small arms survey

ARMED ACTORS

Issue Brief

Armed Actors Issue Brief Number 2 ■ May 2013

Ad Hoc Arsenals

PSSM Practices of Selected Non-state Actors

The physical security and stockpile management (PSSM) of small arms and light weapons and their associated ammunition is a topic of growing interest to researchers and policymakers. In recent years the Small Arms Survey and other research organizations have examined national (government) PSSM practices and international standards. These analyses have shed new light on the strengths and shortcomings of existing controls and the dangers associated with poor PSSM. With some notable exceptions,[1] the PSSM practices adopted by armed groups have received far less attention. Yet their arsenals often contain similar weapons and ammunition to those of government arsenals and cause similar problems when not properly secured or maintained.

The small arms and light weapons held by armed groups pose multiple threats. Weapons that are lost or stolen from poorly secured stockpiles can fuel conflict and violent crime, both locally and abroad. Poor stockpile management practices can also lead to—or fail to prevent—the misuse of weapons issued to group members, including the abuse of civilians. Accidental explosions resulting from improper storage conditions and the inadequate maintenance of munitions can pose an acute threat to civilians living near poorly secured stockpiles. The Small Arms Survey (2013) has identified more than 20 unplanned (accidental) explosions at stockpiles reportedly belonging to non-state armed groups since 1987. Addressing these threats requires a thorough and detailed understanding

A weapons store which was locked but had no roof, housing SA-7 MANPADS and trigger packs later destroyed by a weapons disposal team. Near Kajo Keji in what is now South Sudan, May 2005. © Sean Sutton/MAG

of the PSSM practices adopted by armed groups and constraints on the types and rigour of these practices. Such an assessment is particularly crucial for local, national, and international actors working to secure non-state stockpiles in the immediate aftermath of conflict. Yet to date these topics have received little attention from researchers.

This *Issue Brief* attempts to address this gap in research by analysing the practices of groups in Colombia, Libya, and Sudan. The three groups studied are the Misrata revolutionary brigades in Libya, the Revolutionary Armed Forces of Colombia (FARC), and the Sudan People's Liberation Army (SPLA). All are large, comparatively well-resourced armed groups with explicit territorial or political objectives. While the FARC and SPLA have been around for decades, the Misrata brigades were less than a year old when their PSSM practices were assessed. The analysis of the FARC and SPLA focuses on periods when these groups were actively engaged in combat. While the Misrata brigades have remained active and prominent armed actors well after the end of the 2011 Libyan civil war, this *Issue Brief* looks primarily at their PSSM procedures several months after the conflict had ceased. Other key differences between the groups include their organizational structures and the climate, topography, and infrastructural development in the areas in which they operate.

Key findings include the following:

- Strategic and military considerations have a significant impact on the PSSM practices of armed groups, as evidenced by the avoidance of large, purpose-built depots by the SPLA and FARC, and the strong emphasis placed on concealing and protecting stockpiles from enemy attack, capture, and diversion by all of the groups studied.
- In some cases armed groups' PSSM practices are consistent with basic safety measures aimed at protecting civilian populations. Some groups, for instance, keep stockpiles of ammunition and explosives far from civilian areas.
- The case studies reveal significant variation in the type and rigour of PSSM practices, both among and within the groups studied.
- Information collected as part of this study suggests that securing armed groups' stockpiles in accordance with international best practices would require significant investment in infrastructure and in many cases could not be accomplished until after the conflicts in which they are involved have ended.

This *Issue Brief* is divided into three sections. The first briefly introduces and defines key terms. The second consists of case studies of the PSSM practices of the Misrata brigades, the FARC, and the SPLA. The conclusion identifies and explains key characteristics of the PSSM practices of non-state groups as revealed through the case studies.

Terms and definitions

This study uses the Small Arms Survey's definition of 'small arms and light weapons', which draws heavily on the widely used definition adopted in 1997 by the UN Panel of Experts on Small Arms (UNGA, 1997). For the purposes of this *Issue Brief*, the following firearms are considered to be small arms:

- pistols and revolvers;
- rifles and carbines;
- shot guns;
- sub-machine guns; and
- light machine guns.

The term 'light weapons' refers to:

- heavy machine guns;
- mortar systems with calibres of 120 mm or less;
- hand-held, under-barrel, and automatic grenade launchers;
- recoilless guns;
- landmines;
- portable rocket launchers, including rockets fired from single-shot, disposable launch tubes;
- portable missiles and launchers, namely anti-tank guided weapons (ATGWs) and man-portable air defence systems (MANPADS);
- improvised man- and crew-portable launchers for artillery rockets that are 120 mm or less; and
- improvised explosive devices (IEDs).

The term 'firearms' is used to refer to all firearms, including heavy machine guns (Small Arms Survey, 2008, pp. 8–10; n.d.).

In accordance with Small Arms Survey practices, the term 'physical security' is used to refer to measures aimed at 'provid[ing] the capability to detect, assess, communicate, delay, and respond to an unauthorized attempt at entry' into weapons storage facilities (King, 2011, p. 2). 'Stockpile management' refers to the 'safe and secure accounting, storage, transportation, and handling of munitions and weapons' (Bevan and Wilkinson, 2008, p. xxx).

Libya: the Misrata brigades

This section provides a brief overview of the PSSM practices adopted by Misrata revolutionary brigades in Libya. They controlled an estimated 75–85 per cent of non-state combatants and weapon stockpiles following the uprising against Muammar Qaddafi's regime in 2011 (McQuinn, 2012, p. 17). The overview is largely based on information gathered during unscheduled visits to six weapons storage facilities conducted by co-author Brian McQuinn between 15 March and 22 March 2012 in Misrata, Libya. The sites were selected at random and the visits took place immediately after their selection to ensure that no preparation for the visits was possible. Revolutionary brigades of different sizes managed the visited sites; visits were conducted at sites controlled by at least one small brigade (less than 250 members), medium-sized brigade (250–750

members), and large brigade (more than 750 members). This section also draws on additional information gathered by McQuinn during his doctoral research in Libya between May 2011 and March 2012, including in interviews with senior personnel in the Misratan Union of Revolutionaries (MUR) and the Misratan Military Council (MMC) (see also McQuinn, 2012, p. 13). As noted above, this case study differs from the two that follow in that it reflects post-conflict PSSM practices. The Libyan civil war was over when the site visits and many of the interviews were conducted. This helps to explain some of the key differences between the brigades' PSSM practices and those adopted by the other armed groups studied, including the storage of many munitions in large, permanent structures.

Structure and organization

As at November 2011, 236 revolutionary brigades were registered with the MUR (McQuinn, 2012, p. 32), an umbrella organization for brigade members established after the war with Qaddafi's regime (McQuinn, 2012, p. 19, n. 16).[2] The brigades ranged in size from 11 to 1,412 members, with the majority consisting of fewer than 250 members. The six largest brigades, the so-called 'super-brigades', had more than 1,000 members each (McQuinn, 2012, p. 39). Many of the larger brigades comprised four or five sub-groups of 200–350 members that effectively functioned as separate organizations.[3] Reflecting the organic and largely spontaneous nature of the uprising, few brigade members were professional soldiers when they joined. Most were private- or public-sector employees or students, or were unemployed prior to the uprising (McQuinn, 2012, p. 18). By the end of the conflict total membership in the brigades had risen to nearly 36,000 (McQuinn, 2012, p. 40).

Initially, brigade leadership was informal and the composition of the brigades was fluid as members continuously moved between units.[4] Decision making within the unit was by consensus even after groups took on more defined identities and organizational structures.[5] Ties to local communities strengthened unit cohesion. During the conflict executive committees comprising wealthy and influential residents from a particular neighbourhood provided support to units of volunteers from that neighbourhood. As the conflict progressed, brigade command structures became more formal, but brigade cohesion and loyalty to brigade leaders remained strong (McQuinn, 2012, pp. 16–20).

