small arms survey

Issue Brief

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Fire and Forget

The Proliferation of Man-portable Air Defence Systems in Syria

Introduction

Since the start of Syria's civil war in 2011, the country has become a hotbed of arms trafficking and proliferation of conventional weapons. Images and accounts of the conflict reveal that armed groups have acquired a variety of small arms and light weapons, some of which are recent-generation systems that are rarely encountered outside of government control elsewhere. Among the most sensitive of these weapons are the numerous man-portable air defence systems (MANPADS) that armed groups have looted from Syrian government depots and acquired from other sources. Many of these missiles are newer and more technologically sophisticated than illicit MANPADS in other countries. Given the porosity of Syria's borders, the presence of groups affiliated with al-Qaeda and other violent extremists, and the inherent limitations of controlling small arms and light weapons in conflict zones, the danger that violent groups in other countries will acquire these missiles is real.

This Issue Brief assesses the acquisition and use of MANPADS by armed groups in Syria. The analysis is based on a review of video footage and photographs posted online by journalists, researchers, and armed groups; media reports; and statements by government officials. These accounts document the acquisition and use of increasingly advanced MANPADS by Syrian armed groups, including systems not previously seen outside of government control.

Major findings from this Issue Brief include the following:

- Armed groups in Syria have acquired at least eight models of MANPADS, including three models not previously seen outside of government control in other countries. These MANPADS include recent-generation systems.
- The vast majority of MANPADS acquired by Syrian armed groups appear to be Chinese-, Russian-, and Soviet-designed systems or foreign variants.
- There is no publicly available evidence to support claims by the Russian government that armed groups in Syria have acquired US FIM-92 Stinger-series MANPADS or foreign Stinger-pattern systems.
- International transfers of MANPADS to armed groups in Syria appear to violate resolutions, guidelines, and agreements adopted by several multilateral organizations.
- Video footage of armed groups and their arsenals is useful for identifying the types of MANPADS in Syria but provides little insight into their origins or suppliers.

An armed group firing a MANPADS in Syria, 2013. © faroq syria/YouTube

This Issue Brief begins with an overview of the models, capabilities, age, and condition of MANPADS circulating in Syria. It continues with an assessment of the sources of these systems, as well as of allegations of trafficking from Sudan. The concluding section evaluates the implications of MANPADS proliferation in Syria, including in the context of global counter-MANPADS efforts.

This Issue Brief makes use of the definition of MANPADS in the Wassenaar Arrangement's Elements for Export Controls of MANPADS:

> surface-to-air missile systems designed to be man-portable and carried and fired by a single individual; and other surface-to-air missile systems designed to be operated and fired by more than one individual acting as a crew and portable by several individuals (WA, 2007, art. 1.1).

While this definition captures a wide range of man- and crew-portable systems, the vast majority of MANPADS—in Syria and globally—are shoulder-fired. These systems are comprised of three key components: a missile in a launch tube, a gripstock (launcher), and a battery. Most MANPADS are 'fire and forget' weapons, meaning that the missiles guide themselves to their targets. The disposable launch tubes containing the missiles are approximately 1.5–1.8 m in length and the entire system typically weighs between 15 and 19 kg. Since the first MANPADS were fielded in the late 1960s, manufacturers in at least two dozen countries have produced more than one million missiles (Schroeder, 2013, pp. 3, 5). As of 2011, the US government had identified 40 civilian aircraft that had been struck by MANPADS, resulting in 28 crashes with more than 800 deaths (USDOS, 2011).

When referring to specific models of MANPADS, this Issue Brief uses the transliterated model designations assigned by the country of origin. Other common designations are included in parentheses next to the first reference to the model. Variants of several of these systems have been produced by multiple countries. Many of the variants are similar in appearance to the original model; telling them apart often requires images of higher resolution than those posted online. When referring generally to the model and foreign variants, the term 'pattern' is used, as in 'Igla-1-pattern MANPADS'. Similarly, the term 'Strela-2- or Strela-2M-pattern' is used to refer generally to the sub-category of MANPADS consisting of the Strela-2 (SA-7a) and Strela-2M (SA-7b) and foreign variants, or to individual MANPADS that fall within this sub-category when the precise model is not known. Armed groups in Syria often refer to Strela 2- and Strela-2M-pattern missiles as 'Cobras'. Table 1 lists the MANPADS identified in this Issue Brief.

Overview of MANPADS acquired by armed groups in Syria

Models and capabilities

An analysis of video footage and photographs from Syria reveals that armed groups have acquired at least eight different models of MANPADS, three of which had not been seen outside of government control prior to sightings in Syria. These systems

Table 1 **MANPADS exported to Syria (1970–2012) or acquired by Syrian armed groups (2012–14)**

System	US Department of Defense/NATO designation	Country of origin	Year fielded	Selected foreign variants (by country)	Acquired by Syrian armed groups
9K32 Strela-2	SA-7a/Grail	Soviet Union	1968	Bulgaria, China, Croatia, Czech Republic, Egypt, North Korea, Poland Romania, Serbia	Confirmed
9K32M Strela-2M	SA-7b/Grail Mod 1	Soviet Union	1970		
9K34 Strela-3	SA-14/Gremlin	Soviet Union	1974	Belarus, Bulgaria, North Korea	No reports
9K310 Igla-1	SA-16/Gimlet	Soviet Union	1981	Bulgaria, North Korea	Confirmed
9K310-1 Igla-1M	SA-16/Gimlet	Soviet Union	Unknown/unclear	Unknown/unclear	Confirmed
9K38 Igla†	SA-18/Grouse	Soviet Union	1983	Unknown/unclear	Unclear
9K338 Igla-S	SA-24/Grinch	Russian Federation	2003	No known foreign producers	Confirmed
FN-6[1]	FN-6	China	Unknown/unclear	No known foreign producers	Confirmed

Notes: Imports and acquisitions are 'confirmed' via video or photograph.

