–South Sudan region, while the United States lifted a ban on defence exports to Juba. It is too soon to say whether the ATT will lead to greater convergence on export practices concerning the region. In any case, the majority of weapons in the two countries are in the hands of non-state actors, whether through deliberate supply or accidental diversion. Lying outside state control and completely unregulated, these are the weapons that fuel insurgencies and inter-communal violence in Sudan and South Sudan.

Battlefield capture

Non-state armed groups also acquire weapons from state forces through battlefield capture, although some are more successful than others. With decreasing support from external actors, the Sudan Revolutionary Front has maintained a sizeable arsenal through its military victories against SAF. In South Kordofan, the SPLM–N captured hundreds of thousands of rounds of small- to medium-calibre ammunition as well as more than a dozen vehicles and tanks from SAF in 2012.[99] While the SPLM–N in Blue Nile have been less successful at capturing military equipment than their South Kordofan counterparts, they too have seized significant quantities of SAF weapons during battle (Gramizzi, 2013). In most instances, these weapons not only correlate with the materiel that the SPLM–N captured in South Kordofan, but also match the equipment captured from SAF in Darfur and found in the hands of Southern militias in South Sudan.

In general terms, Sudanese government stockpiles have proved to be the main source of military hardware for insurgent groups and a crucial alternative to externally sourced supplies. The rapprochement between Chad and Sudan in 2010, the regime change in Libya in 2011, and the need for South Sudan to normalize its bilateral relations with Sudan have all contributed to a reduction of arms supplies to non-state armed groups in Darfur, in particular.

In the long term, the Khartoum government's inability to secure control over its own stockpiles could harm its relationship with some international suppliers, some of whom appear quite concerned about serving as an indirect source of weapons for non-state actors, sometimes in violation of UN sanctions.

Likewise, Southern insurgent groups have captured arms and ammunition from the SPLA. In 2012–13, Yau Yau's militia secured large numbers of weapons and their associated ammunition as a result of its battlefield successes against the SPLA in Jonglei. These weapons included heavy machine guns, mortars, and several vehicles.[100]

Supply from non-state armed groups to civilians

Non-state armed groups operating on both sides of the Sudan–South Sudan border are a continuous source of arms and ammunition to civilians. In Sudan, for example, tribal militias such as those formed by Missiriya groups that receive weapons from SAF and its affiliate forces have occasionally supplied local pastoralist communities to advance their quest for land and resources in competition with neighbours (Craze, 2013).

In South Sudan, insurgent groups that receive regular supplies from Khartoum have used their arms as recruitment tools in launching attacks against SPLA installations. During his second rebellion, Yau Yau succeeded in luring thousands of Murle youths to his ranks by providing them with weapons after an SPLA disarmament programme in 2012 resulted in widespread grievances among these communities. Sometimes this practice has unintended consequences, however. When Athor armed Nuer youths in Jonglei to attack the SPLA in May 2011, for instance, the Nuer refused to obey Athor's orders, and instead used their newly acquired weapons to attack their Murle adversaries (Small Arms Survey, 2012b, p. 9).

Conclusion

Arms proliferation among non-state actors is only one facet of the conflicts in and between Sudan and South Sudan. Yet the ongoing supply of arms and ammunition to insurgents, rebels, tribal groups, and civilians has demonstrably affected levels of violence, both organized and individual, in the CPA period and beyond. Since the end of the civil war, patterns of weapons transfers to Sudan and South Sudan, and lines of retransfer within and between the countries, have influenced both local fighting and state and national political dynamics. Understanding the types of newer arms and ammunition flowing to non-state actors, as well as their origins and suppliers, is key to gaining a fuller picture of armed violence in the two countries. It is all the more important because the arms trade to and within Sudan and South Sudan has so often been deliberately shrouded in mystery.

For the peacekeeping community, donor governments, and states concerned with the proliferation of illicit weapons and diversion, the HSBA's tracing work offers some lessons. It has overcome, to some extent, the knowledge gap on arms supplies to and within Sudan and South Sudan. It has established a de facto monitoring mechanism that can quickly observe the new arrival of particularly dangerous weapons, while providing feedback to governments and exporting states about the final destination of exported arms and ammunition. It has also introduced concrete opportunities for international cooperation in efforts to clarify the diversion of arms to illicit holders.