Small arms and light weapons holdings

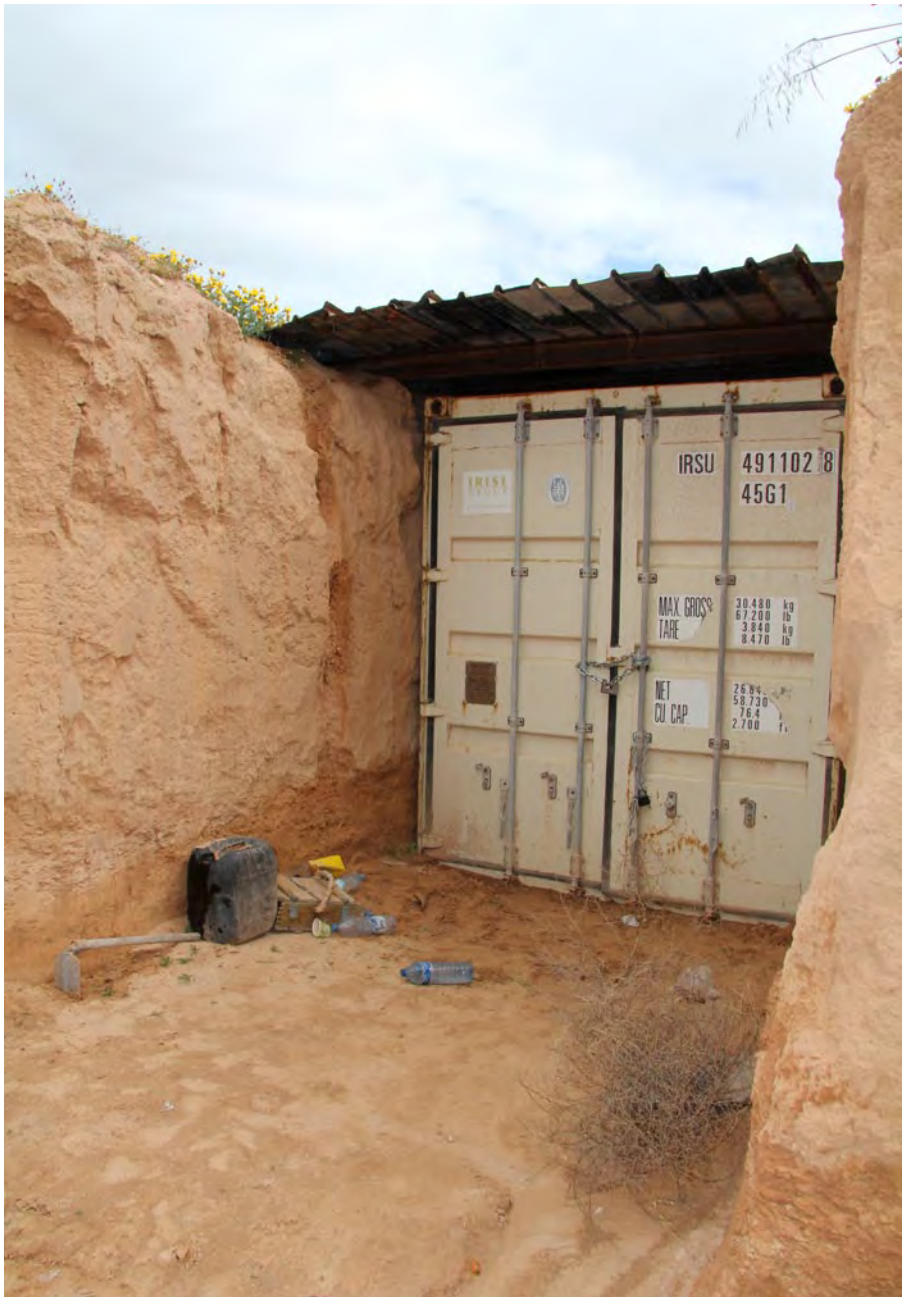
Interviews with brigade members, accounts by journalists, and photos and video footage from the conflict provide some insight into the types and quantities of small arms and light weapons acquired by the revolutionary brigades. According to brigade commanders and officials from the MMC, 75–90 per cent of the small arms used by the brigades were AK-series assault rifles. Other firearms used by the brigades include FN rifles and PK machine guns (McQuinn, 2012, p. 44). Photos and videos from the conflict reveal that anti-Qaddafi forces also acquired smaller quantities of other firearms, ranging from 19th-century carbines to modern AK-103 assault rifles and Barrett M82 anti-materiel rifles (Chivers, 2011; Jenzen-Jones, 2011; 2012).

Light weapons stockpiled by the brigades include heavy machine guns, anti-tank mines, rocket-propelled grenades (RPGs), recoilless rifles, mortars, ATGWs, and MANPADS (see McQuinn, 2012, p. 46). Some of these weapons, such as ATGWs and MANPADS, are typically subject to special storage and transfer controls by militaries because of the acute threat they pose when acquired by terrorist organizations (e.g. see OSCE, 2008; OAS, 2005). The brigades also acquired large quantities of artillery rockets designed for use with vehicle-mounted systems. During the war brigade members developed improvised man- and crew-portable launchers for some of these munitions (McQuinn, 2012, pp. 48–49). Many of these items, including ATGWs and MANPADS, remain in brigade inventories.

Storage facilities and physical security

Most of the brigades' inventories of small arms, light weapons, and ammunition were stored in commercial warehouses, ISO shipping containers, or a combination of both (i.e. shipping containers placed inside warehouses).[6] Warehouses used by the medium-sized and large brigades were generally better maintained and more robust, featuring sealed walls and floors, and proper ventilation. Warehouses used by some of the smaller brigades were little more than breeze-block (cinder-block) sheds. None of the facilities at the six sites visited in March 2012 was a purpose-built depot. Most storage facilities were located above ground, with at least one notable exception. At one site weapons were stored in shipping containers placed in 14'–16'-deep trenches (approximately the height of the containers) dug in hard-packed clay and sand. The trenches were arranged in two rows connected by a road. As facility personnel explained, the containers were placed underground during the war to protect them against Grad rocket attacks.[7]

Most of the weapons storage sites were located outside population centres. Some were in factories and business parks along the coast. The converted warehouses were generally located in commercial districts, most of which were several miles from the nearest residential area. During the war most businesses were closed and thus the number of people in these districts was minimal. However, as businesses reopen and commercial activity has resumed, the number of people working and shopping in the areas surrounding these storage sites has increased, raising concerns about



Weapon and ammunition storage container observed during a site visit in Misrata, March 2011. © Brian McQuinn.

the safety of civilians. Only one of the facilities inspected during the site visits was located in a mixed-use (residential and commercial) area. This facility was significantly smaller than the others and contained mostly small-calibre ammunition.[8]

As at March 2012 the MUR was constructing new storage facilities with the goal of consolidating the munitions currently held by its 236 member brigades into a dozen locations managed by the MMC. Given the quantity of munitions to be consolidated,[9] this is a significant undertaking.[10] The UN has been advising the MUR on the construction of the facilities to ensure that they meet basic international standards.[11]

Physical security measures adopted by the brigades evolved gradually during and after the conflict. These practices varied significantly from brigade to brigade. The largest brigades tended to have the most sophisticated and formalized measures, whereas controls adopted by the smallest brigades were generally ad hoc and less extensive (McQuinn, 2012, p. 51).

At all but one of visited sites, all weapons were locked in storage units at the time of the visit. The one (partial) exception was a warehouse undergoing refurbishment. This warehouse, which was one of several controlled by the brigade, was located roughly 50 kilometers outside Misrata in a secluded olive tree orchard. Its contents, including a Strelets surface-to-air missile system and several missiles, were stacked in large piles outside the warehouse. While there were guards for the complex as a whole, there was no fencing, external lighting, or protection from the elements. Some of the weapons, including the Strelets missiles and launcher, were rusting and coated with dust. It should be noted that, other than the contents of the warehouse being refurbished, the rest of the brigade's weapons were secured in locked storage units.[12]

Officials at all of the visited sites indicated that armed guards continuously monitored the storage facilities. During the visits at least four guards were observed at all sites. The three largest brigades provided documentation on guard patrols (duty schedules or weapon sign-out sheets) going back at least three months. The other three brigades did not keep written records of patrols (McQuinn, 2012, p. 51).