† To the author's knowledge, the only 9K38 Igla identified in Syria is a training unit seen in video footage posted on YouTube in 2012 (Hammoriaforever, n.d; Image 1).

Sources: Brown Moses (n.d.); Chivers and Schmitt (2013); Fiszer and Gruszczynski (2004); O'Halloran and Foss (2011); Spleeters (2013)

Image 1 **Launch tube for Igla trainer system in Syria, 2012**

© Hammoriaforever/YouTube

range from the comparatively primitive Strela-2, a first-generation Soviet-designed system initially fielded more than 40 years ago, to third-generation Igla-S (SA-24) MANPADS. Other systems spotted in Syria are the Soviet-designed Strela-2M and Igla-1 (SA-16) or foreign variants, and the Chinese FN-6. A yellow-coloured training version of the Igla (SA-18) MANPADS is also visible in a video posted online in November 2012 (Hammoriaforever, n.d.; see Image 1). To date, no standard Igla (9P39) launch tubes have been spotted in Syria.[2]

Strela-2 (or -2M) and Igla-1-pattern MANPADS are widely proliferated[3] and have been acquired by numerous armed groups worldwide, including in neighbouring Iraq (Schroeder, 2007; Schroeder and King, 2012, pp. 326–29). FN-6 and Igla-S MANPADS were fielded more recently and their global distribution is significantly more limited; there are no substantiated reports of acquisition of either system by armed groups outside of Syria. Both systems are notably more capable than the first-generation systems commonly encountered in the arsenals of non-state actors. The FN-6 has a range of 6,000 m and can reportedly engage targets flying as high as 3,500 m (O'Halloran and Foss, 2011, p. 7). In contrast, the Strela-2 has a maximum effective range of just 3,400 m and an effective altitude of only 1,500 m (p. 37).[4] The FN-6, which has a more sophisticated guidance system, is also faster than Strela-2 missiles (pp. 6–7, 37). The Igla-S indicates that it too is superior to the Strela-2 MANPADS in range, engagement altitude, engagement velocity, guidance, and resistance to countermeasures (O'Halloran and Foss, 2011, pp. 36–37; Rosoboron export, n.d.). While the Igla-S is more capable than the Igla-1 in range and accuracy, the differences in performance are less stark (O'Halloran and Foss, 2011, p. 34).

Estimating the quantity of MANPADS acquired by Syrian armed groups is much more difficult than identifying the models in circulation. The groups have not released detailed information about their holdings, and other sources of information are too vague and incomplete to conduct even a cursory inventory. Video footage featuring stockpiles of multiple launch tubes reveals that anti-government forces have acquired at least dozens of MANPADS, but existing data sources do not permit extrapolation beyond this rough minimum estimate.

The Russian Federation and the Stinger missile myth

Contrary to repeated claims by the media and the Russian government, there is no evidence that armed groups in Syria have acquired US-designed FIM-92 Stinger MANPADS. The reports appeared regularly in media articles in 2012, culminating in claims by a high-ranking Russian official that Syrian armed groups had acquired several dozen Stinger missiles (AFP, 2012; RIA Novosti, 2012a; MFA, 2012).[5] US officials denied the allegations, challenging Russian government officials to provide evidence to support their claims, which were also denied by a spokesman for the Syrian National Council (SNS, 2012; Al-Sharq al-Awsat, 2012). An official from the Russian Foreign Ministry subsequently conceded that 'the US

Image 2 **FN-6 launch tube spray-painted to conceal markings, 2013**

© C.J. Chivers/*The New York Times*

does not supply MANPADS to militants in Syria' (RIA Novosti, 2012b). Two weeks later, however, Russian foreign minister Sergey Lavrov claimed to have 'confirmed information' that anti-government forces had acquired 50 Stinger missiles for use against regime fighter jets. Lavrov also hinted at the possibility of attacks on civilian aircraft. 'You know, what "Stingers" are intended for. Free Syrian Army leaders have repeatedly said that civil aircraft will be a legitimate aim, if they use the Syrian airports,' he remarked (MFA, 2012).[6]

An analysis of videos and photographs from Syria yielded no evidence of acquisition or use of Stinger MANPADS by armed groups. The Russian government has not released photographs or other hard evidence to support their claims, and the only photo accompanying media reports of 'Stingers' in Syria is of another type of missile misidentified as a Stinger (Hughes, 2012).[7] The apparent absence of US-produced missiles is consistent with open-source reporting on the global inventory of illicit MANPADS, which includes few if any illicit Stinger missiles and launchers.

