

WEAPONS OF THE WAR IN UKRAINE

A three-year investigation of weapon supplies
into Donetsk and Luhansk

November 2021



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Front cover image: A UAV of unknown designation with the number 2166 documented by CAR in Kyiv on 10 November 2020.

Inside cover image: A PSO-1 optical sight documented by CAR on 19 December 2018 in Severodonets'k.

All photos taken by Conflict Armament Research unless stated otherwise.

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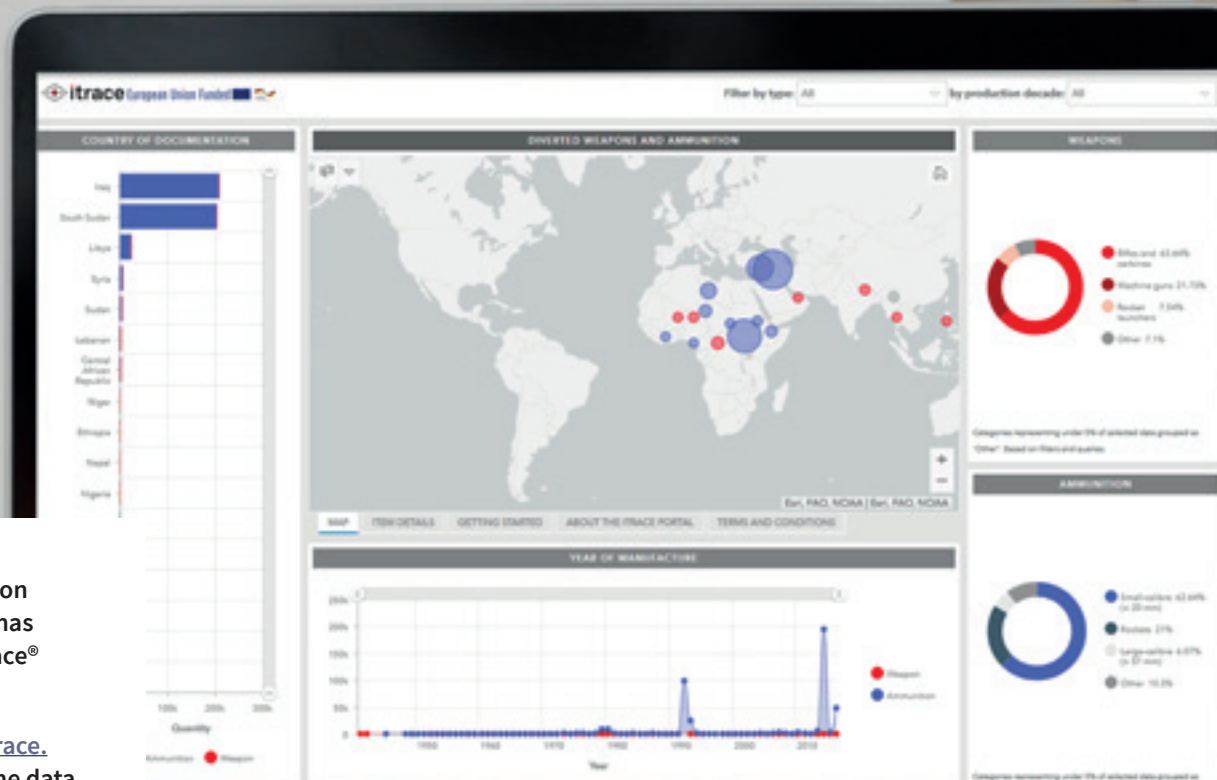
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LIST OF ABBREVIATIONS

ATGW	Anti-tank guided weapon
CAR	Conflict Armament Research
DPR	Donetsk People's Republic
IAI	Israel Aerospace Industries
LCW	PJSC Luhansk Cartridge Works
LPR	Luhansk People's Republic
MANPADS	Man-portable air defence system
UAV	Unmanned aerial vehicle



The weapons and ammunition data featured in this report has been published in CAR's iTrace® database.

Visit <https://ukraine-2021-itrace.hub.arcgis.com> to explore the data further and to access interactive case studies from this report.

KEY FINDINGS

- Factories based in what is today the Russian Federation manufactured the majority of the 4,793 rounds of small-calibre ammunition and all but two of the 43 weapons documented by Conflict Armament Research (CAR) in Ukraine between 2018 and 2020.¹ Almost half of the weapon models had never been documented by CAR in any of the other countries in which it studies diverted weapons, indicating that the conflict in Ukraine is not dependent on extra-regional supply chains.
- A significant proportion of the items recovered from the self-declared Donetsk and Luhansk 'People's Republics' (DPR/LPR) were manufactured after the dissolution of the Soviet Union.
- Most documented small arms displayed matching serial numbers on their main components. Such matches indicate that the components are original and were not taken from other weapons. The lack of component mixing suggests a short chain of custody between the point at which weapons left a production facility or military inventory and use by armed formations operating in certain areas of the Donetsk and Luhansk regions of Ukraine.
- CAR observed obliteration of certain marks on specific types of ammunition. Marks were obliterated in about two-thirds of the RPO-A and all of the MRO-A disposable rocket launchers documented in Ukraine, hindering attribution and traceability.² As with all cases of obliteration, it is likely that parties removed the marks either to conceal evidence of the precise point of diversion or to mask the country of manufacture.
- The parties responsible for obliterating some identifying marks on rocket launchers purposefully left others intact. These residual marks, such as secondary serial or lot numbers, would have enabled users to maintain inventories of the weapons although their primary identifying marks had been removed. This method suggests that the suppliers and the end users of these weapons applied record-keeping and inventory management processes in line with established military doctrine, implying that they operated within a larger, centralised logistics structure.
- Close analysis of mark obliteration methods indicates that markings were not removed in a consistent manner. The variations suggest that different channels sourced the materiel, that the end users themselves decided on the obliteration method, or that the approach to removing identifying marks evolved over time, in response to increased scrutiny.
- CAR's tracing of components of Russian-manufactured unmanned aerial vehicles (UAVs), recovered from armed formations operating in certain areas of the Donetsk and Luhansk regions of Ukraine, identified independent Russian electronics and component distributors as conduits for foreign technology acquisition on behalf of Russian defence and security entities.
- CAR documented a recovered intelligence, surveillance, and reconnaissance UAV model in eastern Ukraine that was identical to one recovered in Lithuania in 2016. Both UAVs had been constructed using a range of components manufactured in EU states.
- Disagreements between European governments and industry actors pose challenges to the enforcement of embargoes. Opaque licensing requirements for dual-use components, combined with a lack of clarity over the ultimate end use or end user of components, appear to facilitate the integration of key EU-made technology into Russian military UAVs, despite an EU arms embargo that was imposed on the Russian Federation in 2014. Indeed, between 2014 and 2018, according to Russian customs records, Israel Aerospace Industries (IAI) supplied a sanctioned Russian defence company and its subsidiary with UAV components produced by a range of European and US manufacturers.
- At least five Ukrainian defence industry entities based in Luhansk and Donetsk have begun exporting goods to a new set of Russian customers since the beginning of the war in eastern Ukraine in 2014. Two of these entities are part of the Ukrainian state-owned defence conglomerate Ukroboronprom. Further investigation is necessary to determine whether illegal expropriation and asset stripping of these Ukrainian state enterprises is occurring in certain areas of the Donetsk and Luhansk regions of Ukraine.

METHODOLOGY

CAR field investigation teams document illicit weapons, ammunition, and related materiel in conflict-affected locations and trace their supply sources.

The teams inspect weapons and other items in a variety of situations—whether recovered by state security forces, surrendered at the cessation of hostilities, cached, or held by insurgent forces. They document all items photographically, date and geo-reference the documentation, and incorporate contextual interview data gathered from the forces in control of the items at the time of documentation.

CAR occasionally uses information and photographs from social media as background information but does not base its investigations on them, since the provenance of such data is often difficult to verify. Moreover, open-source information does not always provide the detailed physical elements—notably external and internal markings—required to trace weapons and ammunition.

CAR traces only a portion of the items it documents in the field. This traced materiel is usually of particular significance to CAR investigations. If numerous individual items were to be traced, an excessive burden would need to be placed on the national governments and manufacturing companies concerned. Furthermore, some of the documented items are untraceable. For example, most loose small-calibre ammunition lacks the lot numbers required to identify it in production, sales, and export records. Similarly, records pertaining to the production, sale, and export of many older weapons are no longer available.

CAR supplements formal weapon tracing by analysing physical evidence gathered from the weapons themselves and from related materiel; obtaining government, commercial, transport, and other documents; and interviewing individuals with knowledge or experience of the equipment transfers under scrutiny.



▲ CAR supplements formal weapon tracing with analysis of physical evidence gathered from the weapons themselves and related materiel.

CAR retains all documents, interview notes, emails, recordings, photographs, and other data obtained from third parties in a secure, encrypted format. Wherever relevant, CAR publications refer to these items as being ‘on file’. To protect its sources, CAR is unable to publish all details about them or the circumstances under which it acquired certain items. CAR’s sources provide all such items willingly and with full knowledge of their use by CAR. CAR does not undertake undercover work or use other clandestine investigation methods. For privacy reasons, CAR’s open access publications do not refer to private individuals by name, except in the case of well-known public officials.

CAR has contacted all governments and companies substantively referenced in this report. Unless specified, no reference to the names of countries of manufacture, manufacturing companies, intermediary parties, distributors, intended end users, or other individuals or companies implies illegality or wrongdoing on the part of the named entity. CAR would like to acknowledge the cooperation of the governments, companies, and individuals whose responses to CAR’s trace requests and provision of other information have been critical in its ongoing investigations.

INTRODUCTION

Since 2014, Ukrainian defence and security forces have been engaged in combat with separatist elements active in parts of the Donetsk and Luhansk regions, two provinces bordering the Russian Federation (see Map 1). In this report, CAR will refer to these entities as ‘armed formations’ operating in ‘certain areas of the Donetsk and Luhansk regions of Ukraine’.

Since erupting in early 2014, the war has been punctuated by several internationally brokered—and often broken—ceasefires, while its front line of more than 400 km has remained largely unchanged (OCHA, n.d.; OSCE, n.d.). The conflict has resulted in thousands of military and civilian casualties, as well as the displacement of almost 1.5 million people (OHCHR, 2021; UNHCR, n.d.).

To sustain their war effort, the self-declared DPR and LPR have fielded a wide range of equipment, from assault rifles and designated marksman rifles to grenade and rocket launchers, precision-guided munitions, landmines, anti-tank guided weapons (ATGW), man-portable air defence systems (MANPADS), armoured personnel carriers, main battle tanks, and UAVs.

By comparing the collected information with details in its own database, CAR established that a significant portion of this equipment was manufactured after the dissolution of the Soviet Union and the independence of Ukraine. This finding highlights the fact that the weapons and ammunition in circulation in certain areas of the Donetsk and Luhansk regions of Ukraine are not solely made up of models that were designed decades ago, in the Soviet era. The presence of old designs complicates any study that seeks to reveal important details about the dynamics of weapon diversion that fuel a conflict, since identifying their ages and origins requires detailed physical inspection. Put simply, differentiating between old designs that have been in circulation for many decades and those that were produced more recently requires a study that is grounded in

THE WEAPONS AND AMMUNITION IN CIRCULATION IN CERTAIN AREAS OF THE DONETSK AND LUHANSK REGIONS OF UKRAINE ARE NOT SOLELY MADE UP OF MODELS THAT WERE DESIGNED DECADES AGO, IN THE SOVIET ERA.

field-gathered evidence. CAR’s fieldwork in Ukraine complements previous research on the topic (Ferguson and Jenzen-Jones, 2014; Schroeder and Shumska, 2021). The fieldwork also supports ongoing judicial, intelligence, and forensic investigations, enhancing stakeholders’ understanding of such aspects as rifle barrel modifications, partial obliteration attempts, the repetition of serial numbers on internal weapon parts, and details of internal UAV components.