At all of the visited sites exterior doors were secured with a single padlock.[13] While the types of lock used varied from site to site, most were large commercial padlocks. During one visit the manager was unable to locate the key to the exterior door lock and had to pry it off with a crowbar. Doing so took about five minutes, providing a rough indication of the lock's strength. The use of locks on internal doors varied significantly from site to site and there was no apparent pattern to the use of locks inside the storage facilities.[14]

While most of the sites had external lighting, it was not always sufficient to illuminate the entire storage facility. Most of the warehouses had internal lighting, but, because of concerns about the condition of the wiring, it was not used at some sites. All of the facilities except for the warehouse in

the olive grove described above were either fenced or walled.[15]

Many storage facility personnel knew little about the advanced weapon systems in their holdings because they did not use them during the fighting. Munitions were often sorted by size or appearance rather than by hazard division,[16] and weapons were often stored in close proximity to their ammunition. At one site brigade members had stacked approximately two dozen loose SA-7 missiles onto a pallet, including several partially assembled units (i.e. missiles and batteries) and at least one fully assembled unit (missile, battery, and gripstock). Some munitions were placed on pallets, while others were stacked directly on the floor. While many of the weapons and rounds of ammunition were stored in shipping crates, large piles of loose ammunition were also observed. At one warehouse dozens of loose RPG rounds were haphazardly piled in a corner.[17]

None of the facilities visited was temperature controlled. While a few fire extinguishers were on hand at some locations,[18] fire-fighting equipment was minimal. Brigade leaders regularly indicated their concern about the storage conditions and the risk of unplanned explosions, which in part explains the initiative to construct new storage facilities and consolidate the brigades' weapons and ammunition.[19]

The facilities also lacked alarm and intruder detection systems, although the lay-out, level of activity, and communal nature of the complexes in which storage facilities were located reduced the likelihood of unauthorized access by outsiders. The areas surrounding the storage facilities were often social hubs for brigade members. Consequently, a dozen or more people were often present in the complexes at any given time. Furthermore, brigade members knew each other very well, making it difficult for outsiders to surreptitiously enter the compound, gain access to storage facilities, and smuggle out weapons.[20]

Stockpile management

As explained above, stockpile management practices include measures that promote the 'safe and secure accounting, storage, transportation, and handling of munitions and weapons'. While data limitations preclude a complete accounting of stockpile management by the Misrata brigades, site visits and interviews with leaders of the MMC and MUR suggest that the practices observed during the visits were indicative of those of the other brigades.[21] Interviews with brigade leaders also shed light on several key practices, including access control, inventory management, and end-use restrictions.

Each of the brigades that were visited had designated a facility manager who oversaw the day-to-day operations of the facility and in many cases also served as the brigade's procurement officer. The manager controlled access to the depots, monitored the sign-in and sign-out sheets, inspected the stockpile facilities, and ensured that rough estimates of the weapons stockpiles were kept.[22]

The vast majority of brigades, including the smaller ones, generally prohibited access to—and use of—light weapons by their members. For example, at all six visited sites, the use of vehicles equipped with machine guns required written authorization from the MMC, copies of which were retained by facility managers. During the visits facility personnel at all of the sites were able to provide examples of these authorizations (McQuinn, 2012, p. 52). Restrictions on access to other types of light weapon such as RPGs were not as formalized.[23]

Controls on small arms were generally less rigorous and less standardized, particularly among the smaller brigades. While most brigades compiled detailed lists of small arms in their inventories, of the six brigades whose facilities were inspected, only the three larger brigades kept written records of weapons issued to their members and required members to sign out weapons while on duty (McQuinn, 2012, p. 54). The brigade with the strongest controls required that small arms issued to members be stored in brigade facilities. At this facility the verbal consent of members' commanding officer was required before facility personnel could release the members' weapons to them.[24] In contrast, leaders of the smallest brigade, which had only 30 members, explained that control over firearms was the responsibility of individual members.[25]

In an attempt to formalize end-use restrictions on the usage of small arms, the MCC drafted and distributed a standardized declaration form to be signed by all brigade members. By signing the form, each member made the following pledge: 'to use the weapon in my possession only to defend myself, my honour, and my country, not to misuse it or expose it or theft, nor to hand it over to anyone, no matter what the circumstances, unless the group asks me to do so' (McQuinn, 2012, p. 24).

Differences in lock-and-key controls were also apparent. At facilities managed by medium-sized and large brigades, only one person (the site manager) held the keys to weapons storage facilities. At two sites the site managers were unavailable, resulting in significant delays, but also underscoring adherence to restrictions on the distribution of keys. Key control at sites operated by the smaller brigades was less formalized. This was due in part to the fact that individual members were responsible for their small arms, which were normally stored in their places of residence.[26]

At the time of the visits none of the brigades conducted detailed physical inventories of weapons or ammunition. During the conflict they provided lists of their weapons to the military councils, but in most cases the lists included only the type and quantity of items. More detailed information, including serial numbers and other identification markings, was rarely systematically recorded.[27]

Conclusion

The PSSM practices adopted by the Misrata revolutionary brigades varied significantly. As explained above, PSSM practices adopted by medium-sized and large brigades were more rigorous and more formalized, and were implemented more systematically than those adopted by their smaller counterparts. Yet even at storage sites managed by the larger brigades, PSSM practices often reflected a lack of knowledge about the various munitions acquired by the brigades and inadequate experience with PSSM. Any increased risk of diversion was partially offset by key characteristics of the brigades, including their high unit cohesion, stable membership, and the communal nature of the complex in which storage facilities were located. Similarly, the placement of many of the storage facilities away from residential areas helped mitigate the potential threat to civilians from unplanned explosions.

Colombia: Revolutionary Armed Forces of Colombia

This section provides a brief overview of the PSSM practices of the FARC, Colombia's largest and most prominent insurgent group. Most of this section is based on information obtained through interviews with former FARC members conducted by researchers at the Conflict Analysis Resource Centre, a Colombia-based research centre that has worked on conflict and disarmament, demobilization, and reintegration issues in Colombia since 2005. News reports and other sources were used to supplement information provided by the former combatants.

All of the former combatants interviewed, some of whom were demobilized as recently as 2010, had extensive experience in the group (between eight and 20 years). For the most part they described current practices. They belonged to different structures and played different roles. Two of the former combatants operated mainly in rural areas, one of them in the north-west region of Colombia and the other in the south-west. One of the others operated in both rural and urban areas of the north-eastern region. The final former combatant operated predominantly in urban areas, specifically as a member of militias located in Bogotá.

Structure and organization

The FARC was established in 1964 to promote land tenure reform and to take political power through armed struggle. Its internal structure has undergone several changes and its current structure is similar to that of the Colombian armed forces. The FARC's structure is hierarchical and is divided into the following units: squads (12 members), guerrillas (two squads), companies (two guerrillas), columns (at least two companies), fronts (at least two columns), and blocks (five or more fronts) (FARC, n.d).[28]

The FARC's order of battle includes a hierarchical structure of command and control and specialization of roles for its members. The chain of command consists of the following hierarchy, in ascending order: squad deputy, squad commander, guerrilla deputy, guerrilla commander, company deputy, company commander, column deputy, column commander, front deputy, front commander, block deputy, block commander, Central High Command deputy, and commander of the Central High Command (FARC, n.d.). In addition, urban militias are affiliated to the FARC which are organized as cells[29] and 'mobile columns' that function as 'special forces'.

Changes in the FARC's use of violence and its arsenals that occurred between 2006 and 2008 have affected its organization (Granada, Restrepo, and Vargas, 2009). In recent years the FARC has changed its strategy from a war of movement (around which its military hierarchy is structured) to one of guerrilla warfare.[30]

Cache of explosives and small-calibre ammunition found in Nariño, Colombia, May 2010.
© Ejército Nacional de Colombia.

As part of this change it has focused on the use of explosives—mostly in the form of IEDs used against Colombia's armed forces—and harassing attacks on public forces instead of the prolonged seizure and occupation of territory.

Small arms and light weapons holdings

Precise data on the FARC's membership and holdings of small arms and light weapons is unavailable. The Colombian government estimates that the FARC has between 8,000 and 9,000 members (Semana.com, 2012). The recruiting base, according to official FARC documents, is mostly peasants and youths between 15 and 30 years of age (FARC, n.d.).[31] Former combatants interviewed for this study generally indicated that the types of weapon most used are AK-47, M16, and Galil rifles,[32] and 9 mm pistols. They also claim that the FARC has acquired mortars, grenades, and craft-produced weapons, including firearms and gas cylinders loaded with explosives. With regard to explosives, they indicated that the FARC has used C4 and ANFO, some of which the group is able to produce itself.[33]

Every FARC front has a specialist in small arms, light weapons, and explosives who coordinates the transportation, storage, installation (in the case of explosives), and repair of the front's weapons and ammunition.[34] This person, who is typically referred to as the *'armero'*, is usually a long-time member of the group and has gained the trust of the front commander. Individuals with expertise in explosives are referred to as *'explosivistas'* and are highly respected, not only because of the risk involved in handling explosive devices, but also because of the strategic value of explosives in the FARC's operations. 'Explosives are not a game, [they are the] most serious thing for the FARC', observed one of the former combatants. '[E]xplosives have a higher value for the FARC than small arms.'[35]

Storage facilities and physical security measures

The FARC's storage practices vary depending on the type of weapon and whether the weapons are stored in rural or urban areas.[36] Small arms and their ammunition are usually stored together.[37] Explosives are stored separately, not only for safety reasons, but also because they require special storage arrangements, i.e. dry conditions and cool temperatures.[38]

Although physical security measures implemented by the FARC in rural areas are more or less homogeneous, there are no formal protocols to instruct FARC members on PSSM. Front commanders or senior members of the organization provide PSSM training.[39] Also, some of the former combatants said that a few FARC members have received training in the use of explosives, firearms, and military strategy from foreign 'consultants', including 'people from Iran' and 'individuals with links to the Basque terrorist group ETA'.[40]