Age and condition of MANPADS in Syria

Information on the manufacture date of the MANPADS acquired by Syrian armed groups is sparse. Video footage and other images of MANPADS in Syria are often of low resolution and taken from a distance, making it impossible to read the markings on the launch tubes—a significant source of data on illicit missiles. Exacerbating this problem is the deliberate obfuscation of the markings on the FN-6 launch tubes, many of which were painted over at some point in the supply chain (see Image 2).[8]

Journalists working in Syria or with Syrian contacts have published photos of the markings on two launch tubes: a Strela-2 and an Igla-1M. The Strela-2 was photographed by journalist Damien Spleeters near Azaz, Syria, in March 2013 (see Image 3). The missile was attached to a gripstock but no battery is apparent. Markings on the launch tube indicate that it was manufactured in 1970, which coincides with data on early imports of Strela-2 missiles by the Syrian regime (Spleeters, 2013; SIPRI, n.d.). Assuming the markings are accurate, the missile was more than four decades old when it was photographed.

Two months later, C.J. Chivers of *The New York Times* took photographs of the markings on an Igla-1M in the Idlib Governate (Chivers, 2013a). The markings indicate that the missile was made in 1990, meaning that it was half the age of the SA-7a encountered near Azaz (see Image 4). There is little additional, substantiated information on the age of the MANPADS in Syria, data that would be helpful for identifying the sources of these weapons and the likelihood that they are still operational.[9]

Data limitations also preclude a systematic assessment of the condition of the MANPADS in

question. Armed groups in Syria have posted several videos of what appear to be successful MANPADS attacks on Syrian government aircraft. These videos confirm that at least some of the systems acquired by the armed groups are operational, although the extent to which they are representative of all MANPADS in Syria is unknown since the groups are presumably less likely to post videos of unsuccessful engagements. Media reports from Syria suggest that many of the MANPADS acquired by Syrian armed groups have not performed as well as those featured in the videos. Rebel commanders interviewed by *The New York Times* reportedly complained that many of the MANPADS looted from government depots were inoperable. As summarized by *New York Times* correspondent C.J. Chivers:

> [A] field commander in the Idlib and Hama countrysides for Ahfad al-Rasul said his fighters had captured as many as 50 SA-7s at Base 46, a government stronghold near Aleppo that rebels seized in late 2012, but almost none of them have worked. They have had better success, he said, with captured SA-16s, with which they have shot down at least one MiG and a helicopter near the Abu ad Duhur air base. But they also had four SA-16s, he said, that failed to fire before the fifth one launched and struck an aircraft (Chivers, 2013a).

Given the advanced age of Syria's Strela-2- and Strela-2M-pattern missiles, high failure rates would not be surprising. Data on arms transfers to Syria indicate that, by 2012, many of its Strela missiles were at least 30 to 40 years old—well past the estimated shelf life (Schroeder, 2013, p. 64). Less is known about the Syrian government's Igla-1 MANPADS, which were manufactured more recently than the Strela-2 and Strela-2M missiles but may also be nearing (or be past) the end of their shelf lives. Other possible explanations for the high failure rates include improper storage, inadequate maintenance, or rough handling.

Media reports also raise questions about the reliability of the later-generation FN-6 MANPADS acquired by Syrian armed groups. 'Most of the FN-6s that we got didn't work,' noted one commander, who claimed that some of the malfunctioning missiles had exploded during use, killing or wounding six of his men (Chivers and Schmitt, 2013). Rebels from other units also reported problems with their FN-6 MANPADS (Chivers, 2013a). It is unlikely that advanced age explains these problems; FN-6 MANPADS were not fielded until the 1990s and are still in production. Regardless, the malfunctioning missiles have potentially significant implications, the most obvious of which concerns the threat posed by cross-border proliferation of the missiles. Each unserviceable missile not only reduces the pool of MANPADS vulnerable to diversion but also sows doubt about the reliability of MANPADS from Syria more generally, potentially reducing international demand for them.

At the same time, high failure rates may lead to increased trafficking of MANPADS *to* Syria. The apparent unreliability of existing stocks may help to explain the persistent and often emphatic calls by anti-government forces for more and better anti-aircraft weapons. The resulting pressure on state sponsors of these groups may lead (or may have already led) to additional MANPADS transfers, which would further undermine international norms and increase the risk of illicit proliferation, both within Syria and abroad. Thus, the impact of the age and condition of MANPADS in Syria is multi-faceted and may influence events on the ground in ways that are unpredictable or counter-intuitive.

Image 3 **Strela-2 launch tube near Azaz, Syria, 2013**

© Damien Spleeters

Image 4 **Igla-1M launch tube in Syria**

© C.J. Chivers/*The New York Times*

Sources and trafficking routes

While data limitations preclude a conclusive analysis of the sources of MANPADS in Syria, publicly available accounts of the Syrian military's missile inventories, video footage and photographs taken in Syria, and media reports allow for a partial accounting. This section summarizes and analyses the various claims regarding the sources of the MANPADS acquired by Syrian armed groups and the methods and routes through which they are obtained.

There is little doubt that some of the MANPADS acquired by armed groups in Syria came from domestic sources. The Syrian government ranks among the largest importers of MANPADS, and video footage from Syria clearly shows the capture of MANPADS missiles from the Syrian government. In February 2012, the Associated Press quoted US Assistant Secretary of State Thomas Countryman estimating that Syria had 'tens of thousands' of missiles for MANPADS (Birch, 2012).[10] It is not clear whether he was referring to Syria's current inventory or the sum total of imported missiles, many of which may no longer be in the Syrian

Table 2 **Publicly available data on MANPADS acquired by the Syrian government prior to 2011, by source**

Model	Data source		
	IHS Jane's (inventory)	IISS (inventory)	SIPRI (transfers)
Strela-2 or -2M†	✓	✓	✓
Strela-3	✓	✓	✓
Igla-1	✓	No data	No data
Igla	No data*	✓	✓

Notes:
† The sources studied do not always indicate whether the MANPADS listed as 'SA-7s' are Strela-2 or Strela-2M systems.
* IHS Jane's indicates that Igla missiles imported in 2006 were for vehicle-mounted systems.
Sources: IHS Jane's (2014c); IISS (2010); SIPRI (n.d.)