With the cooperation of the Security Service of Ukraine, CAR field investigation teams gained access to weapons, ammunition, and related items recovered from armed formations operating in certain areas of the Donetsk and Luhansk regions of Ukraine. Between 2018 and 2020, CAR documented captured materiel held by eight different institutions within the Ukrainian judicial and security system, including the National Guard of Ukraine, the National Police of Ukraine, the Security Service of Ukraine, the State Border Guard Service of Ukraine, the Ukrainian Armed Forces, the Ukrainian General Prosecutor, the Ukrainian Military Prosecutor, and the Ukrainian Ministry of Internal Affairs (hereafter referred to as ‘Ukrainian defence and security forces’). Together, these forces recovered weapons and ammunition in 29 different locations across the Donetsk and Luhansk regions between 2014 and 2019 (see Map 1). Unless specified otherwise, the items featured in this report were recovered from armed formations operating in certain areas of the Donetsk and Luhansk regions of Ukraine, or from individuals allegedly connected to them.

Ukrainian authorities provided extensive and detailed responses to CAR’s trace requests, which sought to establish whether the documented materiel once belonged in Ukrainian national inventories. The responses feature information gathered with the facilitation of the Security Service of Ukraine from entities such as the Administration of the State Border Guard Service of Ukraine; the Central Missile and Artillery Directorate of Armaments; the Department of State Property and Resources of the Ministry of Interior of Ukraine; the Logistics Force Command of the Armed Forces of Ukraine; the Main Directorate of the National Guard of Ukraine; the Ministry of Interior Staff Support Department; and the National Police of Ukraine. All these entities provided information on weapons and ammunition registered with them by their markings, serial numbers, lot numbers, or years of manufacture, apart from the Ministry of Interior of Ukraine, which is not authorised to record such information.

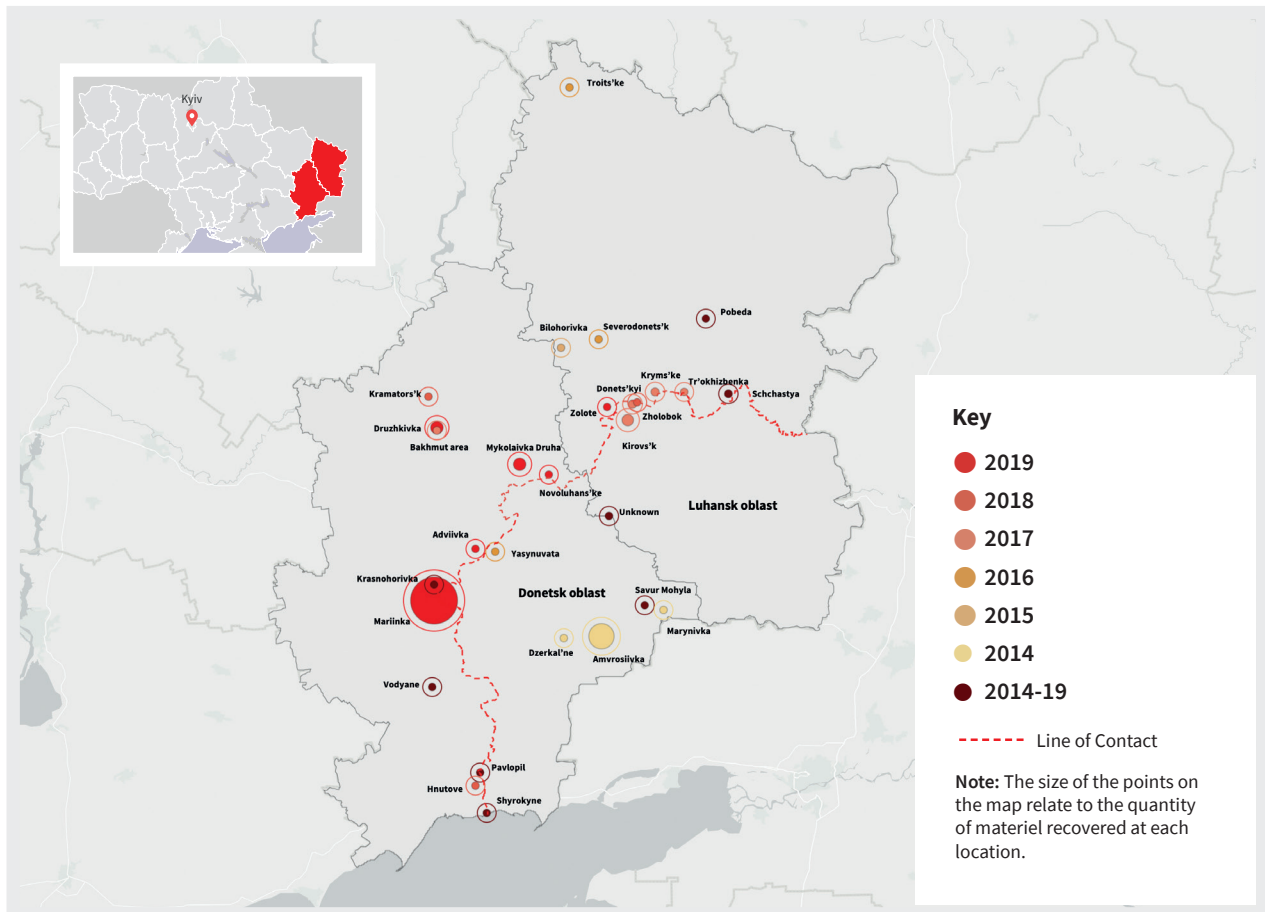
This report features data gathered by CAR field investigation teams, complemented by extensive tracing, forensics, and investigative operations. These activities shine an evidence-based light on the military supply chains of the self-declared DPR and LPR. The report is a window into a largely forgotten conflict that, since early 2014, has persisted at the edge of Europe. It shows that the ‘People’s Republics’ are more than militias armed with weapons inherited from the former Soviet Union; rather, they mimic modern armies and follow established military doctrine.

It should be noted that CAR has no evidence that any of the companies or individuals named in this report have been responsible for support or supply to armed formations operating in Ukraine, or any other wrongdoing.

Map 1

Recovery locations of weapons and ammunition

Documented by CAR in Ukraine, 2018–20





**THIS REPORT IS A
WINDOW INTO A
LARGELY FORGOTTEN
CONFLICT THAT, SINCE
EARLY 2014, HAS
PERSISTED AT THE
EDGE OF EUROPE.**

DOCUMENTATION

Between September 2018 and October 2020, CAR field investigation teams documented 43 weapons and 4,890 units of ammunition. Ukrainian defence and security forces recovered all items between 2014 and 2019 from armed formations operating in certain areas of the Donetsk and Luhansk regions of Ukraine (see Figures 1–2).

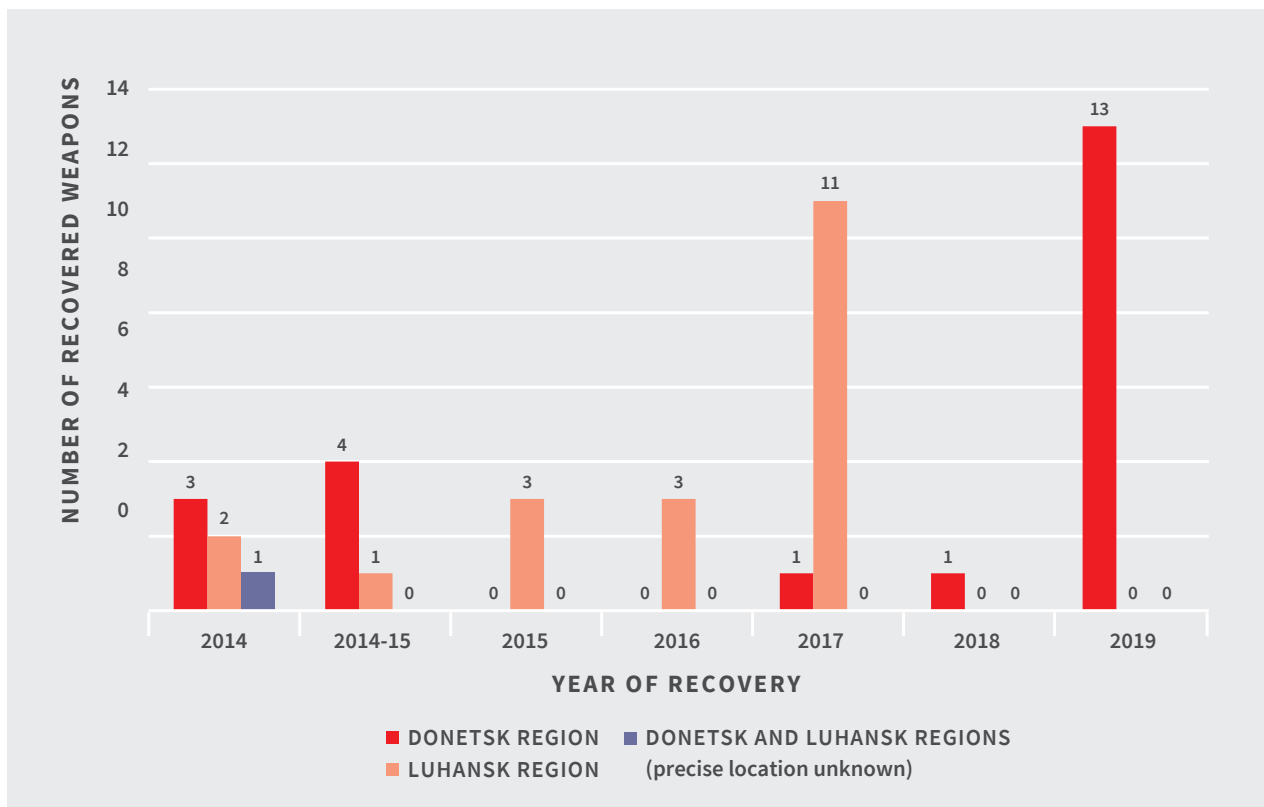
As the following analysis of weapons and ammunition demonstrates, a large proportion of the materiel documented in Ukraine has not been observed by CAR anywhere else in its global operations. Indeed, CAR’s global database shows that 9 of 20 weapon models, 45 of 64 small-calibre ammunition headstamps, and 26 of 29 ammunition models (other than small-calibre ammunition) are unique to the conflict

in Ukraine and have not been documented outside of the country.³ The relative isolation of this data sample compared to CAR’s wider data set is to be expected considering that this is CAR’s first engagement in the region. However, the lack of model matches with other conflict-affected locations where CAR works helps to illustrate a conflict that does not appear dependent on extra-regional supply chains.

Within the Ukraine sample, 5.45 × 39 mm calibre ammunition and weapons chambered for it are by far the most common, constituting 69 per cent of the ammunition sample and 40 per cent of the weapon sample. The other significant calibre was 7.62 × 54 mm R, which accounts for 26 per cent of the weapons and 23 per cent of the ammunition (see Figure 3).