The project's fieldwork has also provided firm evidence of ongoing arming of Southern rebels by the GoS, as well as the fragmentary proliferation that results from battlefield capture and leakage from state forces—both accidental and intentional. It has also documented the shifting preponderance of state suppliers whose weapons end up in the hands of rebels and insurgents. Weapons and ammunition produced in China, Iran, and Sudan have increasingly found their way to non-state users in Sudan and South Sudan's various conflict arenas.

But while much has been learned, much remains unknown. The minutiae of how weapons are diverted—the specific actors involved in the supply chain, their motivations, and potential rewards—can only be better understood through further fieldwork. Not only the large-scale trafficking of weapons and ammunition that may occur by airdrop, but the dimensions of smaller-scale diversion from state stockpiles and the cross-border 'ant trade' require investigation. Cooperation from exporting governments, manufacturers, and shippers in responding to tracing requests has been good, but there is scope for improvement. Such assistance is crucial to clarifying chains of custody.

The tools and techniques employed by the HSBA originate in UN panel investigations of embargo violations and illicit transfers. The recent 'privatization' of arms and ammunition tracing, conducted by experts and supported by donors, also shows strong potential in this field. In supporting such work, donors should look carefully at the 'fit'—not only the independence and reliability of the field researchers, but also the relationships that can be built with official forces, and the political context in which the work is done. The replication of this work in other conflict and post-conflict zones depends on such factors.

The expansion of independent tracing work is needed, not least because—as the work of the HSBA and others has consistently confirmed—illicit arms and ammunition proliferation know no national boundaries and countries cannot be investigated in isolation from their neighbours in the region. Indeed, Sudanese ammunition proliferates across sub-Saharan Africa, from Somalia to Côte d'Ivoire, and weapons move across borders to countries where conflict sparks demand. These dynamics suggest a need for a larger initiative that can identify flows to and within the entire region.

For the moment, arms and ammunition tracing in Sudan and South Sudan faces new challenges. Research findings have become so widely read and publicized that illicit arms suppliers now feel compelled to try to cover their tracks through the removal of serial numbers and other identifying marks. While this is a double-edged sword for suppliers—as the weapons cannot be traced definitively although they are clearly identified as diverted—it raises the bar for researchers and collaborators.

With conflicts occurring on several fronts in Sudan and South Sudan, arms and ammunition will continue to be diverted to sustain these battles. While

weapons tracing is merely one form of research that enables policy-makers and security providers to better understand the drivers and tools of conflict, it is integral for countries such as Sudan and South Sudan, where weapons are often beyond state control.

Endnotes

1 See, for example, UN (2013b; 2013c).

2 See, for example, Chivers and Schmitt (2013) on purported transfers of surface-to-air missiles from Sudan to Turkey and on to Syrian rebels. The investigation is informed by a strong knowledge of weapons identification and tracing techniques.

3 Initially known as the Sudan HSBA, the project name was formally changed to the HSBA for Sudan and South Sudan in 2012.

4 The HSBA's five core focus areas are: to investigate international, regional, and domestic transfers of arms; to assess domestic small arms stockpiles and inventories; to map and assess origins, motivations, and the distribution of armed groups; to measure the scale and distribution of mortality, morbidity, and victimization; and to examine local security arrangements and demand for weapons. See the project summary at HSBA (n.d.a).

5 Although exceptions continue to occur, few non-state groups within Sudan and South Sudan currently receive direct transfers of arms or ammunition from outside the two countries. In contrast, Ethiopia assisted the rebels during the civil war and, in earlier phases of the Darfur conflict, Chad supported some Darfur rebel groups. On Chad's relationship with the Darfur rebels, see Tubiana (2008).

6 Small Arms Survey grant application.

7 HSBA tracing reports are available at HSBA (n.d.b).

8 Some forensic labs have the ability to recover markings that are not visible to the human eye, but relatively few such labs exist in Africa.

9 Sudan is not a party to the legally binding UN Firearms Protocol, which requires import markings (UNGA, 2001, art. 8(1)(b)). The politically binding International Tracing Instrument, however, reminds all states of the importance of applying import marks (UNGA, 2005, annexe para. 8(b)), as well as other actions that improve the prospects of weapons tracing.