Image 5 **Vehicle-mounted missile system captured by Libyan armed groups in 2011**

© Anonymous (n.d.)

military's arsenals. Other publicly available estimates suggest that Countryman was referring to all missiles for MANPADS transferred to Syria since 1970. Data on transfers compiled by the Stockholm International Peace Research Institute (SIPRI) lists nearly 17,000 missiles, most of which are Strela-2- or Strela-2M-pattern missiles imported from 1970 to 1983. More recent transfers identified by SIPRI were much smaller and include 1,500 Strela-3 missiles imported from the Soviet Union in 1987–89 and 300 Igla missiles retransferred from Belarus in 2003.

Data compiled by SIPRI is largely consistent with estimates of the Syrian government's inventory of MANPADS published by IHS Jane's and the International Institute of Security Studies (IISS). There is consensus that MANPADS imported by the Syrian government consist exclusively of Soviet-designed systems, including Strela-2-, Strela-2M-, and Strela-3-pattern MANPADS. There is less agreement regarding the importation of Igla-1-pattern MANPADS. Only IHS Jane's lists Igla-1s among the MANPADS acquired by the Syrian government, reportedly in 2003—the same year as a Belarusian transfer of Igla MANPADS reported by Jane's and SIPRI (IHS Jane's, 2014c; SIPRI, n.d.). Since Jane's does not identify the quantity or source of the imported Igla-1 missiles, it is not clear whether the listing is a reference to the MANPADS from Belarus identified by SIPRI as Iglas, or a separate transfer of Igla-1s that also occurred in 2003. Table 2 lists the models of MANPADS identified by IHS Jane's, IISS, and SIPRI.

The Syrian government has also imported vehicle-mounted Strelets air defence systems that employ missiles with the same model designation as missiles used with Igla and Igla-S MANPADS. In recent years, the Russian government has sold similar launchers to several other countries,

Image 6 **Inert Igla-S MANPADS reportedly taken from the Bala air defence base in November 2012**

© Hammoriaforever (n.d.)

Image 7 **Anti-government forces transporting an Igla-S MANPADS launch tube with an earlier Igla-series launcher**

© Harakat Hazm 9th Unit (n.d.)

including Libya and Burkina Faso (IHS Jane's, 2014a, Pyadushkin, 2011; see Image 5).[11] SIPRI estimates that the Russian Federation exported roughly 200 Igla and 200 Igla-S missiles to Syria for use with its Strelets launchers in 2006 and 2008–10, respectively (SIPRI, n.d.).

There are no substantiated, publicly available reports of deliveries of Igla-S MANPADS to the Syrian government. US and Russian sources indicate that the Russian government denied Syria's requests for Igla MANPADS in the early 2000s, selling them vehicle-mounted Strelets systems instead (IHS Jane's, 2002; 2005). In 2007, a representative of Russia's Rosoboronexport company reportedly told RIA Novosti that the Syrian government 'want[s] the Igla portable air defense system, but we have refused to supply it' (RIA Novosti, 2007). Rumours of an impending Russian MANPADS sale

A Syrian rebel holding a MANPADS, 2013. © atareb ctiy/YouTube

surfaced in 2008, but there is no publicly available evidence that the sale was completed.

Video footage of Syrian armed groups corroborates some accounts of the Syrian military's imports of MANPADS while also raising doubts about the comprehensiveness of these accounts. In November 2012, anti-government forces overran the 46th Regiment base near Aleppo, capturing large quantities of weapons and ammunition. Video footage taken shortly after rebels took control shows them inspecting crates containing Igla-1-pattern missiles (Atareb Syriafree, n.d.). Armed groups in Syria have posted several additional videos and photographs of MANPADS purportedly seized from government forces, including Strela-2 or -2Ms and more Igla-1s, imports of which are documented by SIPRI and IHS Jane's. Similarly, images of the training rounds for Igla MANPADS captured by armed groups in November 2012 lend credence to SIPRI's data regarding the transfer of these systems.

At the same time, videos and photos from Syria indicate that some transfers to the Syrian government may have eluded non-governmental research organizations. A video of weapons reportedly taken from the Bala air defence base in November 2012 includes several Igla-S launch tubes and gripstocks. Many of the tubes—and all of the gripstocks—are painted silver, and the gripstocks are marked with the word 'MAKET', the Russian word for 'model' (Binnie, 2012c; Higgins, 2012; see Image 6). Inert missiles and launchers are typically used for training purposes and it is unclear why a government would stockpile them if it had not also imported live MANPADS. Their presence raises the possibility that Igla-S MANPADS were indeed transferred to Syria, although more information is needed to draw any definitive conclusions.[12]

Images of a conventional (non-trainer) Igla-S MANPADS raise additional questions. A video posted on YouTube in February 2013 shows what appears to be an Igla-S missile connected to a MANPADS gripstock—the first such sighting outside of government control, not only in Syria, but worldwide (Harakat Hazm 9th Unit, 2013). Notably, the gripstock

featured in the video is not the standard Igla-S (9P522) launching mechanism; it is a launcher for an earlier version of the Igla-series MANPADS (see Image 7). The markings on the launch tube are not visible and therefore it is difficult to tell whether it was sourced domestically or from abroad. If the missile was looted from Syrian government stockpiles and the gripstock is capable of launching the missile, the video calls into question repeated claims that the Igla-S missiles sold to Syria for the Strelets systems are incompatible with MANPADS gripstocks (Pyadushkin, 2012; Binnie, 2012b).