Figure 1

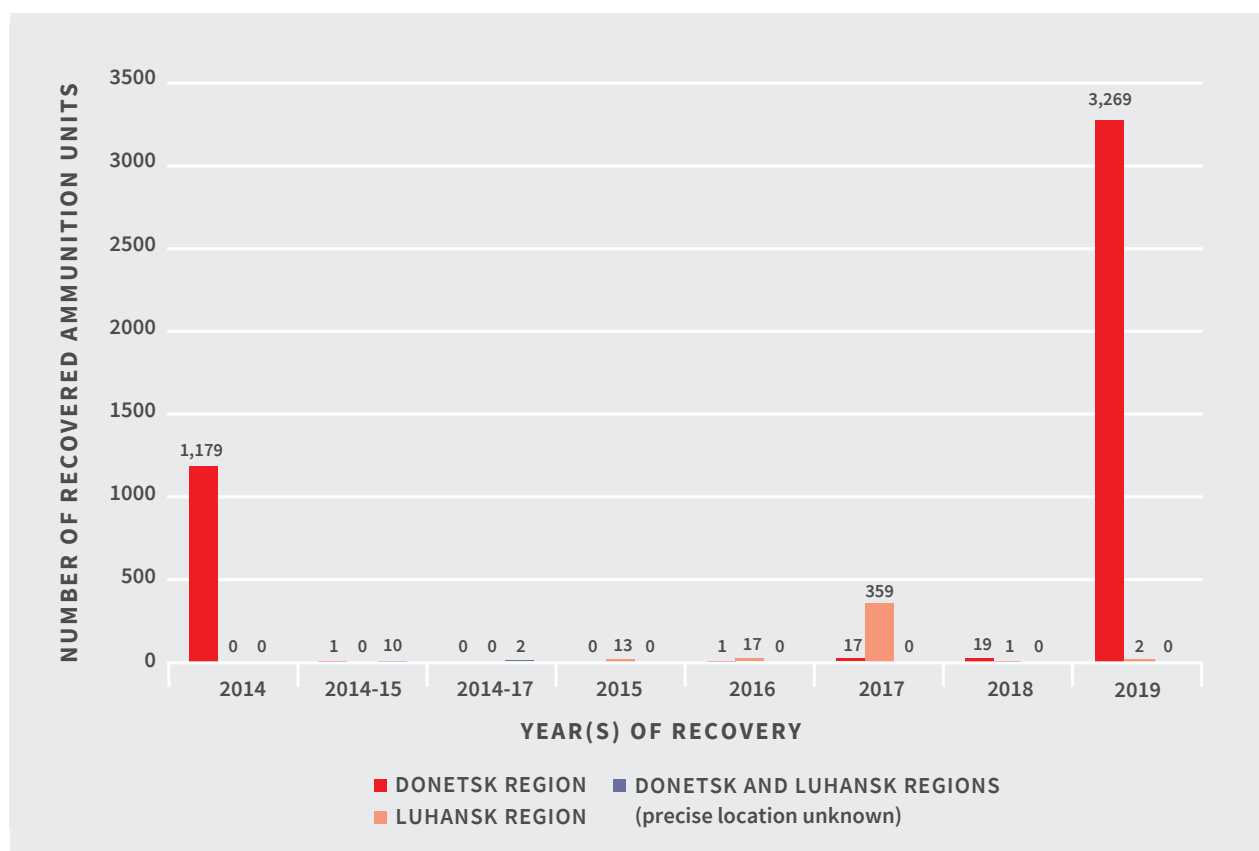
Year of recovery of weapons by region within certain areas of the Donetsk and Luhansk regions of Ukraine



Note: Recovery information gathered by CAR during documentation did not always include a precise date or location of recovery.

Figure 2

Year of recovery of units of ammunition by region within certain areas of the Donetsk and Luhansk regions of Ukraine



Note: Recovery information gathered by CAR during documentation did not always include a precise date or location of recovery.

Figure 3

Ammunition and weapons documented by CAR in Ukraine, by calibre

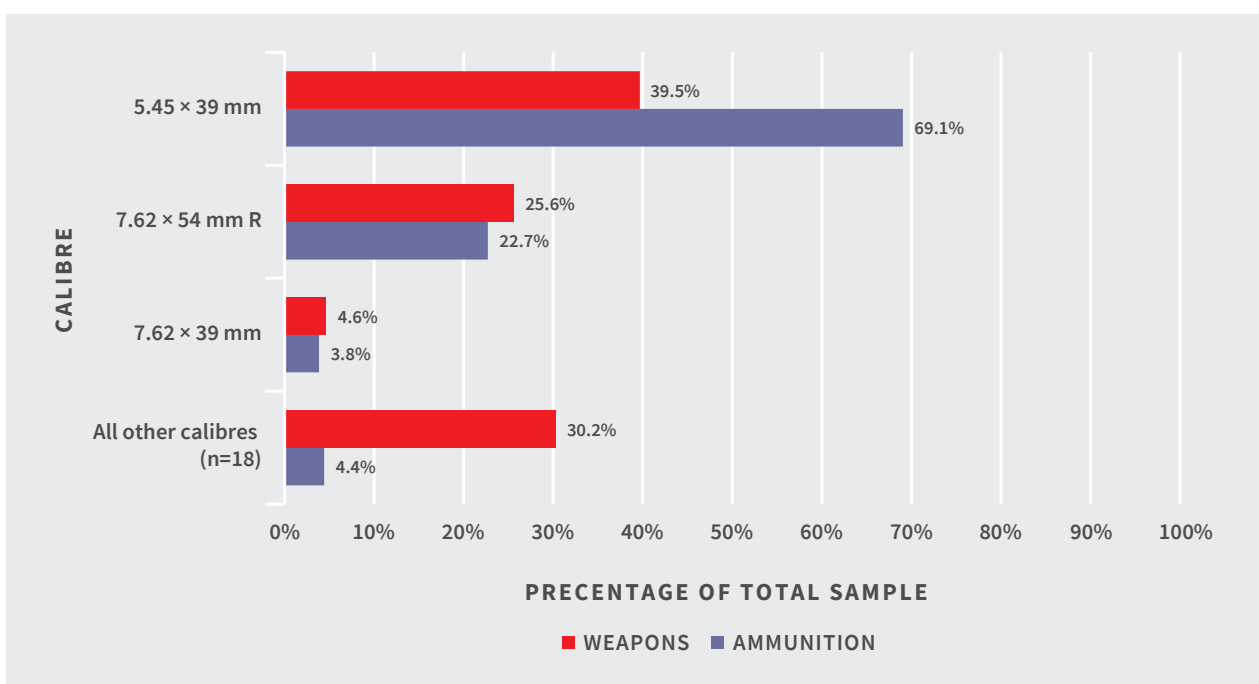
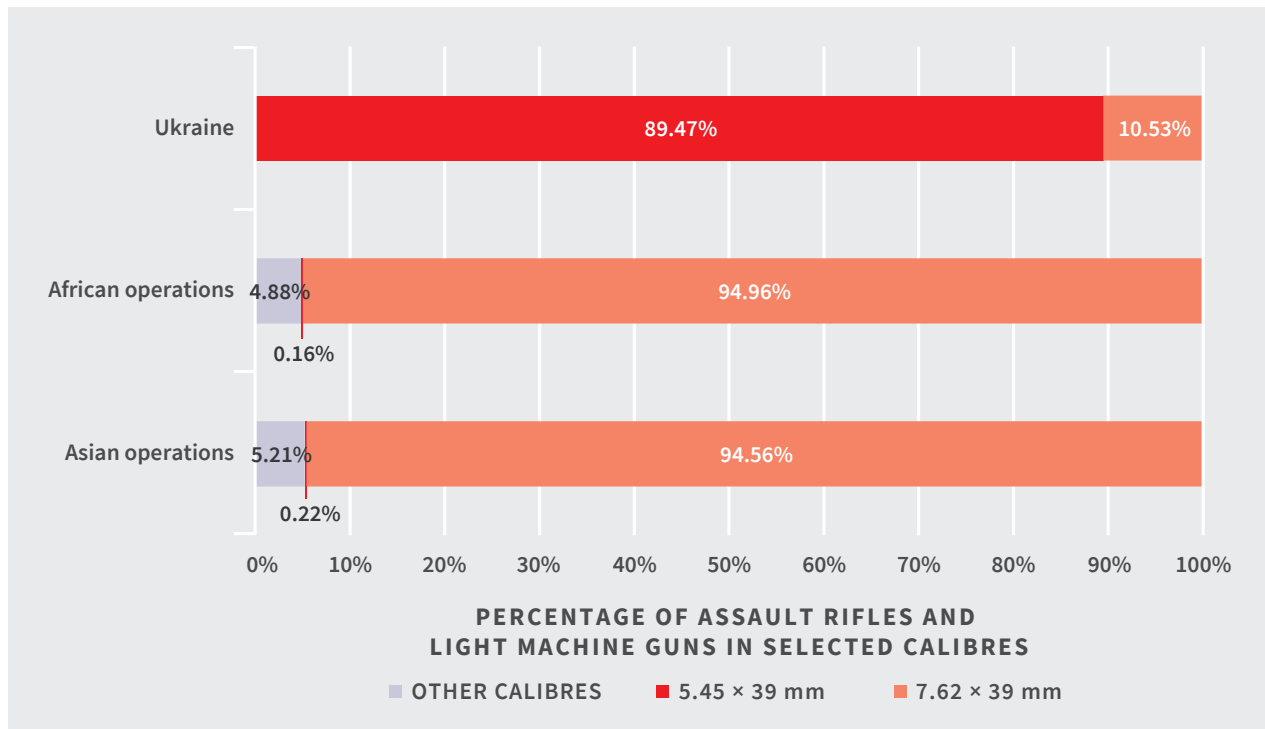


Figure 4

Prevalence of 5.45 × 39 mm calibre assault rifles and light machine guns in CAR's documentation regions, compared to 7.62 × 39 mm



Note: Other calibres for these weapons include: 5.56 × 45 mm, 7.5 × 54 mm, 7.62 × 25 mm, 7.62 × 51 mm, and 7.62 × 54 mm R.

The prominence of the 5.45 × 39 mm calibre in the Ukraine sample is notable, particularly as CAR found no evidence of supply connections with other conflicts in which its field investigation teams operate. Unlike those conflicts, the one in Ukraine does not appear to be dependent on extra-regional supply chains.

per cent of its entire weapon sample), 17 of them in Ukraine. Accordingly, Ukraine is the only country in CAR's data set where 5.45 × 39 mm is the most commonly observed weapon calibre (see Figure 4). This finding illustrates a phenomenon common across most regions where CAR operates: illicit actors typically rely more on short-range, regional weapon supply routes than on long-range, complex diversion mechanisms.

▼ CAR field investigation team documenting a weapon component in Ukraine.

In its global operations, CAR has documented only 28 weapons of this calibre (about 0.5





WEAPONS OF THE WAR IN UKRAINE

WEAPONS

—

WEAPONS

CAR documented 43 weapons in Ukraine between 2018 and 2020.⁴ The most common weapon categories were assault rifles (15 items) and precision rifles (nine items). CAR also documented 8 machine guns (4 light, 3 medium, and 1 heavy); 6 grenade launchers (3 automatic and 3 under-barrel); 2 self-loading pistols; 1 anti-materiel rifle; 1 recoilless weapon; and 1 medium mortar (see Table 1).

Factories based in what is today the Russian Federation manufactured all the weapons that CAR documented, apart from one Chinese Type 54 pistol and one M-37-pattern mortar whose provenance could not be established. In total, CAR documented 20 weapon models in Ukraine. Nine models are unique to Ukraine in CAR's database; CAR has never documented them anywhere else in its global operations (see Table 1).