In rural areas the FARC usually stores small arms, light weapons, and ammunition in plastic bins underground. The former combatants underscored the importance of properly greasing the weapons before burying them, which helps to prevent them from rusting.[41] These stockpiles have a minimum size of one square metre.[42] The FARC also stores arms and ammunition in caves, hollow trees, and other places. Placement and concealment techniques vary from front to front, and depend more on the geographical conditions of the area and the abilities of the individual concealing the weapons than on the instructions given by the group.[43]

Most stockpiles in rural areas are located in remote and sparsely populated regions, such as rainforests, where thick vegetation helps to conceal the weapons.[44] For security reasons, FARC members in charge of storing weapons, called *'caleteros'*, do not keep written records of the locations of stockpiles. Instead they rely on their memories and knowledge of the land to find the stockpiles.[45]

The FARC tightly restricts information on the location of stockpiles. Only one or two *caleteros* designated by the front commander know the location of weapons stockpiles. Given this secrecy, security guards, locks, and other physical security measures are often considered unnecessary and are only occasionally used, according to the former combatants interviewed for this study.[46]

The former combatants identified two basic characteristics of stockpiles: they should be difficult to access and well concealed. Stockpiles are often dug into the banks of rivers and the displaced earth is then carried away to ensure that the area surrounding it is inconspicuous.[47] Sometimes flora from the area is planted around the stockpile to conceal it better.[48] Explosives are not stored underground, but are usually covered with plastic and hidden under a table-like arrangement of vegetation from the area. To prevent unplanned explosions, explosives are stored without igniters or any type of electric device.[49] The former combatants who were interviewed knew of no additional physical security measures.

In urban areas arms, ammunition, and explosives are stored in the homes of militia members and in houses owned by the FARC. These houses are located in marginalized and densely populated neighbourhoods. The weapons, which often include rifles, revolvers, pistols, 7.62 mm and 7.65 mm ammunition, and explosives such as C4 and ANFO, are stored in boxes that are hidden in fake ceilings, closets, or small rooms. According to the former combatants, physical security measures applied to these stockpiles were minimal because of the need for immediate access to the weapons.[50]

Stockpile management

Stockpile management practices adopted by the FARC have changed very little since 2006, with some exceptions. One notable change was

implemented in response to the loss of weaponry because of demobilizations. According to the former combatants, prior to 2002 the FARC usually stored between 100 and 200 rifles in each stockpile. In recent years, however, to minimize the loss of weapons as a result of raids by government forces acting on tip-offs from demobilized FARC members,[51] it began to reduce the number of arms per stockpile to between 20 and 40 rifles.[52]

Every FARC front maintains detailed inventories of its small arms, light weapons, ammunition, and explosives. These inventories are confidential and are recorded in the *caletero*'s digital file or accounting books, access to which is restricted and controlled by the front commander. Each front retains control over the weapons and ammunition issued to each member. After ideological and military training, new FARC recruits receive an assault rifle—usually an AK-series rifle—and between four and eight magazines of ammunition, which are recorded in the personnel file[53] of each member. The FARC leaders use these records to hold individual members accountable for the weapons and ammunition issued to them.

Personnel files contain the serial number of the firearm and the amount of ammunition issued to each member.[54] After each military operation or task, members must report the number of rounds of ammunition expended to the commander, who then subtracts that number from the running total of issued ammunition recorded in the members' files. In addition, front commanders regularly inspect all issued weapons. Approximately every six months the front commander consults with the *caletero* regarding the state of stored weapons and simultaneously checks each weapon issued to individual squad members. During these inspections each weapon is checked and all ammunition is counted. The details of these inventories are noted in the records of each FARC member in the unit.[55] Instances of lost or stolen weapons must be explained to the front commander, who can forward the case to the 'council of war' for its consideration if the explanation provided by the individual who committed the offence is not satisfactory.

Explosives are also tightly controlled. FARC members usually produce only the exact amount of explosives they need for a particular military operation. The quantity and type of explosives and the ignition devices (detonators, fuses, and cables) used are recorded and the explosives are temporarily placed in storage until the operation for which they were produced takes place.[56]

Generally, in rural areas requests for firearms and ammunition are submitted through the chain of command. Combatants must inform the commander of their need for new weapons and ammunition and must justify their request.[57] If the request is deemed appropriate, the commander orders the person in charge of storing the weapons to deliver the items to the requestor. In some fronts stockpile managers maintain written records of these requests, while in others no written records are kept.[58]

Access to storage facilities and stockpiled weapons in urban areas is less controlled than in rural areas. The leader of each urban cell keeps track of the weapons received without reporting their location to the other members of the cell. Militia members are usually not issued with a firearm. When they are assigned a task that requires the use of weapons, they must return the weapons after the task is completed. Members of each urban cell are collectively responsible for weapons and explosives in their possession.[59] In other words, if the weapons are stolen or lost, all the members of the cell are punished.

Weapons are highly valued by the guerrillas. In fact, all interviewees said that weapons 'are more valued than the combatants'.[60] For FARC members, the penalties for losing, damaging, or stealing a weapon vary according to the severity of the infraction. Usually these acts are considered to be serious crimes. The punishments are ordered by a 'council of war' and range from collecting firewood and making latrines to the death penalty.[61]

As a result of the severity of the punishments, theft and loss of weapons are rare, according to the former FARC members.[62] Most weapons lost by the FARC are seized by the Colombian government, which often learns of their location from demobilized members. These raids and the subsequent loss of weapons help to explain the strict controls on access to weapons and explosives, which is usually limited to individuals selected by the front command who demonstrate a high level of commitment to the organization.[63]

Conclusion

The PSSM practices adopted by the FARC are not highly technical and are primarily based on the knowledge acquired by the organization over several decades of insurgency. However, the likelihood of the theft or loss of weapons is reduced by the command structure, the severity of punishments for the loss or diversion of weapons and ammunition, and the value given to the weapons.[64]

The PSSM practices adopted by the FARC vary from front to front and between rural and urban areas. The organization's ability to store weapons in remote areas without leaving evidence and its strategies to avoid detection by the authorities in urban centres are often viewed by the FARC as adequate substitute for guards, locks, lighting, fencing, and other physical security measures.

Although there are few, if any, formal PSSM protocols, the trust placed in people responsible for these functions in the FARC and the tight control over information about stockpiles are the FARC's most effective measures to control access to weapons and avoid detection by authorities. Also, the specialization of functions (e.g. the division of functions and responsibilities among *'armeros'*, *'caleteros'*, and *'explo-*

sivistas') facilitates control and minimizes the risks of theft and the diversion of the FARC's weapons and ammunition.

Sudan People's Liberation Army, pre-2005

This section assesses the PSSM practices adopted by the SPLA during the civil war it fought against the Khartoum-based government between 1983 and the signing of the 2005 Comprehensive Peace Agreement (CPA). The analysis is based on multiple interviews conducted by Small Arms Survey staff and consultants in South Sudan in 2012 with former SPLA members and experts with first-hand knowledge of SPLA practices.[65] Former members currently occupy the majority of leadership roles in the newly elected Government of South Sudan and in the new professional military and security sectors. The individuals who were interviewed performed a range of roles and held various ranks in the group. It must be noted that the information presented below represents general SPLA practices. Conditions and practices probably varied from location to location and at different time periods (Glickson, 1995; Johnson, 2003). The war spanned 22 years and was fought over a large area that was almost completely lacking in infrastructure. During that time different levels of organization, coordination, and capacity were in place. The following therefore represents general, rather than universal, SPLA practices.

Structure and organization

The SPLA was one of several southern-led rebel groups that took up arms against the Khartoum-based government since Sudan's independence in 1956. Southern Sudan had long been marginalized politically and economically within Sudan (Johnson, 2003). This inequality led to persistent fighting between the north and south (Johnson, 2003, p. 29). A peace agreement signed in 1972 halted the fighting for the 11 years prior to the founding of the SPLA. However, the agreement failed to resolve the key underlying grievances, so a return to conflict was almost inevitable (Johnson, 2003, p. 63).

The SPLA was officially formed in July 1983, following a mutiny involving a battalion commanded by southern officers in the Sudanese army (Johnson, 2003, pp. 61–62). Originally the goals of the SPLA were greater political and economic equality between northern and southern Sudan, not a separate state. As the conflict progressed, however, secession became the goal (Metelits, 2004, p. 70). This would be realized in 2011, when South Sudan officially became recognized as an independent state. Today the SPLA is the new state of South Sudan's military.