In some cases, MANPADS acquired by armed groups were smuggled into Syria. These systems include Chinese-made FN-6 MANPADS, which first appeared in videos in February 2013. The FN-6s almost certainly came from abroad; there are no known reports of exports of these systems to the Syrian government, and investigations by journalists point to foreign suppliers.[13] Government officials and rebels interviewed by *The New York Times* identified Sudan as the source of the missiles, which were reportedly purchased by Qatar and shipped through Turkey. A spokesman for the Sudan Armed Forces (SAF) denied the accusations, saying they were aimed at 'harm[ing] our relations with countries Sudan has good relations with' (Chivers and Schmitt, 2013).

SAF is a plausible source given that it is one of only a handful of known importers of FN-6 MANPADS, and in view of the widespread proliferation of Sudanese weapons and ammunition among armed groups.[14] Yet the number of FN-6s delivered to Sudan were reportedly small—ten systems according to IHS Jane's (2014b).[15] Assuming this estimate is correct, even Sudan's entire stock would be insufficient to support the air defence needs of the growing insurgency in Syria. Regardless, definitively linking the FN-6 MANPADS acquired by Syrian armed groups to Sudanese arsenals would require significantly more information than is currently in the public domain. Such a link could only be established through the systematic comparison of lot numbers and manufacture dates on the missiles in Syria with those of the FN-6 MANPADS imported by SAF. Given efforts to conceal the origins of the FN-6 MANPADS provided to the Syrian armed groups (through the spray-painting of launch tubes)—and the Sudanese government's non-cooperation with previous arms tracing requests[16]—acquiring this information would be extremely difficult.

The government of Qatar has also been implicated in transfers of MANPADS to armed groups in Syria.

Syrian rebels displaying four different models of MANPADS, 2013. © Alasala Watanmya/YouTube

In June 2013, *The New York Times* published an article detailing the Qatari government's alleged role in at least two shipments of MANPADS, including FN-6s. Citing four unidentified 'American and Middle Eastern officials with knowledge of intelligence reports on the weapons', the article claims that the two shipments were relatively small—'amounting to no more than a few dozen missiles'—and that they consisted of unidentified 'Eastern Bloc' missiles, along with the FN-6s. The Eastern Bloc missiles reportedly came from Libya (Mazzetti, Chivers, and Schmitt, 2013), where hundreds of MANPADS were looted from government arsenals during the uprising that toppled dictator Muammar Qaddafi in 2011.

The vast majority of the looted Libyan missiles were indeed Eastern Bloc Strela-2M-pattern MANPADS, several of which were subsequently seized from armed groups and smugglers in Lebanon, Mali, and Tunisia, according to UN investigators (UNSC, 2013, p. 32; 2014, pp. 92).[17] The Strela-2M MANPADS seized in Lebanon[18] were reportedly bound for Syria (UNSC, 2013, pp. 35–38; 2014, pp. 49, 89), although evidence supporting this claim appears to be circumstantial.[19] Even if the missiles were destined for Syria, it does not necessarily follow that the Strela-2Ms acquired by Syrian armed groups came from Libya. Determining whether arms traffickers have succeeded in delivering Libyan MANPADS to Syria is difficult given:

- the lack of specific information about the Strela-2M missiles acquired by anti-government forces—such as the make, manufacture date, and lot number;
- the presence of similar (Strela-2- or Strela-2M-pattern) missiles in Syrian government arsenals; and
- the widespread availability of Strela missiles on black markets worldwide.[20]

Without more and better data on the Strela-2 and Strela-2M MANPADS in Syria—and the alleged shipments of these missiles from abroad—any link between Libya and the MANPADS acquired by armed groups in Syria will remain unverifiable.

Claims regarding Saudi Arabia's alleged role in MANPADS transfers to Syria are even more difficult to assess. Iterations of this claim have appeared in numerous media articles, including in a widely referenced June 2013 story from Reuters.[21] Citing an unidentified 'Gulf source', the article indicates that Saudi Arabia 'began supplying anti-aircraft missiles to rebels "on a small scale" about two months ago' and that the intended recipient was Gen. Salim Idris, then the leader of the Free Syrian Army. According to Reuters, 'suppliers in France and Belgium' provided the missiles, the transport of which was reportedly funded by France (Bakr, 2013).

Nine months later, the media again implicated the Saudi government in the provision—or planned provision—of MANPADS to armed groups in Syria. In February 2014, the *Wall Street Journal* published an article asserting that the Saudi government had offered to supply unspecified 'Chinese man-portable air defense systems' to Syrian groups aligned with the Free Syrian Army. The MANPADS and other weapons were to be delivered to southern Syria through Jordan and to groups in the north via Turkey, according to unidentified 'Western and Arab diplomats and opposition figures'. The weapons were reportedly already 'waiting in warehouses in Jordan and Turkey' as of mid-February (Abi-Habib, 2014).