Table 1

Weapon models documented by CAR in Ukraine, 2018–20

Note: = Highlighted items are unique to Ukraine in CAR's global database.

Type	Model	Quantity documented	Calibre	Manufacturer	Country	Year(s) of manufacture
Self-loading pistol	Makarov	1	9 × 18 mm	Izhmash	Russian Federation	1984
	Type 54	1	7.62 × 25 mm	Unknown	China	Unknown
Assault rifle	AKM	1	7.62 × 39 mm	Izhmash	Russian Federation	1962
	AK-74	8	5.45 × 39 mm	Izhmash	Russian Federation	1980 1985 (2) 1986 (2) 1987 (2) 1988
	AKS-74	3	5.45 × 39 mm	Izhmash	Russian Federation	1981 1983 1987
	AK-74N	2	5.45 × 39 mm	Izhmash	Russian Federation	1986 1991
	AK-74M	1	5.45 × 39 mm	Izhmash	Russian Federation	1993
Designated marksman rifle	SVD	8	7.62 × 54 mm R	Izhmash	Russian Federation	1980 1990 (2) 1994 (3) 2000 (2)
	VSS	1	9 × 39 mm	Tula Arms Plant	Russian Federation	Unknown

Type	Model	Quantity documented	Calibre	Manufacturer	Country	Year(s) of manufacture
Anti-materiel rifle	ASVK	1	12.7 × 108 mm	V.A. Degtyarev Plant JSC	Russian Federation	2013
Light machine gun	RPK	1	7.62 × 39 mm	Vyatskie Polyany Machine-Building Plant Molot	Russian Federation	1970
	RPK-74	3	5.45 × 39 mm	Vyatskie Polyany Machine-Building Plant Molot	Russian Federation	1981 1985 1987
Medium machine gun	PKM	2	7.62 × 54 mm R	Kovrov Mechanical Plant JSC	Russian Federation	1975 1977
	PKT	1	7.62 × 54 mm R	Tula Arms Plant	Russian Federation	1980
Heavy machine gun	KPVT	1	14.5 × 114 mm	V.A. Degtyarev Plant JSC	Russian Federation	1977
Recoilless weapon	RPG-7V	1	40 mm	Kovrov Mechanical Plant JSC	Russian Federation	1977
Automatic grenade launcher	AGS-17	3	30 mm	Vyatskie Polyany Machine-Building Plant Molot	Russian Federation	1995 1996 1999
Under-barrel grenade launcher	GP-25	2	40 mm	Unknown	Russian Federation	Unknown
	GP-34	1	40 mm	Izhmash	Russian Federation	Unknown
Medium mortar	M-37-pattern	1	82 mm	Unknown	Unknown	Unknown

CAR has identified the age of 37 weapons in this sample (86 per cent); these items span six production decades between 1962 and 2013. Ten of the 43 weapons documented by CAR in Ukraine were manufactured after

the dissolution of the Soviet Union in 1991 (see Figures 5–6). Five factories based in the Russian Federation manufactured the weapons documented by CAR in Ukraine (see Figure 7).

Figure 5

Weapons documented in Ukraine for which CAR identified the year of production, in relation to the dissolution of the Soviet Union (n=37)



Figure 6

Period of manufacture of weapon types documented in Ukraine, in relation to the dissolution of the Soviet Union (n=43)

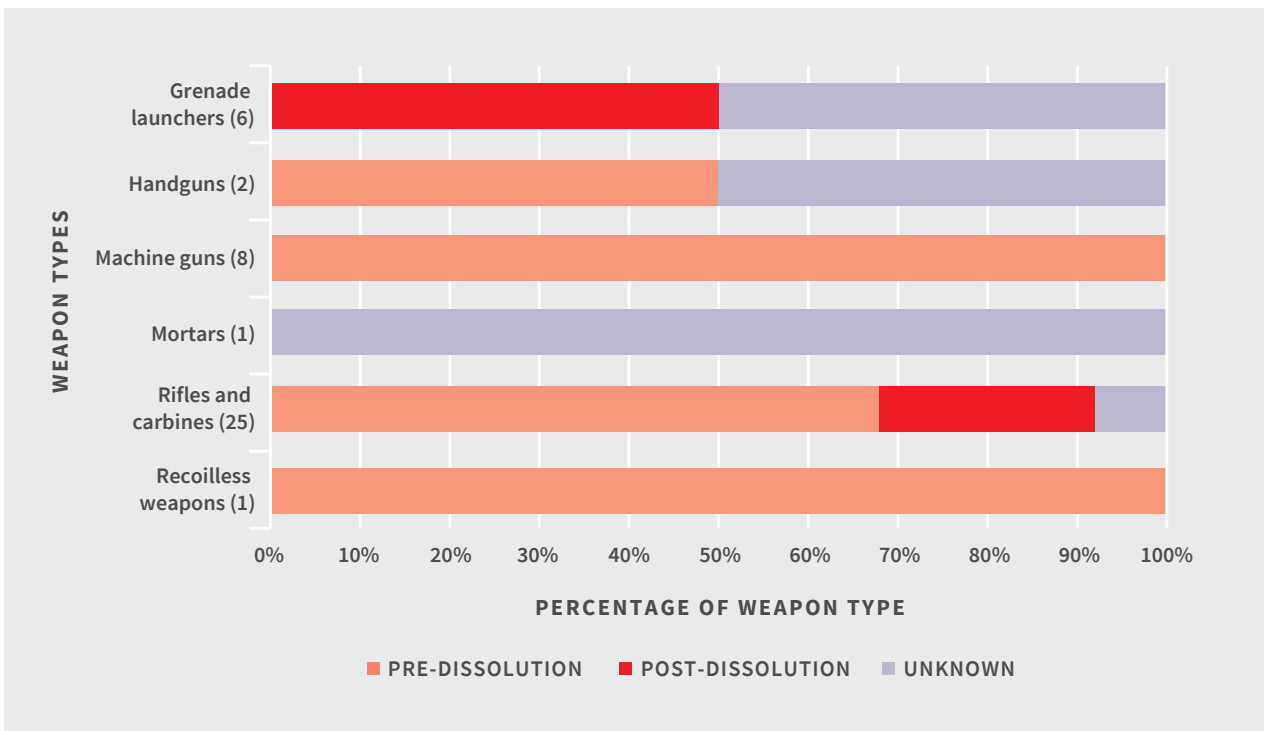
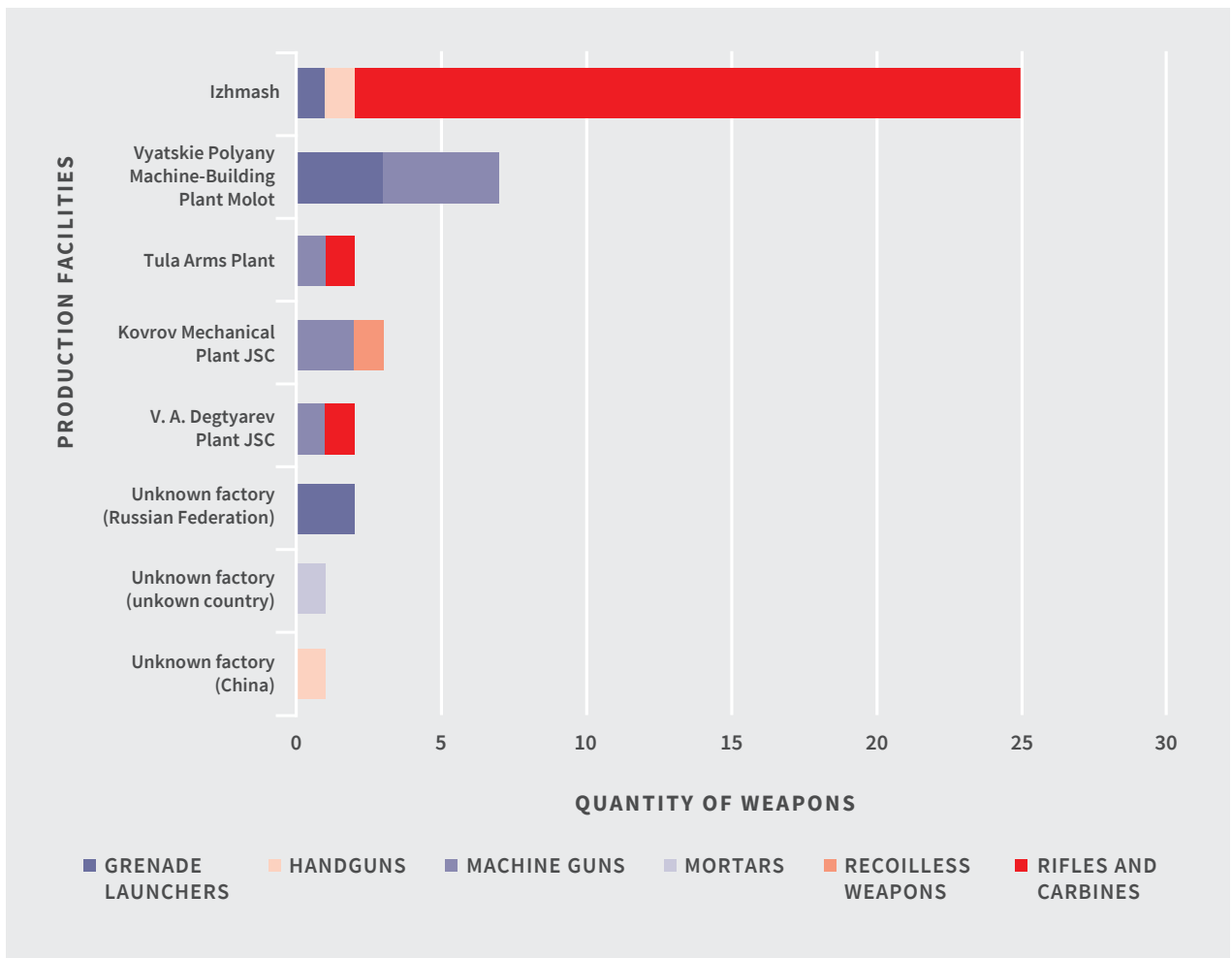


Figure 7
Number of weapons, by type and production facility (n=43)



▼ Ministry of Foreign Affairs of Ukraine (left) and St. Michael's Golden-Domed Monastery (right), Kyiv.



Three of the documented weapons feature names, written or printed onto paper or cloth and taped onto them (see Map 2).⁵ This practice suggests that some armed formations attempt to exercise some degree of inventory management. In the absence of more formalised record-keeping tools and training, however, they appear to have used temporary labelling to ensure that individuals were issued with the weapons assigned to them.

The locations and formatting of the labels are inconsistent, however. All labels feature an individual's name, although presented differently; only one includes the weapon's serial number. These discrepancies suggest a lack of standardisation in the management process, which so far is concentrated in the Luhansk region (see Map 2).

Map 2

Recovery points of weapons featuring a name taped onto them



Distinctive models

Nine of the 20 weapon models documented by CAR in Ukraine have never been documented anywhere else in CAR's global operations. They include a 9 × 39 mm VSS designated marksman rifle, produced on an unknown date (see Figure 49), and a 12.7 × 108 mm ASVK anti-materiel rifle, manufactured in 2013 (see Figure 50).

CAR's database contains thousands of weapons, spanning more than 900 different models, many of which CAR documented in multiple conflict zones. The fact that nearly half of the models documented in Ukraine are unique to the conflict is thus notable. All nine weapon models originated in factories based in what is now the Russian Federation, including weapons manufactured during the Soviet era.