The leadership of the SPLA was highly trained. Many were former officers in the Sudanese Armed Forces (SAF)[66] who received training at a regionally respected officers' training school (Metz, 1991, pp. 253–54). The SPLA leader, Dr John Garang, was among those with a formal military education background. Prior to leading the SPLA, Garang served as a colonel in the Sudanese army and head of the Staff College (Johnson, 2003, p. 61). As part of his Sudanese army career Garang went on to receive additional training in the United States prior to the war (Metz, 1991, p. 262).

The lower ranks of the SPLA possessed significantly less prior training and education. Some of the ranks comprised previously enlisted SAF soldiers. However, most combatants were enlisted civilians, including children. The average fighter joined the SPLA with very little formal education. Illiteracy rates among SPLA members was a reflection of the wider South Sudanese society, i.e. extremely high, which remains true today (Rands, 2010, p. 25). Prior to joining a unit, most fighters received military training from the SPLA at a training camp based in Ethiopia.[67] Many of the fighters, however, were not full-time professional combatants. In fact, even during the war many SPLA fighters kept their civilian occupations and only served when requested (Metz, 1991, p. 262).

During the war the SPLA was estimated to be about 150,000 strong and was divided into conventional military structures, i.e. divisions, brigades, battalions, companies, platoons, and squads. Each division comprised about 10,000 soldiers and was divided into brigades that had about 3,000-plus soldiers. Brigades were divided into battalions comprising up to 1,000 soldiers each. Each battalion was further divided into smaller groupings of companies (135–145 soldiers), platoons (35–45 soldiers), and squads (12–14 soldiers).

Small arms and light weapons holdings

Every member of the SPLA was allocated one service rifle and four to five full clips of ammunition.[68] Kalashnikov-pattern assault rifles were the predominant type of small arms issued to SPLA fighters. According to one interviewee, the Kalashnikov was believed to be a superior combat firearm to the other options.[69] Other rifles were available to the SPLA as well. G3-variant rifles, for instance, were frequently captured from SAF.[70] According to interviews, however, once seized, they were rarely used by SPLA fighters.[71] One likely reason was the scarcity of suitable ammunition (7.61 x 51 mm) (King, forthcoming). Instead, they were often traded to the community for goods (such as food) or distributed to local chiefs and civilians for local defence.[72]

The primary light weapons acquired and used by the SPLA included heavy machine guns (12.7 and 14.5 mm), RPGs (particularly RPG-7 variants), and mortars (60 mm). Larger vehicle-mounted weapons systems were on occasion captured from Sudanese forces (Metz, 1991, p. 207). These included anti-aircraft cannons like the ZU-23, BM-21 rocket launchers, and howitzers (Metz, 1991, p. 206).[73]

While the models of guided light weapons held by the SPLA were limited

(Berman and Leff, 2008, p. 13),[74] recent evidence suggests that it did acquire significant quantities of certain types, including SA-7 MANPADS. Since the signing of the CPA, multiple SA-7s, including complete systems and parts (the launch tubes or grip stocks), have turned up in the South in abandoned civil-war-era caches. At one site the Mines Advisory Group reportedly found 22 SA-7s (MAG, 2011). There is no evidence that the SPLA had acquired more advanced or later generation MANPADS.[75]

SPLA holdings of ATGWs appear to have been limited. Three MILAN ATGWs were found in a large abandoned pre-2005 SPLA stockpile in Eastern Equatoria, South Sudan (MAG, 2011). Reports of SPLA-owned ATGWs are rare, as revealed by previous Small Arms Survey research (see Berman and Leff, 2008, p. 33). One interviewee stated that ATGWs were in fact more numerous than reported in open sources, although he did not specify numbers or the types used.[76]

Storage facilities and physical security

The PSSM of armed groups are often different from those of a state army, and the SPLA was no exception. These differences are to a large extent explained by resource limitations and strategic considerations. In general, groups like the SPLA seek to counter the superior conventional military strength of the state through mobility and surprise. Given the inferiority of the SPLA's arsenals, defending fixed positions was not always possible or an efficient use of resources (Glickson, 1995, p. 7). SAF maintained air supremacy throughout the war and air raids were viewed as a major threat to the SPLA, including to its arms stockpiles. As a result, avoiding aerial detection factored heavily into the SPLA's weapons storage practices.[77]

For the most part, the SPLA avoided the use of large, permanent storage facilities.[78] Sudanese-built barracks and armouries were periodically seized by SPLA forces, but they were rarely used for weapons storage because they were difficult to conceal from SAF aircraft.[79] These facilities were visible from the air, and as the former tenants, SAF knew their locations well. Instead, the SPLA tended to use storage facilities that could be hidden from aerial detection. Natural canopies (trees and rock formations) were used to conceal stocks.[80] Storage locations that blended into the surroundings when viewed from above were preferred.

SPLA storage sites included both human-made structures and natural settings. *Tukols* were the main type of structure used as storage facilities. These are mud huts (sometimes made with local bricks) that are used throughout South Sudan as homes, churches, and places of business. Most *tukols* have grass roofs, although some roofs and doors are made from metal sheets. The building materials used in *tukols* possessed some qualities that were conducive to storing weapons. A *tukol* with a new roof will repel water and maintain a lower inside temperature. However, the grass roofs are extremely flammable and the walls do little to reduce the blast effect of an unplanned explosion. The composition of the doors and roofs also provides little security against unauthorized access.

The SPLA also stored weapons and ammunition in pits and under tarpaulins.[81] Storage pits were often lined with plastic in an effort to repel water. Simple shelters were also constructed with tarpaulins placed between trees. These tarpaulins were used both to block the rain and conceal the items underneath.

The size of the storage facilities varied depending on the number of items the site was meant to accommodate. These 'mobile stockpiles' could service a single unit or an entire battalion.[82] The facilities were either pre-existing structures that were commandeered for weapons storage, such as *tukols*, or could be constructed within a matter of hours, like the storage pits. This gave the SPLA the flexibility to relocate materiel as needed.

The types and placement of storage facilities reflected the SPLA's focus on protecting its weapons and ammunition from aerial attack. However, because stockpile facilities were not viewed as permanent, investments in conventional PSSM infrastructure were not made. Few, if any, fences were erected around stockpiles, and the mud walls, thatched roofs, and dirt floors of many *tukols* provided limited protection against unauthorized access.[83] Tent shelters or pits were even more vulnerable to unauthorized access.

The SPLA used a limited number of security-enhancing measures at its depots. The most common physical security tool consisted of the placement of physical barriers leading up to stocks. This might include checkpoints on roads and the placement of obstacles and landmines around stockpiles.[84] Padlocks on external doors were used on some *tukols*, but not all.[85] The lack of electricity in most of the country also prevented the use of many security systems. Internal and external lighting, motion detectors, cameras, and alarms were usually not options.

Although the standard features of modern storage facilities were not part of the SPLA's practice, protecting stocks of weapons and ammunition was a major priority. According to one high-ranking SPLA officer, the primary security threats to the stockpiles were seizure or destruction by SAF, damage caused by fire or water, and the leakage of weapons and ammunition to civilians.[86] Strategies were developed to deal with these threats. The strategies varied by weapon type, including the size of the weapons and the way in which they were used by the SPLA.

All small arms and RPGs were kept in close proximity to the fighters.[87] These stockpiles were often stored in the centre of a base with guards to restrict access. This served several purposes. First, it was a strategic decision because these were the weapons of greatest utility in repelling SAF

Ordnance stored in a destroyed mosque in Morobo, in what is now South Sudan. Explosive materiel was left exposed to the elements. This stockpile was later safely destroyed by a weapons disposal team, May 2005. © Sean Sutton/MAG

attacks. They were also the easiest weapons to transport in the event that the unit had to retreat from the area. Finally, small arms and ammunition carried the greatest risk of theft, given the high demand for them among the civilian population. The SPLA hoped to reduce theft by placing the arms in a central location.

Mortars and artillery rounds were typically stored in fixed locations away from troops.[88] Their weight made it difficult to transport large quantities of munitions. This meant that in the event of a retreat, the SPLA would not be able to transport the entire stockpile, and thus it would probably be lost to SAF. Efforts were made to conceal these items from easy detection by, inter alia, burying them in pits. Roving patrols would check remote storage locations, but guards were not stationed at them around the clock.

While no source identified safety as a motivation, the practice of storing high-explosive munitions in remote areas away from SPLA bases and villages did protect people from potential unplanned explosions. It is unlikely that the placement of these munitions sites was based on empirical assessments of the area likely to be affected by an unplanned explosion. Instead, local topography guided decisions on storage site placement.