Assessing the veracity of these claims is extremely difficult. The articles rely heavily on anonymous sources, whose credibility and expertise are unknown, and journalists have provided little or no corroborating documentation to support the assertions of these individuals. There is also little information about the smuggled MANPADS, making it difficult to assess claims about the types, manufacturers, and sources of these weapons. Without better data, there is no way to determine what role, if any, the Saudi government and many of the other governments implicated in these articles may have played in the proliferation of MANPADS in Syria.

These gaps highlight the limitations of available data sources. While useful for identifying the types of illicit MANPADS, video footage posted online reveals little about the quantity, condition, sources, or suppliers of MANPADS to armed groups, or the trafficking methods and routes used to deliver them. This information is still best acquired through conventional sources, namely on-the-ground reporting by journalists, private researchers, and UN investigators. The continued value of—and need for—such reporting is illustrated by the case of Libya. As noted above, hundreds of MANPADS were looted from Libyan arms depots during the 2011 uprising. Numerous amateur videos featuring the missiles were posted online but the information of greatest value was obtained by veteran journalists and researchers deployed to Libya.[22] By scouring looted depots, these individuals found MANPADS components, documentation, and storage crates that contained critically important bits of information (see Image 8). Combined, this information revealed the types, models, countries of origin, and manufacture dates for many of the MANPADS in Libya, along with a rough minimum number of missiles imported by the Qaddafi regime (Chivers, 2011).

Since then, UN investigators have tracked the regional proliferation of Libyan MANPADS through on-site inspections of seized weapons and the submission of trace requests to various governments (UNSC, 2014,

pp. 29, 31, 92). Through a comparison of manufacture dates and lot numbers, the UN has managed to trace Strela-2M MANPADS seized in Lebanon, Mali, and Tunisia to Libya. The resulting account of MANPADS proliferation within and outside of Libya—while far from complete—is much more nuanced and comprehensive than the current (public) understanding of the MANPADS in Syria, despite daily postings of video footage of armed groups and their weapons. As researchers in Libya proved, a single scanned shipping document or a photo of the markings on a storage crate often conveys more information than dozens of low-resolution videos posted on social networking sites. Without access to comparable documentation on MANPADS in Syria, public knowledge of the sources and suppliers of these weapons will remain limited.

Implications of MANPADS proliferation in Syria

The acquisition of MANPADS by armed groups in Syria has significant and wide-ranging implications. This section identifies and assesses their potential impact on the global terrorist threat from MANPADS and on international efforts to combat this threat.

The most obvious implication—and the one that has received the most media attention—is the potential threat posed by the diversion and misuse of MANPADS in Syria. Weapons acquired by armed groups are generally more vulnerable to theft, loss, and diversion than weapons held by governments, and the use of diverted MANPADS against commercial airliners could have catastrophic consequences. It is unclear what, if any, control measures have been implemented by the armed groups and their state sponsors. Stockpile security and end-use monitoring could help to reduce the risk of diversion—but only marginally.

The ability of governments to track the movement and to control the use of MANPADS provided to armed groups is inherently limited, as are the type and rigour of physical security measures and stockpile management procedures that can be implemented by groups operating in war zones.[23] These limitations are illustrated by the US government's efforts to monitor and retrieve Stinger MANPADS distributed to armed groups in Afghanistan in the 1980s. As part of a covert aid programme for anti-Soviet fighters, the US Central Intelligence Agency (CIA) supplied several hundred FIM-92 Stinger MANPADS, which were distributed by Pakistan's Inter-Services Intelligence agency. The CIA attempted to limit the risk of diversion, partly by keeping detailed records of each missile, expanding its network of Afghan informants to better track the weapons, and requiring a one-for-one exchange of expended launch tubes for new missiles (Coll, 2004, pp. 11, 151; Schroeder, Stohl, and Smith, 2007, p. 83). Despite these efforts, dozens of the missiles were acquired by unauthorized end users, including the Soviet military, the Iranian government, and various armed groups in Afghanistan and elsewhere (Schroeder, Stohl, and Smith, 2007, pp. 88–89). Attempts to buy back the

Image 8 **Markings on eight MANPADS crates**

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wayward Stingers in the early 1990s proved only partially successful despite a multi-million dollar budget and extensive international support;[24] an estimated 600 Stinger missiles remained outside of government control as of 1996 (Coll, 2004, p. 337).

Other examples of third-party acquisition of government-supplied MANPADS include the retransfer of Libyan Strela missiles by the Irish Republican Army (IRA) to the Spanish separatist group ETA in 2000, and the sale of 41 Eritrean-supplied MANPADS to the US government by Somali militant leader Hussein Aideed in 2003. ETA reportedly used the missiles—which the Libyan government provided to the IRA in the 1980s—in three failed attempts to assassinate the Spanish prime minister in 2001 (*Belfast Telegraph*, 2010; Goodman, 2010). The missiles supplied to Aideed in 1998 were intended for use against Ethiopian aircraft but instead ended up in the hands of US agents, who reportedly paid Aideed USD 500,000 for the missiles (UNSC, 2003; *Economist*, 2004).