HANDGUNS

9 × 18 mm Makarov pistol

On 11 December 2019, CAR documented one 9 × 18 mm Makarov pistol (see Figure 8). Izhmash manufactured this item in 1984.

→ Ukrainian authorities responded to a CAR trace request, indicating that this pistol was in service with their armed forces before being lost during an attack by armed formations on a Ukrainian command post in the Donetsk region in April 2014.⁶ Russian authorities have yet to respond to a CAR trace request, which sought more information on this item.⁷

Figure 8

A 9 × 18 mm Makarov pistol with the serial number YX4762

Documented by CAR in Severodonets'k on 11 December 2019



7.62 × 25 mm Type 54 pistol

On 11 December 2019, CAR documented one 7.62 × 25 mm Type 54 pistol (see Figure 9). This is the only Chinese weapon that CAR documented in Ukraine. CAR was not able to identify the factory that produced the weapon.

→ In response to a trace request sent by CAR, Ukrainian authorities reported that this pistol was not in service with the Armed Forces of Ukraine, and that it was not recorded as stolen or lost.⁸ Chinese authorities have yet to respond to a CAR trace request, which sought more information on this item.⁹

Figure 9

A 7.62 × 25 mm Type 54 pistol with the serial number 30032424

Documented by CAR in Severodonets'k on 11 December 2019



▼ View of Mariupol and the Sea of Azov.

RIFLES

7.62 × 39 mm AKM assault rifle

On 17 December 2018, CAR documented one 7.62 × 39 mm AKM assault rifle (see Figure 10). Izhmash manufactured the rifle in 1962.

The rifle still has its original bolt and bolt carrier, which are marked with part of the weapon's serial number.

→ In response to a trace request sent by CAR, Ukrainian authorities reported that the AKM rifle had never been in service with the Armed Forces of Ukraine, that it had not been recorded as stolen, lost, or written-off, and that it was never transferred to any other military units.¹⁰ Russian authorities have yet to respond to a CAR trace request, which sought more information on this item.¹¹

Figure 10

A 7.62 × 39 mm AKM assault rifle with the serial number TP0280

Documented by CAR in Kyiv on 17 December 2018



5.45 × 39 mm AK-74 assault rifle

CAR documented eight 5.45 × 39 mm AK-74 assault rifles in Ukraine (see Table 2 and Figures 11–21). Izhmash manufactured these rifles between 1980 and 1988. Ukrainian defence and security forces recovered four of the rifles in four separate events in Luhansk region in 2016 and 2017, and the other four in two recoveries in Donetsk region in 2019.

Seven of the eight rifles retain their original bolts and bolt carriers, which are marked with part of each weapon's serial number. Given the interoperability of AK-pattern assemblies and components, it is not surprising that CAR has documented numerous weapons with mismatched components, particularly among materiel in service with non-state forces or non-military personnel. In the Ukraine sample, however, a large proportion of weapons bear

matching serial numbers, which probably indicates a short chain of custody between their dispatch from a factory or a formal military inventory and their entry into service with armed formations operating in certain areas of the Donetsk and Luhansk regions of Ukraine.

In response to a trace request sent by CAR, Ukrainian authorities reported that six of the AK-74 rifles CAR documented had never been in service with the Armed Forces of Ukraine, that they were not recorded as stolen, lost, or written-off, and that they were never transferred to any other military units.¹²

The authorities also reported that the rifles with serial numbers 4124725¹³ and 4293274¹⁴ were in service with a Ukrainian military unit based in Crimea and were abandoned after the

MANY WEAPONS BEAR MATCHING SERIAL NUMBERS, WHICH MAY INDICATE A SHORTER CHAIN OF CUSTODY BETWEEN MANUFACTURE AND END USE.

Russian annexation of 2014 (see Figures 13–14). CAR does not know the chain of custody of these weapons between Crimea in 2014 and their recovery in eastern Ukraine by Ukrainian defence and security forces in 2016 and 2019.

Russian authorities have yet to respond to a CAR trace request, which sought more information on these items.¹⁵

Table 2

AK-74 assault rifles documented by CAR in Ukraine

Note: = CAR traced the highlighted items to the Ukrainian national inventory.

Recovery date and location	Year of manufacture	Serial number	Bolt mark	Bolt carrier mark
15 April 2019 (Shyrokyne)	1980	701 560	560	560
12 June 2019 (Druzhkivka)	1985	3754 038	038	038
5 March 2016 (Schchastya)	1985	4124 725	725	725
15 April 2019 (Shyrokyne)	1986	4293 274	274	274
2017 (Holubivka)	1986	4310 184	817	176
24 June 2017 (Tr'okhizbenka)	1987	4737 492	492	492
11 July 2016 (Troits'ke)	1987	5177 278	278	278
12 June 2019 (Druzhkivka)	1988	5419 478	478	478

Figure 11

A 5.45 × 39 mm AK-74 assault rifle with the serial number 701560

Documented by CAR in Mariupol on 9 May 2019



Figure 12

A 5.45 × 39 mm AK-74 assault rifle with the serial number 3754038

Documented by CAR in Kramators'k on 17 September 2019



Figure 13

A 5.45 × 39 mm AK-74 assault rifle with the serial number 4124725

Documented by CAR in Kyiv on 17 December 2018



Figure 14

A 5.45 × 39 mm AK-74 assault rifle with the serial number 4293274
Documented by CAR in Mariupol on 9 May 2019



Figure 15

A 5.45 × 39 mm AK-74 assault rifle with the serial number 4310184
Documented by CAR in Holubivka on 11 December 2019



▼ Mural depicting
Lesya Ukrainka,
Reitarska Street, Kyiv.



Unlike other AK-74 assault rifles documented by CAR in Ukraine, the one documented in Holubivka bears marks on its bolt and bolt carrier that are distinct from its main serial number (4310184), indicating that these components were taken from other weapons (see Figures 16–18).

Figure 16

Serial number 4310184 on the left-hand side of the forward trunnion of a 5.45 × 39 mm AK-74 assault rifle

Documented by CAR in Holubivka on 11 December 2019



Figure 17

Bolt of 5.45 × 39 mm AK-74 assault rifle with the serial number 4310184

Documented by CAR in Holubivka on 11 December 2019



Figure 18

Right-hand side of the bolt carrier of a 5.45 × 39 mm AK-74 assault rifle with the serial number 4310184

Documented by CAR in Holubivka on 11 December 2019



Figure 19

A 5.45 × 39 mm AK-74 assault rifle with the serial number 4737492

Documented by CAR in Severodonets'k on 19 December 2018



Figure 20

A 5.45 × 39 mm AK-74 assault rifle with the serial number 5177278

Documented by CAR in Kyiv on 17 December 2018



Figure 21

A 5.45 × 39 mm AK-74 assault rifle with the serial number 5419478

Documented by CAR in Kramators'k on 17 September 2019



5.45 × 39 mm AKS-74 assault rifle

On 19 December 2018, 6 May 2019, and 17 September 2019, CAR documented three 5.45 × 39 mm AKS-74 assault rifles (see Figures 22–24). Izhmash manufactured the rifles in 1987, 1981, and 1983, respectively.

The AKS-74 with the serial number 5252901 features a bolt and a bolt carrier taken from other weapons (see Figure 22). In response to a trace request sent by CAR, Ukrainian authorities reported that the rifle had been in service with a Ukrainian military unit based in Crimea and was left there after the Russian annexation of 2014.¹⁶ CAR does not know the chain of custody

of this weapon between Crimea in 2014 and its recovery in eastern Ukraine by Ukrainian defence and security forces on 5 June 2017.

→ In response to a trace request sent by CAR, Ukrainian authorities reported that the two other AKS-74 assault rifles had never been in service with the Armed Forces of Ukraine, that they were not recorded as stolen, lost, or written-off, and that they were never transferred to any other military units.¹⁷ Russian authorities have yet to respond to a CAR trace request, which sought more information on these items.¹⁸

Figure 22

A 5.45 × 39 mm AKS-74 assault rifle with the serial number 5252901

Documented by CAR in Severodonets'k on 19 December 2018



Figure 23

A 5.45 × 39 mm AKS-74 assault rifle with the serial number 1291269

Documented by CAR in Sarny on 6 May 2019



Figure 24

A 5.45 × 39 mm AKS-74 assault rifle with the serial number 2706638

Documented by CAR in Kramators'k on 17 September 2019



Crimea

KEY FINDING

Through formal tracing with Ukrainian authorities, CAR has confirmed that several of the weapons documented in this report had previously been in service with Ukrainian military units based in Crimea. These weapons—which include two AK-74 rifles and

one AKS-74 rifle (see Figures 13–14 and 22)—were abandoned after the Russian annexation of Crimea in 2014. One of the AK-74 rifles was recovered from armed formations in Luhansk region in March 2016, barely two years after the annexation.

▼ A CAR field investigation team took apart a VSS suppressed designated marksman rifle to document it in Ukraine.



5.45 × 39 mm AK-74N assault rifle

On 19 December 2018 and 17 December 2019, CAR documented two 5.45 × 39 mm AK-74N assault rifles (see Figures 25–26). Izhmash produced these rifles in 1991 and 1986, respectively. The two rifles still retain their original bolts and bolt carriers, which are marked with part of the weapons' serial numbers.

→ In response to a trace request sent by CAR, Ukrainian authorities reported that the AK-74N assault rifles had never been in service with the Armed Forces of Ukraine, that they were not recorded as stolen, lost, or written-off, and that they were never transferred to any other military units.¹⁹ Russian authorities have yet to respond to a CAR trace request, which sought more information on these items.²⁰

Figure 25

A 5.45 × 39 mm AK-74N assault rifle with the serial number 7492536

Documented by CAR in Severodonets'k on 19 December 2018



Figure 26

A 5.45 × 39 mm AK-74N assault rifle with the serial number 4799855

Documented by CAR in Kramators'k on 17 September 2019



5.45 × 39 mm AK-74M assault rifle

On 6 May 2019, CAR documented one 5.45 × 39 mm AK-74M assault rifle (see Figure 27). Izhmash manufactured this rifle in 1993. The rifle retains its original bolt and bolt carrier, which are marked with part of the weapon's serial number.

→ In response to a trace request sent by CAR, Ukrainian authorities reported that the AK-74M rifle had never been in service with the Armed Forces of Ukraine, that it was not recorded as stolen, lost, or written-off, and that it was never transferred to any other military units.²¹ Russian authorities have yet to respond to a CAR trace request, which sought more information on this item.²²

Figure 27

A 5.45 × 39 mm AK-74M assault rifle with the serial number 8364331

Documented by CAR in Rivne on 6 May 2019



Short chain of custody:

Original components

Many of the rifles documented by CAR in Ukraine retain their original components, including seven of the eight AK-74 rifles featured in this report (see Table 2 and Figures 11–21).

The fact that most AK-variant rifles carry interchangeable components—and are in illicit circulation in conflicts for years or decades—means that CAR investigators in other oper-

ations commonly encounter weapons with mixed components from different weapons (often multiple different weapons).

A large proportion of the weapons documented in Ukraine bear matching serial numbers, which may suggest a short chain of custody between their dispatch from a factory or formal military inventory and their acquisition by armed formations.

7.62 × 54 mm R SVD designated marksman rifle

Between 2018 and 2019, CAR documented eight 7.62 × 54 mm R SVD designated marksman rifles. Izhmash manufactured these rifles between 1980 and 2000, five of them after the dissolution of the Soviet Union in 1991 (see Table 3 and Figures 28–36).