10 This section draws on Florquin and Leff (2014, p. 186, Box 6.1).

11 This letter has been modified and redacted.

12 While these vehicles may be sold as civilian goods, they can subsequently be converted into military vehicles. It is not always clear where in the chain of custody this type of conversion takes place.

13 Author correspondence with a UN official, 15 November 2013.

14 This section draws on Small Arms Survey (2012a, p. 2).

15 Author correspondence with a representative of the US Department of Defense, 15 November 2013.

16 'Conventional weapons' is a UN Comtrade category that includes artillery, rocket launchers, and grenade launchers, among other weapons systems, as well as their projectiles. For a list of the UN Comtrade categories analysed in this section, see Small Arms Survey (2009, p. 10, n. 18).

17 All of the alleged transfers from St. Vincent and the Grenadines—a country that does not produce any weapons or ammunition—reportedly occurred in 2009 and were categorized as

'parts and accessories for small arms and light weapons' (UN Comtrade code 930599). Whether the transfers took place or represent a coding error is not known.

18 In some cases, HSBA researchers received verifiable documentation from independent experts and journalists working in Sudan and South Sudan.

19 Third parties provided some photographic documentation to HSBA researchers; that documentation is not reflected in this list of tracing missions.

20 The main body of SSDM/A troops was located in Kodok, some 15 km from Lul.

21 This report was written and largely finalized prior to the outbreak of intra-Southern conflict between the government and supporters of former vice president Riek Machar.

22 For details on the development of the Abyei crisis, see Craze (2011; 2013, pp. 72–102). The stand-off between the GoS and GRSS over Abyei is not discussed here because the HSBA has not conducted arms and ammunition tracing there.

23 This section is based on Gramizzi and Tubiana (2013, pp. 24–32).

24 This section is based on Gramizzi (2013).

25 The Greater Upper Nile region of South Sudan includes Jonglei, Unity, and Upper Nile states.

26 Descriptions of the militias in this section draw on Small Arms Survey (2013d).

27 Correspondence from the Republic of Bulgaria to the Small Arms Survey, 5 September 2013.

28 Author correspondence with a weapons researcher, 23 September 2013.

29 Experts have suggested, although not officially confirmed, that the abbreviation 'XSD' in the contract number could refer to the Xinshidai Company. See Bevan (2012, p. 13); UNSC (2013c, p. 48).

30 The contract number on the crate bears the date 2010, which is the year the contract was signed, not necessarily the year the items were delivered.

31 JEM reportedly captured this ammunition from SAF during battle in Jaw in February 2012, according to JEM fighters.

32 These were spent cartridgres reportedly fired by SAF during battle with the SPLM–N.

33 See Small Arms Survey (2012a).

34 Author phone interviews with members of the Lou Nuer and Murle as well as officials of the UN Mission in South Sudan (UNMISS), July 2013.

35 HEAT stands for 'high-explosive anti-tank'.

36 Human Rights Watch was among the first observers to provide details of Iranian weapons in Sudan, documenting Iranian weapons among the stockpiles of SAF weapons captured by the SPLA during the civil war (HRW, 1998). The dates of manufacture of many of the weapons indicated that they had been produced in the early 1990s.

37 Author correspondence with a former UN arms expert, November 2013.

38 See CyberYana (n.d.).

39 Peter Gadet told Christian Aid that he received unmarked weapons from factories in Khartoum that were being assembled under Chinese supervision. See Christian Aid (2001, p. 13).

40 Olony's forces did not allow the Small Arms Survey to photograph its weapons, but the launchers were visually observed.

41 The SPLM–N did not allow the inspectors to photograph the landmines because they considered them SPLM–N stockpiles.

42 Sudan has not reported any exports to UN Comtrade, nor has any country reported imports from Sudan to UN Comtrade. Yet Sudan's Military Industry Corporation stated publicly that it had sold weapons to Ethiopia and Mozambique (Binnie, 2013; Alkhaleej, 2013). Sudan has also covertly supplied weapons to Côte d'Ivoire and Somalia (UNSC, 2013a; 2013b; 2013c).