The limitations of stockpile security and end-use monitoring as they apply to armed groups is germane not only to the MANPADS currently in Syria, but also to those that could be provided should advocates of greater US and European support for anti-government forces in Syria prevail. Since 2011, there has been intense debate in the United States and Europe over whether to supply MANPADS and other sensitive weapons to moderate factions of the Syrian opposition. For some advocates of increased aid, the debate boils down to the pressing need to neutralize Syrian air power, which outweighs the potential harm associated with diversion or misuse of MANPADS provided to armed groups. Other advocates call for the imposition of 'reasonable safeguards' on shipments of surface-to-air missiles to Syria but do not identify specific safeguards, explain how these safeguards would be implemented without a robust on-the-ground presence in Syria, or clarify how agencies tasked with implementing these safeguards would overcome the obstacles that have hindered previous covert aid programmes.[25] Concrete and specific answers to these questions are essential to the assessment of proliferation risks posed by the provision of additional MANPADS and other sensitive weapons to armed groups in Syria.

Assessing the net impact of the MANPADS already in Syria is extremely difficult. Little is known about the quantity of missiles and key components outside of government control, the serviceability of these items, or the usage rates by armed groups—key variables in determining the quantity of functional systems potentially available to terrorists. Publicly available data on arms transfers indicates that the Syrian government had imported thousands, possibly tens of thousands, of missiles for MANPADS, but these estimates do not necessarily reflect current national holdings of complete, operational systems. Most governments procure more missiles than launchers and thus the number of complete systems imported by the Syrian government is some fraction of the total number of imported missiles.[26]

Furthermore, attrition through age, training exercises, and possibly through retransfer has undoubtedly reduced the Syrian government's inventory of functional missiles, perhaps significantly. Use by anti-government forces has further reduced these stocks, and complaints by rebels of malfunctioning MANPADS indicate that at least some of the remaining missiles are inoperable.

Assuming that the malfunctioning missiles described by the rebels are not anomalous, the quantity of complete, operational MANPADS in Syria is unlikely to exceed several hundred—far fewer than commonly assumed. Whether and to what extent this difference matters is debatable. In the hands of trained terrorists with global reach, even a few missiles pose a potentially catastrophic threat to commercial aviation, and it is clear that dozens of MANPADS are vulnerable to cross-border diversion, including to terrorist organizations.

Concerns about proliferation extend beyond the hardware. The same social media sites used by researchers to track the spread of MANPADS in Syria also host videos that provide detailed instructions on how to assemble and operate these weapons, and how to construct improvised components.[27] Such videos are accessible to anyone with an Internet connection, including violent non-state actors. When combined with MANPADS user manuals and other instructional materials available online, the videos form an increasingly voluminous ad hoc online training library for terrorists worldwide.

Some of these sites prohibit the posting of content that is intended to incite violence or that encourages illegal activities that are dangerous, such as instructional videos on bomb-making or terrorist acts. Presumably this restriction extends to videos with instructions on how to operate or make improvised components for MANPADS. Yet despite these restrictions, such videos are readily available on prominent file-sharing websites. The videos highlight the ease and rapidity with which potentially dangerous information is disseminated in the Internet age, and the challenges of limiting the spread of such material without unduly infringing on free speech and academic inquiry.

The transfer of sophisticated MANPADS to Syrian armed groups also signifies a serious erosion of international norms prohibiting the distribution of MANPADS to non-state actors. These norms are clearly articulated in guidelines adopted by the 100+ members of the Asia–Pacific

Economic Cooperation Forum (APEC), the Organization for Security and Co-operation in Europe (OSCE), the Organization of American States (OAS), and the Wassenaar Arrangement.

The prohibition on transfers of MANPADS to armed groups is unambiguous. The Wassenaar Arrangement's Elements for Export Controls for MANPADS, which the OSCE subsequently applied, almost verbatim, to the OSCE region, restricts exports of MANPADS 'to foreign governments or to agents specifically authorised to act on behalf of a government' (WA, 2007, para. 3.1). APEC and the OAS adopted agreements that include nearly identical provisions (APEC, 2004; OAS, 2005). Members of the Group of Eight (G8) agreed to ban the transfer of MANPADS to non-state actors (G8, 2003). Resolutions passed by other organizations, such as the 191-member International Civil Aviation Organization, indirectly promote this norm by urging members to adopt the provisions in the Wassenaar Arrangement's Elements.[28]

Transfers of MANPADS to armed groups in Syria indirectly undermine other key provisions of international agreements on MANPADS control. The Elements and other guidelines adopted by members of APEC, the OAS, the OSCE, and the Wassenaar Arrangement contain numerous controls on the import, transit, and export of MANPADS, many of which require specific actions by the recipient government.[29] For example, the Wassenaar Arrangement's Elements for Export Controls for MANPADS requires exporting governments to:

- export MANPADS only 'after presentation of an official [end-use certificate] certified by the *Government of the receiving country*';
- limit access to hardware, training, and technical and technological documentation for MANPADS to 'military and civilian personnel of the *receiving government* who have the proper security clearance';
- assure themselves that the *recipient government* will not re-export MANPADS except with the prior consent of the exporting government; and
- satisfy themselves of the *recipient government's* 'willingness and ability to implement effective measures for secure storage, handling, transportation, [and] use' of MANPADS, including inventories by serial number of initial shipments and monthly physical inventories thereafter (WA, 2007, paras. 3.1, 3.8, 3.9, emphasis added).