In all but two cases, the serial number on the SVD rifles is repeated, often in full, on key weapon components, including the bolt, bolt carrier, top cover, and fire selector lever. In contrast, each of the remaining two rifles features a component marked with the same alphanumeric sequence and taken from another undocumented SVD (see Table 3). This suggests that, at some stage, both SVD rifles were present alongside a third, undocumented one.

→ In response to a trace request sent by CAR, Ukrainian authorities reported that the SVD rifles had never been in service with the Armed Forces of Ukraine, that they were not recorded as stolen, lost, or written-off, and that they were never transferred to any other military units.²³ Russian authorities have yet to respond to CAR's trace requests, which sought more information on these items.²⁴

Table 3

SVD rifles documented by CAR in Ukraine

Recovery date and location	Year of manufacture	Serial number	Bolt carrier mark	Bolt mark	Top cover mark
12 June 2019 (Druzhkivka)	1980	17368	[component not present]	[component not present]	17368
5 June 2017 (Donets'kyi)	1990	90985	90985	90985	[no marks]
5 June 2017 (Donets'kyi)	1990	91438	91438	91438	91438
1 June–31 August 2014 (Savur Mohyla)	1994	43039	43039	43039	AB-231
1 June–31 August 2014 (Savur Mohyla)	1994	43646	43646	AB231	[no marks]
24 June 2017 (Tr'okhizbenka)	1994	44797	44797	44797	44797
1–10 March 2018 (Krasnohorivka)	2000	0060300	60300	60300	60300
24 June 2017 (Tr'okhizbenka)	2000	0061272	61272	61272	[no marks]

Figure 28

A 7.62 × 54 mm R SVD designated marksman rifle with the serial number 17368

Documented by CAR in Druzhkivka on 17 September 2019



Figure 29

A 7.62 × 54 mm R SVD designated marksman rifle with the serial number 90985

Documented by CAR in Severodonets'k on 19 December 2018



Figure 30

Prayer ribbon found on an SVD rifle, with two prayers of protection (Psalm 90 and Prayer of the Holy Cross) on the left and right of the Calvary variant of the Russian Orthodox Cross

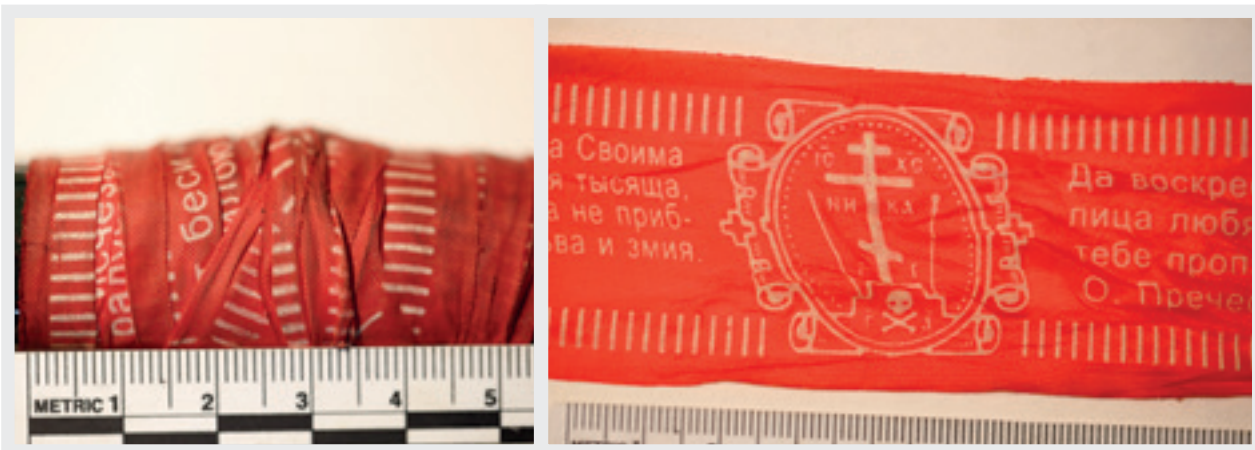


Figure 31

A 7.62 × 54 mm R SVD designated marksman rifle with the serial number 91438

Documented by CAR in Severodonets'k on 19 December 2018

**Figure 32**

A 7.62 × 54 mm R SVD designated marksman rifle with the serial number 43039

Documented by CAR in Paraskoviivka on 8 May 2019

**Figure 33**

A 7.62 × 54 mm R SVD designated marksman rifle with the serial number 43646

Documented by CAR in Paraskoviivka on 8 May 2019

**Figure 34**

A 7.62 × 54 mm R SVD designated marksman rifle with the serial number 44797

Documented by CAR in Severodonets'k on 19 December 2018



Figure 35

A 7.62 × 54 mm R SVD designated marksman rifle with the serial number 0060300

Documented by CAR in Mariupol on 18 September 2019



Figure 36

A 7.62 × 54 mm R SVD designated marksman rifle with the serial number 0061272

Documented by CAR in Severodonets'k on 19 December 2018



CAR inspected the bores of the rifles with serial numbers 43039 and 43646, which are camouflaged and feature post-production modifications to the barrels (see Figures 32–33). CAR observed no visible corrosion or excessive wear to the bore (see Figure 37). While the crown of the rifle with the serial number 43039 shows marks caused by barrel cleaning, CAR does not consider this damage severe enough to reduce accuracy significantly.

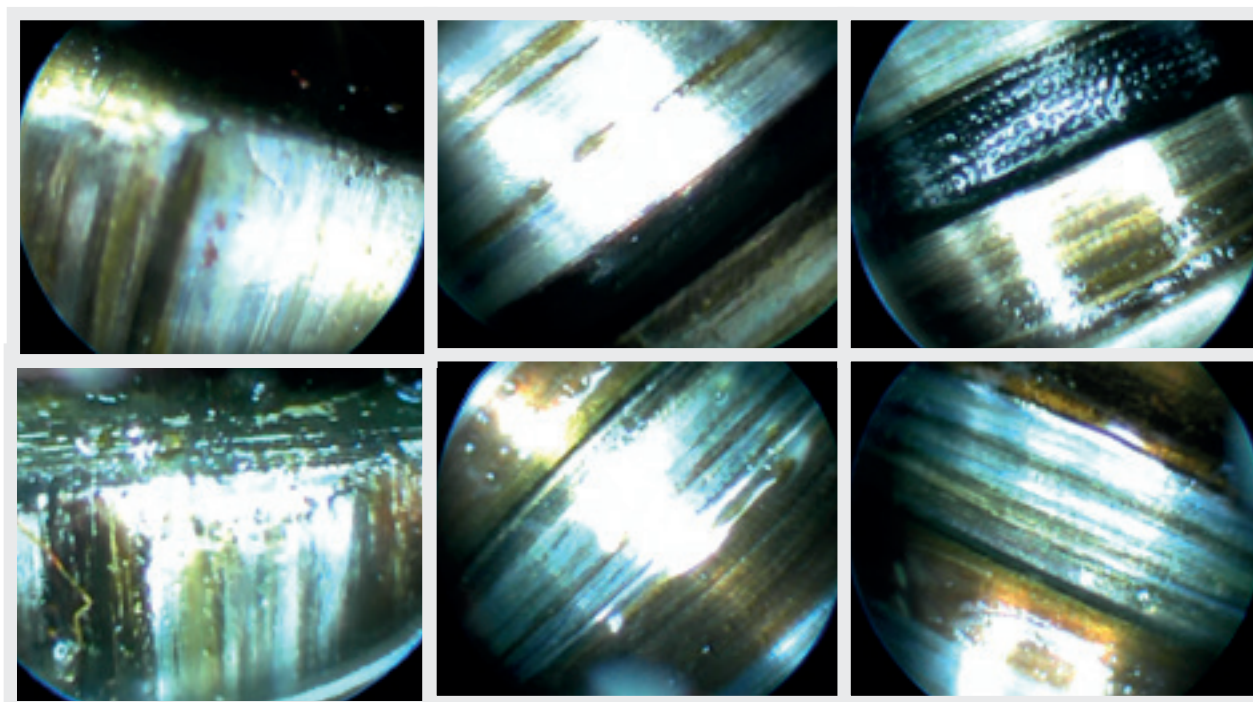
Many military-grade rifles, including SVD models, feature chrome-lined barrels designed to reduce wear and corrosion. The chrome lining in the barrels of the two inspected rifles shows no sign of corrosion, with only minimal copper and carbon deposits present in the bores. The rifle with the serial number 43039 exhibits slightly more—yet not excessive—carbon deposits in the rifling grooves.

▼ Kyiv Founders Monument on the banks of the Dnipro river, Kyiv.



Figure 37

Bore inspection photos of the SVD rifle with the serial number 43039 (top row) and of the SVD rifle with the serial number 43646 (bottom row)



The excellent external and internal condition of these two SVD rifles suggests that the operators maintained them well throughout their life, both in storage and while deployed. When used as intended, precision rifle systems do not habitually fire large volumes of ammunition during their service lives. If, however, barrels are not cleaned and oiled after firing, they can corrode quickly due to chemical interactions between water and corrosive powder and bullet residues in the barrel. It is likely, therefore, that the operators of these rifles were trained in

equipment maintenance and that the chain of custody between the original military holding unit and the end user was short.

In contrast, the barrels of the SVD rifles with the serial numbers 17368 and 0060300, which were not modified or camouflaged, are in poor condition (see Figures 28 and 35). They show wear and corrosion, potentially demonstrating a lack of appropriate care during the lifecycle of the rifle (see Figures 38–39). This damage is likely to affect the rifles' performance significantly.

Figure 38

Bore inspection photos of the SVD rifle with the serial number 17368

Inspected by CAR on 17 September 2019

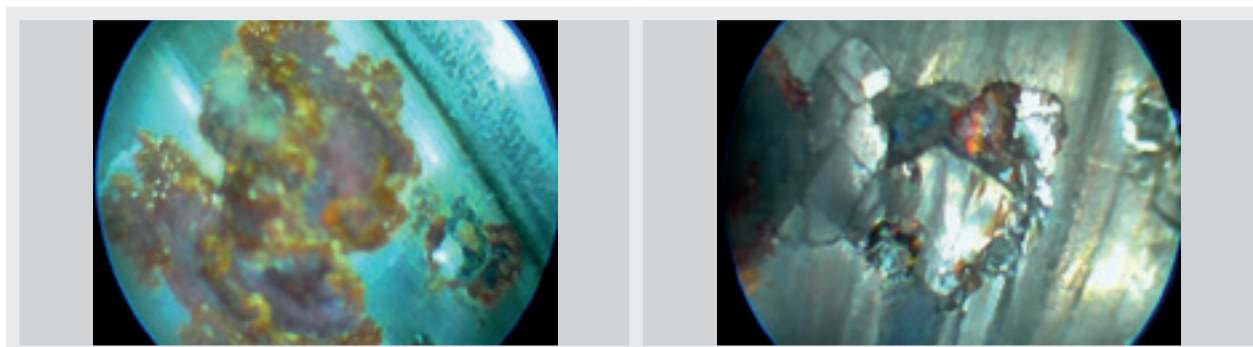
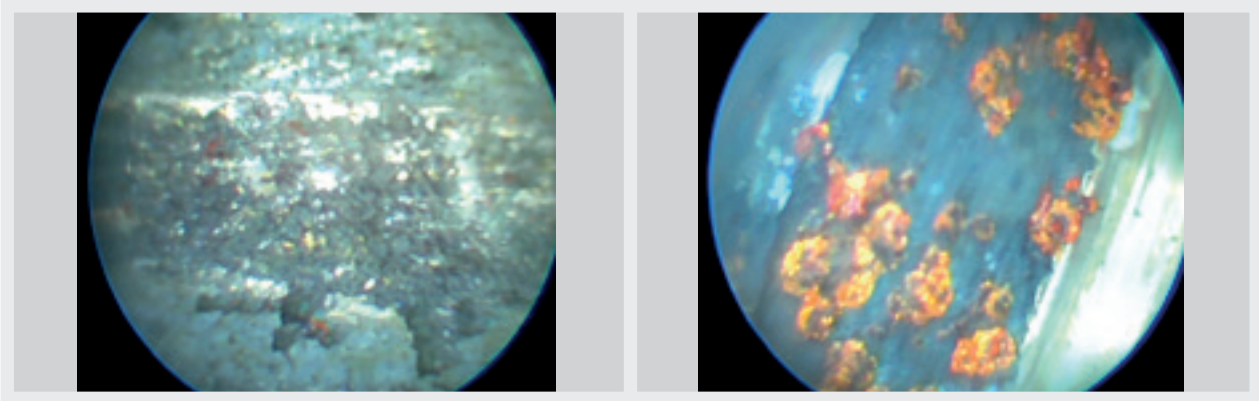