Stockpile management

The SPLA compiled and maintained written inventories of its weapons and ammunition throughout the war.[89] As one interviewee explained, 'every bullet had to be accounted for'.[90] However, this claim was not verified as the Survey did not observe any of these records. The logistics officer assigned to each unit was responsible for maintaining records of the unit's weapons and ammunition, along with other items such as fuel.[91] After each engagement ammunition and inventory records were adjusted. Information on issued weapons and reserve stocks was used in planning both offensive and defensive operations. Records were sent up the chain of command and were eventually stored at SPLA headquarters. Accounting data was necessary to guide operations and direct supply distribution decisions, which were highly centralized in the SPLA.[92]

Each unit also kept records of the weapons and ammunition issued to individual members. Commanders routinely conducted inspections of members' weapons and ammunition prior to and after military operations.[93] Fighters were expected to account for any discrepancies between records of issued weapons and their holdings at the time of the inspection, and all such discrepancies were recorded. Punishment for missing weapons and ammunition could be severe, including imprisonment (SPLM, 2003, sec. 39; Bangerter, 2012, p. 63). Inspections were important as SPLA soldiers were known to trade ammunition and weapons with villagers, primarily for food.[94] To minimize the loss of arms and ammunition resulting from these exchanges the SPLA banned them unless a higher-ranking official approved

them.[95] Lower-ranking soldiers who engaged in the unauthorized sales or bartering of weapons were subject to disciplinary measures, including corporal punishment.

The SPLA established record-keeping protocols specifically suited to the ways in which the soldiers served. Soldiers were permitted periods of non-active duty, during which they were required to always carry their service rifle and ammunition. The SPLA established a paperwork trail to follow each soldier, including during periods away from the fighting. Military Form 1 was a departure notice that soldiers were required to keep on them at all times as they travelled.[96] This form identified the weapon and the amount of ammunition issued to the soldier. Each soldier would present this form at military checkpoints and weapons 'parades', during which SPLA members on leave were occasionally requested to present their weapons.

The SPLA also performed serviceability audits on its weapons and ammunition.[97] It is doubtful, however, whether these audits were widespread or frequent. Much of the requisite knowledge was held only among the top leadership of the SPLA engineering corps. The lower ranks of the corps lacked the training required to assess the serviceability of stockpiled munitions.[98] This limited capacity was illustrated during an interview where a former SPLA engineer described his technical training as having been limited to the placement and removal of landmines.[99]

Conclusion

During the rebellion the SPLA implemented PSSM practices that were very different from those adopted by conventional armies. These practices reflected the risks and realities of conducting insurgency against a better-armed adversary in under-developed areas and with limited resources. The Sudanese government's air superiority forced the SPLA to forgo the usage of purpose-built depots seized from government forces in favour of less-robust structures that were easier to conceal and protect. The SPLA's emphasis on mobility also shaped the security measures that it put in place. In lieu of physical security measures, which were minimal, the group adopted numerous practices aimed at tracking and accounting for inventories of arms and ammunition. These practices reflected the SPLA's priorities, limitations, and constraints during the insurgency. As it transitions to a professional governmental institution, however, the SPLA must continue to adopt more conventional PSSM practices.

Conclusion

The case studies highlight several notable characteristics of PSSM practices adopted by armed groups, including significant variations in practices between and within the groups studied. Controls adopted by the larger Misrata brigades, for example, were generally more extensive and robust than those adopted by smaller brigades. The three largest brigades studied maintained written records of guard patrols and weapons issued to individual members, and imposed tight controls on access to keys for storage facilities. The largest brigade also required that all small arms—including those issued to members—be stored in brigade facilities. These practices were not implemented by many of the smaller brigades. Interviews with former members of the FARC reveal similar differences in the PSSM practices of different units.

The case studies also reveal important differences between PSSM practices adopted by non-state groups and those recommended for governments in international PSSM best practice guides. Of the three groups studied, none stored their weapons in purpose-built depots: storage facilities ranged from commercial warehouses to private homes. Some of the structures used as storage facilities were reportedly little more than mud huts and many weapons were not stored in 'facilities' at all. As noted above, the FARC's rural units often stored their weapons in plastic bins buried underground. Similarly, the SPLA stored certain types of weapon and ammunition in plastic-lined pits and under tarpaulins hung between trees. The case studies also indicate that the groups rarely, if ever, equipped their storage facilities with intruder detection systems, armoury vault doors,[100] or security lighting, or stored weapons separately from ammunition, as prescribed by best practice guides (see OSCE, 2003; 2008).

These differences are not necessarily indicative of a lack of concern about stockpile security. In many cases they reflect military considerations and infrastructural and resource constraints. A good example of the former is the SPLA's storage of weapons in *tukols* and plastic-lined pits rather than seized government-built armouries or other large, permanent structures. As explained above, such facilities were more easily located by the Sudanese government and were therefore more vulnerable to air raids and seizure by Sudanese troops. While the former FARC members interviewed for this study did not identify this concern explicitly, it is likely that it applied to the FARC as well, given the Colombian military's air supremacy and frequent raids on FARC positions. Thus, for these groups, storing their weapons in purpose-built depots as prescribed by international best practices would probably have imperilled their arsenals.

Statements by former group members and steps taken by the groups to secure their stockpiles also reveal an active commitment to preventing the theft, loss, and seizure of their weapons. As noted above, the former FARC members indicated that the group's weapons 'are more valued than the combatants'.[101] While perhaps a bit overstated, the lengths to which the

FARC went to conceal the locations of stockpiled weapons, track and account for weapons and ammunition issued to individual members, and prevent unauthorized access to stored weapons suggest that safeguarding weapons and ammunition was a high priority. The same is true to varying degrees of the other groups studied.

Existing evidence suggests that the groups took fewer steps to prevent unplanned explosions of stockpiled weapons or to minimize the potential damage caused by such explosions. Most of the structures in which weapons were stored were not designed to contain the blast or debris resulting from an explosion. Furthermore, there is no evidence that the groups systematically identified the distance at which residential and commercial buildings would be safe from the effects of unplanned explosions and then built storage facilities beyond this distance. Their tendency to bury stockpiles of explosive munitions in remote locations helped to mitigate the threat from such explosions, but it is unclear whether—and to what extent—concerns about explosions and their impact on civilians were factored in to the placement of stockpiles.

The extent to which the PSSM practices adopted by the armed groups studied succeeded in preventing the diversion and unplanned explosion of weapons and ammunition is difficult to determine, as is their effectiveness vis-à-vis the conventional PSSM practices adopted by many governments. Data on the theft, loss, and diversion of weapons from armed groups' stockpiles is extremely scarce, and the little data on diversion from government stockpiles is largely limited to depots in countries that are outside conflict zones, making any comparison with armed groups dubious at best. As noted above, the Small Arms Survey has identified more than 20 unplanned explosions at armed groups' stockpiles, but information on the extent to which these explosions are related to PSSM practices is often sparse. Better and more detailed data on unplanned explosions and the diversion of weapons from non-state and government stockpiles in conflict zones would shed important light on these questions.

Finally, the SPLA's and FARC's emphasis on secrecy and concealment reflects tactical and strategic challenges that most government militaries do not face, calling into question the applicability of at least some international PSSM best practices to armed groups. Many groups do not have uncontested control over the territory in which they operate and therefore their stockpiles are perpetually vulnerable to government raids or air operations. Under these circumstances the consolidation of weapons holdings in large, purpose-built depots with perimeter fencing, clear zones, and continuous external lighting as prescribed by some best practice guides would significantly increase the likelihood of the detection and capture (or destruction) of stockpiles by government forces. Such constraints also render other physical security requirements unfeasible or impractical. For example, the dispersal of armed groups' holdings in small, well-concealed stockpiles in remote locations with little or no infrastructure makes the installation and maintenance of electronic intruder-detection or closed-circuit television systems difficult or impossible. These constraints are less applicable to armed groups that securely hold their territory like the Misrata brigades, but such groups are the rare exceptions.

Recognition of the constraints confronting armed groups in securing their stockpiles should not be confused with the dismissal or acceptance of the risks associated with not implementing conventional PSSM practices. Instead, these constraints highlight the need for further analysis of armed groups' PSSM practices and for adjustments to conventional PSSM best practices in ways that would expand their applicability to a broader array of armed actors. The case studies also underscore the lack of technical expertise required by armed groups to safely store diverse types of weapon and ammunition for long periods. The provision of external expertise therefore appears critical to securing non-state stocks in the immediate post-conflict phase. ■

Notes

Funding for this *Issue Brief* was provided by the US Department of State's Office of Weapons Removal and Abatement.