43 See MIC (n.d.a.).
44 The MIC website features 7.62 × 39 mm (Maz) and 7.62 × 54R mm (Mokhtar), but not 7.62 × 51 mm ammunition.
45 Author correspondence with a researcher in the DRC, December 2013.
46 Ammunition documented by the Small Arms Survey in June, July, and August 2013.
47 See Small Arms Survey (2011).
48 Sudanese ammunition was possibly transferred directly from Sudan to the former Ivorian government in the framework of a cooperation agreement that the two governments signed in 2010 (UNSC, 2013a). Large quantities were later diverted to rebels and ultimately civilians in early 2011 (Anders, 2014).
49 The Type 80 is based on the Russian PKM, and the Type 85 is based on the Russian DShKM machine gun.
50 See Arsenal JSCo. (n.d.a; n.d.b).
51 Although Bulgaria confirmed providing technical assistance to Sudan for the production of 82 mm and 120 mm mortar ammunition in 1996–98, it did not mention assistance for 60 mm mortar rounds. Correspondence from the Republic of Bulgaria to the Small Arms Survey, 5 September 2013.
52 HE stands for 'high-explosive'.
53 Mortar rounds are ordinarily manufactured in phases. The bomb casings are usually produced first and are engraved with a manufacture date. The bombs are later filled with explosives and given a lot number, which is painted on the final product, along with the year and workshop code.
54 Author correspondence with a researcher in the DRC, December 2013.
55 Author correspondence with a researcher in the Central African Republic, February 2014.
56 Mortar tubes often lack markings. Marking plates are ordinarily affixed to the bipods and baseplates that stabilize them. The year of manufacture of the bipod and baseplate does not neceesarily reflect when the mortar tube itself was produced.
57 Email correspondence with independent arms expert, 21 November 2013.
58 RPG-7 is the original Soviet designation for this anti-tank weapon. Several countries have produced copies since it was introduced in 1962 (Jane's, 2002, pp. 434–36).
59 See Arsenal JSCo. (n.d.c).
60 Most of the weapons in the SLA–AW arsenal at the time were weapons that the group had captured from SAF during battle.
61 The 'V' denotes that it is a complete round, as opposed to the PG-7 warhead. The PG-7V ammunition is spelled 'Sinar', while the launcher is spelled 'Sinnar' (MIC, n.d.a).
62 Correspondence from the Republic of Bulgaria to the Small Arms Survey, 5 September 2013.
63 It is not uncommon for an artillery casing to be manufactured in one workshop or factory and later filled or completed at another workshop or factory.
64 Boxes containing mortar rounds manufactured in 2010 or earlier are all painted in forest green. Those manufactured in 2011 and later are all painted grey.
65 Photograph in the possession of the authors.
66 Author correspondence with a researcher in the DRC, December 2013.
67 Author correspondence with a researcher in the DRC, December 2013.
68 See, for example, UNSC (2006).
69 Correspondence from the Bulgarian government to the Small Arms Survey, October 2012.

70 The address marked on the box corresponds to the official address of Uganda's Ministry of Defence headquarters.

71 In view of the fact that the CPA imposed arms import restrictions on South Sudan, Uganda could even have purchased the ammunition on behalf of South Sudan. In this scenario, Uganda would merely have served as the technical consignee for the ammunition that was ultimately destined for South Sudan's arsenal.

72 A third but far more remote scenario is that Uganda supplied the arms to South Sudan's SPLA and the Sudan Armed Forces captured the boxes during border hostilities (such as the April 2012 battle over the oil town Hejlij). Theoretically, the SPLM–N could then have captured those munitions from the Sudanese government. This scenario is unlikely, not just because of the improbable sequence of events involved, but because the Sudanese government has no real need to keep anti-aircraft munitions on its frontlines with the SPLM–North, which has no aircraft.

73 Correspondence from the Permanent Mission of Bulgaria in Geneva to the Small Arms Survey, 23 September 2013.

74 See the heads of brass cartridges are manufactured with either Berdan or boxed primers.

75 While the colour of the markings differed—yellow on the crates in Sudan, white in South Sudan—experts believe they originate from the same factory. Given the similar construction and colour of the crates, their contents, and the nature of the information provided by the markings, it appears plausible that the boxes with white markings were simply earlier versions of those with yellow markings.

76 As stated on the HAEI website: 'Established in 1987 as project 130, the company was designed to build the local manufacturing capacity of ammunition products. In 2010, the company was restructured under the Metals and Engineering Corporation (METEC)' (HAEI, n.d.).

77 Sealant is used to attach the neck of the cartridge to the base side of the bullet.

78 See *Africa Confidential* (2012); Conflict Armament Research (2012b, p. 26); Small Arms Survey (2007, pp. 4–6); *Sudan Tribune* (2007a; 2007b).