Figure 39

Bore inspection photos of the SVD rifle with the serial number 0060300

Inspected by CAR on 18 September 2019



The SVD rifle with the serial number 0061272 displays camouflage woven adhesive tape applied to its PSO-1 telescopic sight, handguard, and buttstock/pistol grip (see Figure 36). Holes have been carefully cut out for the vents on the handguard and for the elevation and windage wheels of the sight (see Figure 40). Tool marks are visible on the right-hand side of the front sight block,

indicating that the weapon's secondary aiming system was zeroed at some point in time. The presence of non-rectified tool marks on a precision weapon system would not typically be observed under the maintenance regime of professional armourers. The marks could indicate that modifications to the front sight block occurred outside of a professional military context (see Figure 41).²⁵

Figure 40

Camouflage woven adhesive tape applied to the handguard of the SVD rifle with the serial number 0061272



CAR observed paint applied to the rifle's receiver, probably where the weapon coating was damaged (see Figure 42). If the area had been left untreated, it could have created shine, which can give away the operator's firing position. Furthermore, exposed bare metal is prone to corrosion, unless treated.

These repair processes are ones that would be adopted by a sniper trained in the effective application of camouflage and concealment or by an armorer careful to reduce the risk of corrosion. It is not possible to verify when this over-painting occurred, but it is likely that either a user or trained armorer was conscious of the risks and painted over the damage.

Three of the eight SVD rifles CAR documented in Ukraine have been modified to fit sound moderators (see Figure 43). Each of these modified rifles bears additional, post-production enhancements to aid in camouflaging the weapon, notably paint or fabric added to the exposed barrel sections, to disrupt the profile of the weapon and reduce the reflectivity of metal surfaces.

Figure 41

Tool marks on the front sight block of the SVD rifle with the serial number 0061272



Figure 42

Paint applied on the receiver of the SVD rifle with the serial number 0061272

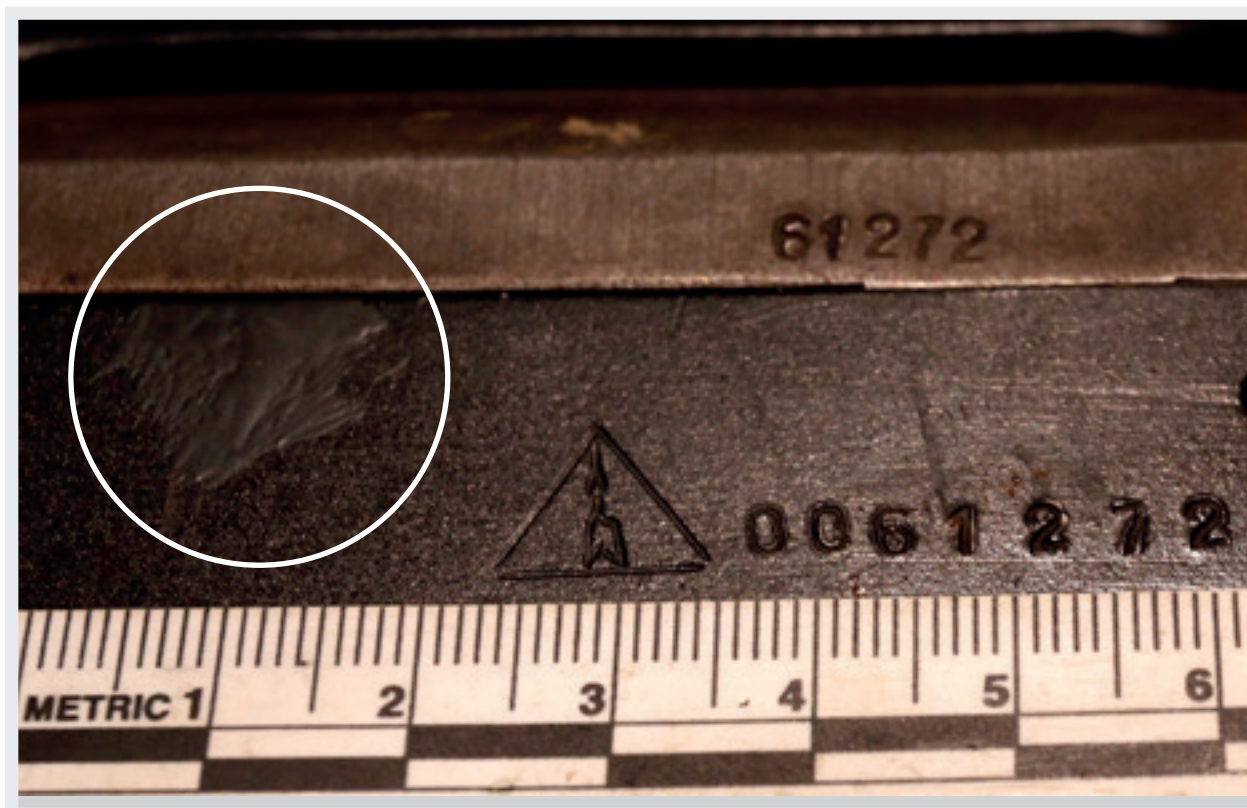


Figure 43

Barrel sections of modified SVD rifles with the serial numbers 91438 (top), 43039 (bottom left), and 43646 (bottom right)



The absence of concealment measures on a precision rifle significantly increases the likelihood that the weapon (and therefore the operator) can be detected by opposing forces, particularly when counter-sniper assets are deployed. Camouflage and concealment are core components of the sniping discipline, with the operator trained to apply concealment measures to blend into his or her operational environment.

The unmodified SVD rifles documented in Ukraine lack such measures (see Figures 28–29 and 34–35). These weapons were probably issued to less well-trained personnel who may have fulfilled a role other than ‘designated marksman’, or they may have deployed in a setting where camouflage and concealment were not considered necessary defensive measures, such as at checkpoint positions.²⁶

The presence of post-production barrel threading on precision rifle systems, combined with more advanced concealment measures, indicates that the intended operator may have had some degree of specialist training and was deemed sufficiently competent to deploy as a sniper to areas where the ability to further disguise the firing point with sound suppression would be tactically advantageous.

To date, CAR has not documented any sound moderators, either on their own or alongside SVD rifles. This indicates that SVD rifles deployed in certain areas of the Donetsk and Luhansk regions of Ukraine are frequently fitted for, but not with, sound moderators. Furthermore, the variations between modified and unmodified rifles suggest that there could be differences in the logistics supply chain, or in the operational and training capabilities, of groups operating modified versus unmodified SVD rifles.

Since sound moderators are not standardised, equipping rifles and their components with these items involves consideration of numerous variables, including the pitch, size, and handedness of the barrel thread, the calibre of the weapon, and any of various adapters and collets needed to ensure the best fit and noise attenuation. It is highly likely, therefore,

THE VARIATIONS BETWEEN MODIFIED AND UNMODIFIED RIFLES SUGGEST THAT THERE COULD BE DIFFERENCES IN THE LOGISTICS SUPPLY CHAIN, OR IN THE OPERATIONAL AND TRAINING CAPABILITIES, OF GROUPS OPERATING MODIFIED VERSUS UNMODIFIED SVD RIFLES.

that moderators, if available, would be issued through the same logistics chain that was responsible for the modification of the weapons.

The variety of approaches adopted to fit sound moderators on the documented SVD rifles suggests that numerous, decentralised logistics chains supplied and modified this equipment, or that a significant evolution in methodology occurred over time. One approach is illustrated by an SVD rifle with the serial number 91438, which has an externally threaded front sight block (see Figure 43, top). The weapon's handguard and buttstock exhibit remnants of green paint, while its barrel is wrapped in camouflage cloth (see Figures 44–45).

Figure 44

Remnant of green paint on the handguard of an SVD rifle with the serial number 91438



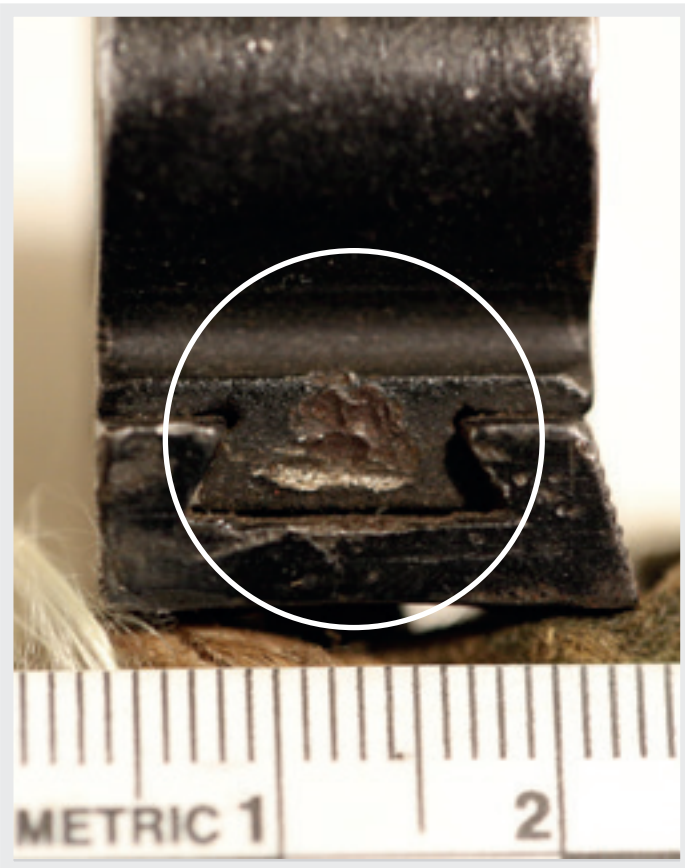
Figure 45

Cloth carefully attached around the barrel of an SVD rifle with the serial number 91438



Figure 46

Front sight block of an SVD rifle with the serial number 91438, showing tool marks typical of windage corrections made with a drift and hammer during a zeroing process



While the front sight block was not modified using conventional factory processes, the work itself reflects an understanding of the impact of bore concentricity on accuracy. Following any adaption to a muzzle accessory, a weapon needs to be re-zeroed, as barrel harmonics are severely affected by even small changes in muzzle weight. It is possible that one aiming system was zeroed for use with a sound moderator and the other aiming system was reserved for emergency use without the sound moderator. That approach would explain why care was taken to zero the secondary aiming system, as evidenced by tool markings on the front sight (see Figure 46).

The care taken to camouflage the weapon and the time involved in carrying out skilled zeroing of the secondary aiming system indicate that the user underwent some degree of specialist training. Such a user is likely to be aware of the tactical benefits of sound-moderated weapons.