These and other provisions require specific actions on the part of the government of the destination country, the implementation of which is not possible when MANPADS are transferred to non-state entities without the knowledge or consent of the destination country's government. Transfers of MANPADS to Syrian armed groups thus violate key provisions in landmark agreements and the norms they underpin. These violations erode the influence of these agreements and threaten the progress made through international counter-MANPADS efforts, including the increased international restraint in MANPADS exports demonstrated (albeit imperfectly) in recent years.

List of abbreviations

APEC	Asia–Pacific Economic Cooperation
CIA	Central Intelligence Agency
G8	Group of Eight
IISS	International Institute of Security Studies
IRA	Irish Republican Army
MANPADS	Man-portable air defence system
OAS	Organization of American States
OSCE	Organization for Security and Co-operation in Europe
SAF	Sudan Armed Forces
SIPRI	Stockholm International Peace Research Institute

Endnotes

1 FN-6 is the export designation. The units used by the Chinese military are referred to as the HY-6 (Hong Ying-6) (O'Halloran and Foss, 2011, p. 6).

2 Video footage purportedly taken in Syria also features a model of MANPADS that the Small Arms Survey was unable to identify. The missile features an aerodynamic spike, which is a distinguishing characteristic of the Russian Igla (9M39) and Igla-S (9M342) missiles. However, the launch tube and position of the missile in the tube appear to differ from those of the Igla and Igla-S. See Revolutionary Shields Commission (n.d.).

3 The US Department of State describes the Strela-2M as the model of MANPADS 'most commonly held by terrorist groups' (USDOS, 2011). While not as widely proliferated as Strela-2Ms, Igla-1 MANPADS have been acquired by armed groups in several countries (Hunter, 2001; Schroeder, 2007; 2013).

4 Some manufacturers have produced improved variants of Strela-2M-pattern missiles that feature improved seekers and larger and more effective warheads (O'Halloran and Foss, 2011, p. 42). It is not clear whether and to what extent these systems have proliferated.

5 See also Al-Akhbar English (2012); Al Arabiya (2012); Binnie (2012a); ITAR-TASS (2012).

6 The States News Service quotes Lavrov's statement as follows: 'There is confirmed information that there are about 50 complexes "Stinger" in the hands of opposition groups in Syria' (MFA, 2012). See also AFP (2012).

7 The term 'Stinger' is often incorrectly used as a synonym for 'MANPADS'.

8 See, for example, Chivers (2013b), Al Turkey (n.d.), and Deir al-Zour Media Authority (n.d.).

9 The manufacture date alone does not reveal the operational status of MANPADS. Some first-generation systems are still functional years or decades beyond their estimated shelf lives while newer systems may not function due to poor storage conditions, rough handling, or faulty components.

10 It is not clear from the source whether Countryman was referring to missiles or complete systems, but it is unlikely that Syria would have imported tens of thousands of complete systems.

11 See also IHS Jane's (2014a).

12 An alternative explanation put forward by IHS Jane's is that the inert systems were delivered as part of a planned sale that was cancelled by the Russian government as a result of diplomatic pressure (Binnie, 2012c).

13 According to IHS Jane's, a member of the Free Syrian Army claimed that an FN-6 MANPADS used in an attack on a Syrian helicopter had been looted from a Syrian military installation (IHS Jane's, 2013). There is little evidence to support this claim, however.

14 See, for example, Conflict Armament Research (2012); Small Arms Survey (2013, p. 6); UNSC (2014, p. 22).

15 SIPRI estimates that 50 missiles were delivered, which is not necessarily inconsistent with IHS Jane's estimate, if the latter is for launchers (SIPRI, n.d.).

16 See, for example, UNSC (2014, p. 77).

17 Researcher Nic Jenzen-Jones has also documented the presence of Pakistani Anza MK-II missiles in Libya, but there are no known reports of gripstocks (Jenzen-Jones, 2013).

18 Lebanese authorities also seized Igla-S (9M342) missiles but, as noted above, the missiles were intended for use with vehicle-mounted launchers and were reportedly incompatible with MANPADS gripstocks (Pyadushkin, 2011).

19 According to UN investigators, the ship carrying the weapons, the *Letfallah II*, is owned by a company that is based in Syria and whose owner is a Syrian citizen (UNSC, 2013, p. 36). In their 2014 report, UN investigators cite a Lebanese government report on the seizure, which indicates that the initiators and financiers of the shipments were Syrian citizens operating in Saudi Arabia (UNSC, 2014, p. 89).

20 The US Department of State describes the Strela-2M as the 'most proliferated type of MANPADS' (USDOS, 2011).

21 See, for example, Williams (2013).

22 See, for example, Bouckaert (2011).

23 For a detailed discussion of the differences between physical security and stockpile management practices adopted by armed groups and states, and of the factors that help to explain these differences, see King et al. (2013).

24 For a detailed discussion of why the US buyback programme failed to re-acquire all of the loose Stinger missiles, see Schroeder, Stohl, and Smith (2007, pp. 91–96).

25 See, for example, Ford (2014).

26 See UNROCA (n.d.).

27 In the interest of limiting the spread of potentially harmful online content, bibliographic information for the videos referenced in this section has been withheld.

28 International Civil Aviation Organization Resolution A36-19 '[u]rges all Contracting States to apply the principles defined in the Elements for Export Controls of MANPADS of the Wassenaar Arrangement' (ICAO, 2007, para. 5).

29 See G8 (2003), OAS (2005), and OSCE (2008).

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