79 The MIC website describes the 'Terab', the Sudanese version of the Chinese CQ; see MIC (n.d.b; n.d.d).

80 See MIC (n.d.g).

81 The construction and colour of Chinese-manufactured 12.7 × 108 mm ammunition is distinct and does not resemble similar-calibre ammunition produced by other countries.

82 Correspondence from the Republic of Bulgaria to the Small Arms Survey, 5 September 2013.

83 Vesti (2013); *Banker* (2005); Kamenarski (2001); *Engineering Review* (2007); 3F122 (2006).

84 Correspondence from the Republic of Bulgaria to the Small Arms Survey, 5 September 2013.

85 Correspondence from the Republic of Bulgaria to the Small Arms Survey, 5 September 2013.

86 Bulgaria voluntarily joined the EU embargo against Sudan in 2001 (Barzashka, 2013).

87 The Pleven District Court of Bulgaria convicted the former CEO of Beta for (1) misappropriating assemblies and components from the company they were managing on 23–28 November 2001 and (2) transporting without the knowledge and permission of border agents some USD 510,130 worth of assemblies and components for the 2S1 Gvozdika self-propelled howitzer in 71 cases during the period 26 November–5 December 2001. The decision was overturned and the case was ongoing at this writing (Veliko Turnovo Appeals Court, 2008).

88 An archived version of the MIC website describes the Abu Fatma as a 122 mm self-propelled howitzer with a four-person crew, combat-ready weight of 15.4 tons, and cruising and oper-

ating range of 500 km (Internet Archive, n.d.). These specifications match exactly those of the Bulgarian 122 mm self-propelled howitzer advertised on the website of Beta in 2001 (Beta Industry Corporation, 2001). The Soviet version of the 2S1 is slightly heavier at 15.7 tons, according to a 1980 technical description by the Soviet Ministry of Defence, as quoted in the Russian-language version of Wikipedia. See USSR MoD (1980), as cited in Wikipedia (2014).

89 See MIC (n.d.c).

90 This point continues to hold true now that Sudan is technically a 'foreign source' for South Sudanese groups.

91 See, for example, de Waal and Flint (2005).

92 Small Arms Survey interviews with dozens of former Southern insurgents, South Sudan, 2011–13.

93 Small Arms Survey interviews with dozens of former Southern insurgents, South Sudan, 2011–13.

94 Small Arms Survey interviews with several Yau Yau defectors, Jonglei, February 2013.

95 Small Arms Survey interviews with SSDM/A defectors, Upper Nile and Jub, July 2013.

96 Author correspondence with arms investigators, August 2013.

97 Author phone interviews with Lou Nuer and Murle community members and UNMISS officials, July 2013.

98 Author interviews with Western diplomats, Juba, South Sudan, 2011–13.

99 HSBA fieldwork conducted throughout 2012.

100 Author correspondence with a UN official close to the conflict, 15 October 2013.

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This *Working Paper* is dedicated to the life and work of Colin Hill MBE (1969–2013), expert in small arms and light weapons as well as explosive ordnance disposal, mentor, and friend.

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 current or recent contributions from the Governments of Australia, Belgium, Denmark, Finland, Germany, the Netherlands, New Zealand, Norway, the United Kingdom, and the United States, as well as from the European Union. The Survey is grateful for past support received from the Governments of Canada, France, Spain, and Sweden. The Survey also wishes to acknowledge the financial assistance it has received over the years from foundations and many bodies within the UN system.

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, sociology, and criminology, and collaborates with a network of researchers, partner institutions, non-governmental organizations, and governments in more than 50 countries.

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The Human Security Baseline Assessment (HSBA) for Sudan and South Sudan is a multi-year research project administered by the Small Arms Survey, an independent research project of the Graduate Institute of International and Development Studies. The HSBA has been developed in cooperation with the Canadian government, the United Nations Mission in the Sudan, the United Nations Development Programme, and non-governmental partners. Through the active generation and dissemination of timely empirical research, the project supports violence reduction initiatives, including disarmament, demobilization, and reintegration programmes, incentive schemes for civilian arms collections, and security sector reform and arms control interventions across Sudan. The HSBA also offers policy-relevant guidance on redressing insecurity.

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