1 See Bangerter (2012, pp. 59–65); Bevan (2006, pp. 278–86); Florquin, Bongard, and Richard (2010, pp. 317–26); and McQuinn (2012, pp. 43–55).
2 The key criterion for distinguishing revolutionary brigades from other groups is the brigades' acceptance of the authority of the MMC (McQuinn, 2012, p. 21).
3 Author interviews with brigade leaders, Misrata, October–November 2011.
4 Author interviews with front-line fighters, Misrata, July–August 2011.
5 Author interviews with members of 21 different brigades, Misrata, July 2011–March 2012.
6 Author observations during six visits to brigade weapons storage facilitates in Misrata, March 2012.
7 Author interviews with Brigade commanders, Misrata, 24 March 2012.
8 Author's observations during six visits to brigade weapons storage facilities, Misrata, March 2012.
9 The MUR estimates that the brigades have accumulated enough munitions to fill several thousand ISO containers (author interview, Misrata, 14 March 2012).
10 Author interviews with senior MMU representative responsible for the construction of these facilities, 18 March 2012.
11 Author interview with UN personnel, Geneva, May 2012.
12 Author's observation during visit to brigade weapons storage facilities, Misrata, March 2012.
13 Author's observations during six visits to brigade weapons storage facilities, Misrata, March 2012. In comparison, best practice guides for governments usually recommend the use of two high-security

locks. The OSCE's *Best Practice Guide on Physical Security of Stockpiles of Conventional Ammunition* recommends the use of two padlocks, each with its own unique key. The padlock should have 'extension shielding over the shackle of at least 9,5 millimeters above the top and on three sides' (OSCE, 2008, p. 48).

14 Author interviews and observations during visits to brigade weapons storage facilities, Misrata, March 2012.

15 Author interviews and observations during visits to brigade weapons storage facilities, Misrata, March 2012.

16 For a brief summary of UN hazard divisions and compatibility groups, see OSCE (2008, pp. 54–55 and 70–72).

17 Author's observations during a visit to a weapons storage facilities, Misrata, 24 March 2012.

18 At one facility, a fire extinguisher was stored in a shipping container holding medium-calibre anti-aircraft rounds.

19 Author interviews during six visits to brigade weapons storage facilitates, Misrata, March 2012.

20 This conclusion is based on observations and interviews during the visits to storage facilities and seven months of fieldwork in Misrata from July 2011 to March 2012.

21 Author interviews with senior MMC and MUR leaders, Misrata, March 2012.

22 Author interviews with brigade leaders, Misrata, October–November 2011 and March 2012.

23 Author's observations during six site visits and interviews with senior brigade and MUR representatives, Misrata, March 2012.

24 Author interview with brigade leaders during visits to brigade weapon storage facilities, 22 March 2012.

25 Author interview with brigade leaders during visits to brigade weapon storage facilities, 17 March 2012.

26 Author's observations during six formal visits to brigade weapons storage facilities and subsequent informal visits to other sites during the research trip, Misrata, March 2012.

27 Author interviews with MMC representatives and brigade leaders. Two brigades were able to produce examples of their early registration documentation.

28 Interview with former combatant (Interview 1, 10 September 2012).

29 A 'cell' is composed of no more than three people. Each cell has relative autonomy and responds to a unique front commander (interview with former combatant (19 September 2012)).

30 In a war of movement the FARC had the ability to seize and occupy a town for a short period of time (such as the taking of Billiar or Mitu). At that time it had the ability to coordinate an attack with a large number of fighters (between 100 and 500). Since then it has not been able to seize and hold territory. Most attacks now consist of ambushes of mobile patrols of the state's armed forces; some of these attacks include the use of large amounts of explosives and IEDs (Granada, Restrepo, and Vargas, 2009).

31 Interview with former combatant (10 September 2012).

32 Most of the M16 and Galil rifles were seized from the Colombian army during raids.

33 Interview with former combatant (10 September 2012).

34 Interview with former combatant (10 September 2012).

35 Interview with former combatant (10 September 2012).

36 Interview with former combatant (14 September 2012).

37 Interview with former combatant (10 September 2012).

38 Interviews with former combatants (10 and 14 September 2012).

39 Interview with former combatant (10 September 2012).

40 Interview with former combatant (19 September 2012).

41 Interview with former combatants (10 and 18 September 2012).

42 Interviews with former combatants (10 and 19 September 2012).

43 Interviews with former combatants (10 and 19 September 2012).

44 Interview with former combatant (19 September 2012).

45 Interview with former combatant (19 September 2012).

46 Interviews with former combatants (10 and 19 September 2012).

47 Interview with former combatant (19 September 2012).

48 Interview with former combatant (19 September 2012).

49 Interviews with former combatants (10 and 19 September 2012).

50 Interview with former combatant (18 September 2012).

51 The raids were often conducted after Colombian authorities received information about the location of the stockpiles from demobilized members.

52 Interview with former combatant (10 September 2012).

53 Former combatants interviewed for this study referred to these files as 'curricula vitae'.

54 Interview with former combatant (10 September 2012).

55 Interviews with former combatants (10 and 14 September 2012).

56 Interviews with former combatants (10 and 19 September 2012).

57 Interviews with former combatants (10 and 14 September 2012).

58 Interview with former combatant (10 September 2012).

59 Interview with former combatant (18 September 2012).

60 Interviews with former combatants (10, 14, 18 and 19 September 2012).

61 Interview with former combatant (18 September 2012).

62 Interviews with former combatants (10, 14 and 19 September 2012).

63 Interviews with former combatants (10, 14 and 19 September 2012).

64 Interviews with former combatants (10, 14 and 19 September 2012).

65 The Small Arms Survey has worked in Sudan and South Sudan since 2005, through the ongoing Human Security Baseline Assessment (HSBA) project. See the HSBA website for more information on the Survey's research in the two countries, <http://www.smallarmssurvey.org/focus-projects/human-security-baseline-assessment-for-sudan-and-south-sudan.html>.

66 The northern Sudanese army used several names during the civil war. SAF is the current name and will be used here to distinguish northern forces from the southern SPLA.

67 Interview with Ministry of Interior representative; former civilian, 26 June 2012.

(For interviews with sources from South Sudan their current position or role is given, as well their former role prior to independence on 9 July 2011.)

68 Interview with representative from the South Sudan Disarmament, Demobilization, and Rehabilitation Commission; former SPLA representative, 25 July 2012.

69 Interview with SPLA officer, current and former, 20 August 2012.

70 Interview with SPLA officer, current and former, 20 August 2012.

71 Interview with SPLA officer, current and former, 20 August 2012.

72 Interview with representative from the South Sudan Peace and Reconciliation Commission (SSPRC), Juba, 20 July 2012.

73 Interview with SPLA officer, current and former, 20 August 2012.

74 SA-7 MANPADS were used in a 1986 attack on a Sudanese civilian airliner (Berman and Leff, 2008, p. 13).

75 See Small Arms Survey (2012).

76 Email correspondence with SPLA officer, current and former, 14 November 2012.

77 Interview with SPLA officer, current and former, 20 August 2012.

78 Interview with SPLA officer, current and former, 20 August 2012.

79 Interview with SPLA officer, current and former, 20 August 2012.

80 Interview with SPLA officer, current and former, 20 August 2012.

81 Interview with Ministry of Interior representative; former SPLA officer, 17 July 2012.

82 Interview with Ministry of Interior representative; former SPLA officer, 17 July 2012.

83 Interview with Ministry of Interior representative; former civilian, 26 June 2012.

84 Interview with civilian NGO worker, July 2012.

85 Interview with Ministry of Interior representative; former civilian , 26 June 2012.

86 Interview with SPLA officer, current and former, 20 August 2012.

87 Interview with SPLA officer, current and former, 20 August 2012.

88 Interview with SPLA officer, current and former, 20 August 2012.

89 Interview with SPLA officer, current and former, 20 August 2012.

90 Interview with member of the South Sudan Peacebuilding Commission (SSPC); former SPLA member, Juba, 24 July 2012.

91 Interview with SPLA officer, current and former, 20 August 2012.

92 Interview with Ministry of Interior representative; former civilian, 26 June 2012.

93 Interview with Ministry of Interior representative; former SPLA officer, 17 July 2012.

94 Interview with SSPRC representative; former SPLA member, Juba, 20 July 2012.

95 Interview with SSPC member, Juba, 24 July 2012.

96 Interview with SPLA officer, current and former, 20 August 2012.

97 Interview with SPLA officer, current and former, 20 August 2012.

98 Interview with international expert advising the post-CPA SPLA engineering corps, Juba, 1 June 2012.

99 Interview with representative in Jonglei State; former SPLA engineer, 15 August 2012.

100 The OSCE *Best Practice Guide* also mentions 'doors with solid hardwood with steel plate on the outside face, with door bucks, frames, and keepers rigidly anchored' as a possible substitute for armoury vault doors (OSCE, 2003, p. 5).

101 Interviews with former combatants (10, 14, 18 and 19 September 2012).

Bibliography

Bangerter, Olivier. 2012. *Internal Control: Codes of Conduct within Insurgent Armed Groups*. Occasional Paper. Geneva: Small Arms Survey.

Berman, Eric and Jonah Leff. 2008. 'Light Weapons: Products, Producers and Proliferation.' In Small Arms Survey. *Small Arms Survey 2008: Risk and Resilience*. Cambridge: Cambridge University Press, pp. 42–75.

Bevan, James. 2006. 'Fuelling Fear: The Lord's Resistance Army and Small Arms.' In Small Arms Survey. *Small Arms Survey 2006: Unfinished Business*. Oxford: Oxford University Press.

—— and Adrian Wilkinson. 2008. 'Glossary of Conventional Ammunition Terminology.' In James Bevan, ed. *Conventional Ammunition in Surplus: A Reference Guide*. Geneva: Small Arms Survey, pp. xix–xxxiii.

Chivers, C. J. 2011. 'Pics from the Capture of Al Qawalish, Libya.' The Gun Blog. 6 July. <http://cjchivers.com/post/7315200016/pics-from-the-capture-of-al-qawalish-libya>

El Espectador. 2012. 'Casa que estalló en Bogotá era usada por FARC para fabricar explosivos.' 15 July. <http://www.elespectador.com/noticias/judicial/articulo-353341-casa-estallo-bogota-era-usada-farc-fabricar-explosivos>

FARC (Revolutionary Armed Forces of Colombia). n.d. 'Beligerancia.' *Suplemento de revista resitencia*. Accessed 24 September 2012. <http://www.abpnoticias.com/boletin_temporal/contenido/libros/Beligerancia__FARC-EP.pdf>

Florquin, Nicolas, Pascal Bongard, and Emilia Richard. 2010. 'Options for Engagement: Armed Groups and Humanitarian Norms.' Small Arms Survey. *Small Arms Survey 2010: Gangs, Groups and Guns*. Cambridge: Cambridge University Press.

Glickson, Roger C. 1995. 'Counterinsurgency in Southern Sudan: The Means to Win?' *Journal of Conflict Studies*, Vol. 15, No. 1, pp. 45–59.

Granada, S., J. Restrepo, and A. Vargas. 2009. 'El agotamiento de la política de seguridad: evolución y transformaciones recientes en el conflicto armado colombiano.' In J. Restrepo and D. Aponte, eds. *Guerra y violencias en Colombia: herramientas e interpretaciones*. Bogotá: Editorial Pontificia Universidad Javeriana/CERAC, pp. 27–124.

Harnecker, M. 1981. 'Colombia: ELN: unidad que multiplica: entrevista a dirigentes máximos de la Unión Camilista Ejército de Liberación Nacional sobre la historia del ELN, y una reflexión sobre la situación de las guerrillas en ese momento.' <http://www.rebelion.org/docs/90192.pdf>

Jenzen-Jones, Nic R. 2011. 'Jumping the Gun: What Does the AK-100 Series Really Mean for Libya's Rebels?' *Security Scholar*. 17 June. <http://securityscholar.wordpress.com/2011/06/17/jumping-the-gun-what-does-the-ak-100-series-really-mean-for-libyas-rebels/>

——. 2012. 'Optics of the Libyan Conflict – Part III.' The Rogue Adventurer. 16 February. <http://rogueadventurer.com/2012/02/16/optics-of-the-libyan-conflict-part-iii/>

Johnson, Douglas H. 2003. *The Root Causes of Sudan's Civil War: Updated to the Peace Agreement*. Kampala: Fountain.

King, Benjamin. 2011. *Safer Stockpiles: Practitioner's Experiences with Physical Security and Stockpile Management (PSSM) Assistance Programmes*. Occasional Paper No. 27. Geneva: Small Arms Survey. April.

——. Forthcoming. *Surplus Management Policy in South Sudan*. Issue Brief. Geneva: Small Arms Survey.

MAG (Mines Advisory Group). 2011. 'S. Sudan: Large SPLA Stockpile Found, Including 22 MANPADS.' <http://www.maginternational.org/news/ssudan-large-stockpile-destroyed-including-22-manpads/>

——. 2012. 'Sudan: Clearing Small Arms and Light Weapons.' <http://www.maginternational.org/news/sudan-clearing-small-arms-light-weapons/>

McQuinn, Brian. 2012. *After the Fall: Libya's Evolving Armed Groups*. Working Paper No. 12. Geneva: Small Arms Survey. October.

Metelits, Claire. 2004. 'Reformed Rebels? Democratization, Global Norms, and the Sudan People's Liberation Army.' *Africa Today*, Vol. 51, No. 1. Fall, pp. 65–82.

Metz, Helen Chapin, ed. 1991. *A Country Study: Sudan*. Washington, DC: Federal Research Division, Library of Congress.

OAS (Organization of American States). 2005. Denying MANPADS to Terrorists: Control and Security of Man-portable Air Defense Systems (MANPADS). AG/RES. 2145 (XXXV-O/05). June. <http://www.fas.org/asmp/campaigns/MANPADS/2005/OASmanpads.pdf>

OSCE (Organization for Security and Cooperation in Europe). 2003. *Best Practice Guide on National Procedures for Stockpile Management and Security*. 19 September. <http://www.osce.org/fsc/13637>

——. 2008. *Best Practice Guide on Physical Security of Stockpiles of Conventional Arms*. 2 June. <http://www.osce.org/fsc/33395>

Rands, Richard. 2010. *In Need of Review: SPLA Transformation in 2006–10 and Beyond*. HSBA Working Paper No. 23. Geneva: Small Arms Survey.

RECSA (Regional Centre on Small Arms). 2005. *Best Practice Guidelines for the Implementation of the Nairobi Declaration and the Nairobi Protocol on Small Arms and Light Weapons*. June. <http://www.recsasec.org/publications/Best%20Practice%20Guidlines%20Book.pdf>

Semana.com. 2012. 'Las cifras de la guerra en Colombia.' 18 September. <http://portal.semana.com/Especiales/cifras-guerra-colombia/index.html>

Small Arms Survey. 2008. *Small Arms Survey 2008: Risk and Resilience*. Cambridge: Cambridge University Press.

——. 2012. 'Guided Light Weapons Reported Held by Non-state Armed Groups 1998–2012.' <http://www.smallarmssurvey.org/fileadmin/docs/M-files/armed-groups-guided-missiles.pdf>

——. 2013. Unplanned Explosions at Munitions Sites (UEMS) Database. Geneva: Small Arms Survey.

——. n.d. 'Definitions of Small Arms and Light Weapons.' <http://www.smallarmssurvey.org/weapons-and-markets/definitions.html>

SPLM (Sudan People's Liberation Movement). 2003. SPLA Act, 2003: Laws of the New Sudan. Secretary of Legal Affairs and Constitutional Development.

UNCASA (United Nations Coordinating Action on Small Arms). 2012. 'Stockpile Management: Weapons.' *International Small Arms Control Standard*. 27 August. <http://www.smallarmsstandards.org/isacs/0520-en.pdf>

UNGA (UN General Assembly). 1997. *Report of the Panel of Governmental Experts on Small Arms*. A/52/298 of 27 August.

UNODA (United Nations Office of Disarmament Affairs). n.d. *International Ammunition Technical Guidelines*. <http://www.un.org/disarmament/convarms/Ammunition/IATG/>

About the Small Arms Survey

The Small Arms Survey serves as the principal international source of public information on all aspects of small arms and armed violence, and as a resource centre for governments, policy-makers, researchers, and activists. In addition to Issue Briefs, the Survey distributes its findings through Occasional Papers, Special Reports, Working Papers, Research Notes, a Book Series, and its annual flagship publication, the *Small Arms Survey*.

The project has an international staff with expertise in security studies, political science, international public policy, law, economics, development studies, conflict resolution, sociology, and criminology, and works closely with a worldwide network of researchers and partners.

The Small Arms Survey is a project of the Graduate Institute of International and Development Studies, Geneva. For more information, please visit www.smallarmssurvey.org.

Credits

Editor: Matt Schroeder
Authors: Benjamin King, Brian McQuinn, Claudia Navas Caputo, and Alonso Tobon
Copy-editor: Alex Potter (fpcc@mtnloaded.co.za)
Proofreader: John Linnegar (johnlinnegar@gmail.com)
Design and Layout: Frank Benno Junghanns

Contact details

Small Arms Survey
47 Avenue Blanc, 1202 Geneva, Switzerland
t +41 22 908 5777 **f** +41 22 732 2738
e info@smallarmssurvey.org