The front sight block and barrel of the two other modified SVD rifles CAR documented show signs of modification that required some degree of armourer-level skill and equipment (see Figures 47–48). The consistent manner in which the rifles were modified suggests that either one person modified them, or several individuals did so following a single set of instructions.

Figure 47

Modified front sight block and threaded barrels of an SVD rifle with the serial number 43039 (left) and an SVD rifle with the serial number 43646 (right)

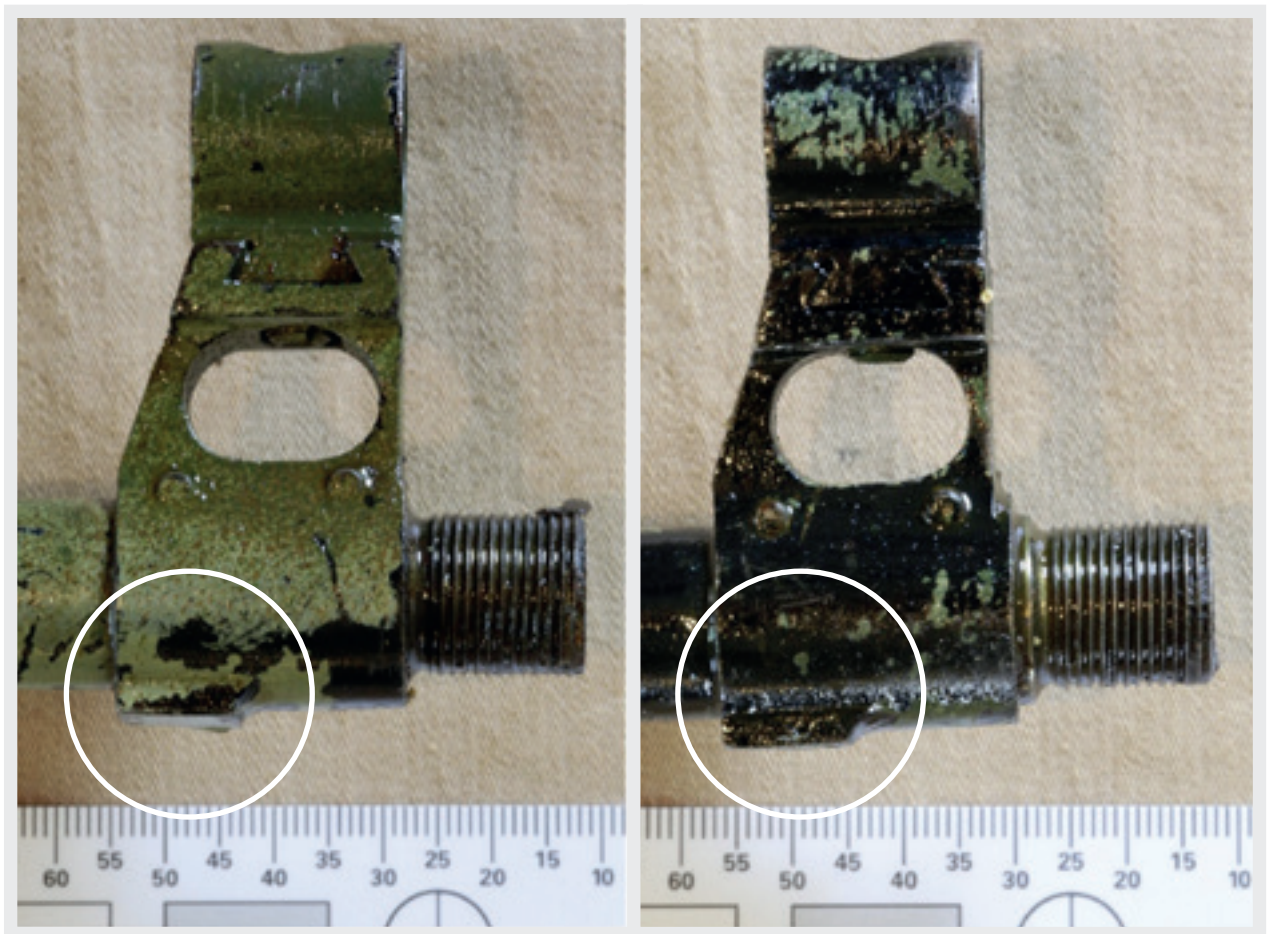
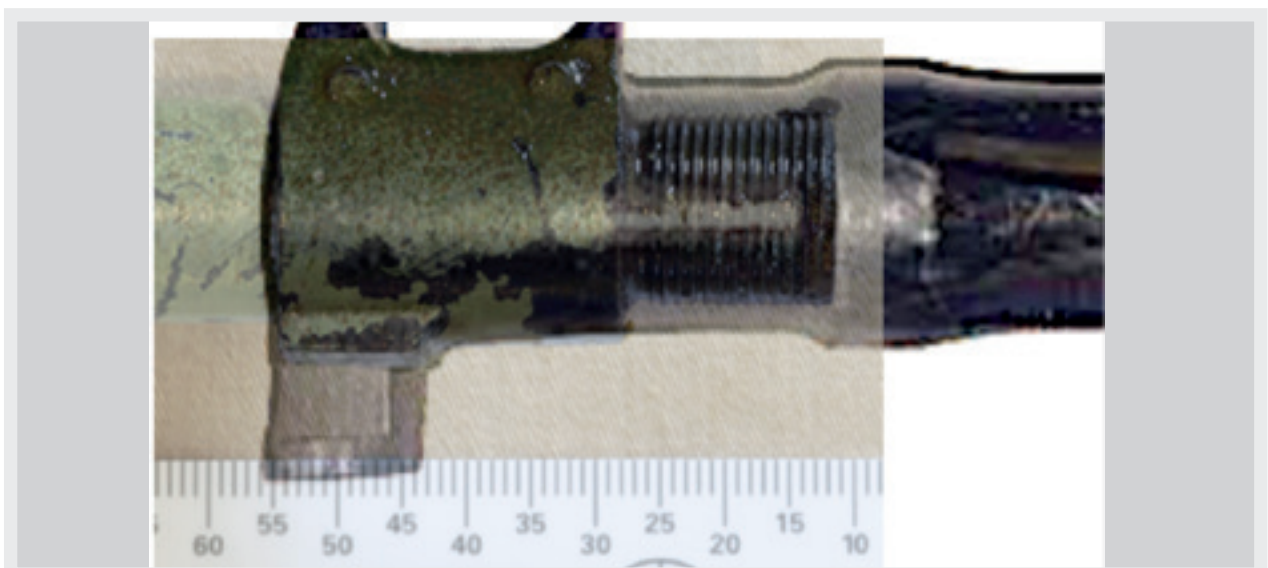


Figure 48

Modified front sight block of an SVD rifle with the serial number 43039, superimposed over a section of an original, unmodified military SVD, showing the extent of the modification



Inventory and weapon management

Several of the weapons documented in Ukraine exhibit signs of professional, but non-standardised, military-type inventory management (see Map 2). Analysis of two SVD designated marksman rifles, for example, reveals that their operators were trained in equipment maintenance. Several SVD rifles also feature post-production modifications to aid in camouflaging the

weapon (see Figures 28–48). The use of different modification approaches may be a sign that numerous, decentralised logistics chains supplied and modified the equipment, or that methodologies for doing so evolved over time. Variations in techniques are also evident in the documented obliteration of markings on disposable rocket launchers (see Figures 76–85 and 97–119).

CAR notes similarities in the extent to which the bayonet lugs have been reduced on these two SVD rifles (see Figure 47, circled). This seems to be an unnecessary machining step, which in no way assists the modification process. The machinist may have received the front sight blocks without bayonet lugs or may have considered them redundant and removed them. Once the flash hider section of the front sight block is removed, the bayonet can no longer be secured to the barrel.²⁷

This barrel modification approach has several advantages, notably that the secondary sighting system remains operational, the process does not require new components, and the work is not dependent on lathes or other complex fabrication equipment.²⁸ The process of exposing the barrel and cutting the thread directly on the barrel reduces the risk of rendering the rifles inoperable through the misalignment of the sound moderator in relation to the axis of the bore. The paint observed on the rifles was applied after barrel modification.

9 × 39 mm VSS suppressed designated marksman rifle

On 25 September 2018, CAR documented one 9 × 39 mm VSS designated marksman rifle (see Figure 49).

Tula Arms Plant manufactured this weapon on an unknown date. A dedicated sound-suppressed rifle, it fires a subsonic bullet.

→ In response to a trace request sent by CAR, Ukrainian authorities reported that the VSS rifle had never been in service with the Armed Forces of Ukraine, that it was not recorded as stolen, lost, or written-off, and that it was never transferred to any other military units.²⁹ Russian authorities have yet to respond to a CAR trace request, which sought more information on this item.³⁰

Figure 49

A 9 × 39 mm VSS suppressed designated marksman rifle with the serial number BK-0680

Documented by CAR in Kyiv on 25 September 2018



12.7 × 108 mm ASVK anti-materiel rifle

On 26 September 2018, CAR documented one 12.7 × 108 mm ASVK anti-materiel rifle (see Figure 50). V.A. Degtyarev Plant JSC manufactured this weapon, part of the 6S8-1 weapon system, in 2013. CAR documented this weapon without an optical sight or ammunition.

→ In response to a trace request sent by CAR, Ukrainian authorities reported that the ASKV anti-materiel rifle had never been in service with the Armed Forces of Ukraine, that it was not recorded as stolen, lost, or written-off, and that it was never transferred to any other military units.³¹ Russian authorities have yet to respond to a CAR trace request, which sought more information on this item.³²

Figure 50

A 12.7 × 108 mm ASVK anti-materiel rifle with the serial number ЦИ13 363

Documented by CAR in Kyiv on 26 September 2018

**MACHINE GUNS****7.62 × 39 mm RPK light machine gun**

On 17 September 2019, CAR documented one 7.62 × 39 mm RPK light machine gun (see Figure 51). Vyatskie Polyany Machine-Building Plant Molot manufactured this weapon in 1970.

→ In response to a trace request sent by CAR, Ukrainian authorities reported that the RPK light machine gun had never been in service with the Armed Forces of Ukraine, that it was not recorded as stolen, lost, or written-off, and that it was never transferred to any other military units.³³ Russian authorities have yet to respond to a CAR trace request, which sought more information on this item.³⁴

Figure 51

A 7.62 × 39 mm RPK light machine gun with the serial number БЛ-0942

Documented by CAR in Kramators'k on 17 September 2019



5.45 × 39 mm RPK-74 light machine gun

Between 2018 and 2019, CAR documented three 5.45 × 39 mm RPK-74 light machine guns. Vyatskie Polyany Machine-Building Plant Molot manufactured these weapons in 1981, 1985, and 1987 (see Figures 52, 53, and 54, respectively).

→ In response to a trace request sent by CAR, Ukrainian authorities reported that none of the RPK-74 light machine guns had ever been in service with the Armed Forces of Ukraine, that they were not recorded as stolen, lost, or written-off, and that they were never transferred to any other military units.³⁵ Russian authorities have yet to respond to a CAR trace request, which sought more information on these items.³⁶

Figure 52

A 5.45 × 39 mm RPK-74 light machine gun with the serial number KH-4669

Documented by CAR in Sarny on 6 May 2019



Figure 53

A 5.45 × 39 mm RPK-74 light machine gun with the serial number OK 9931

Documented by CAR in Severodonets'k on 19 December 2018



Figure 54

A 5.45 × 39 mm RPK-74 light machine gun with the serial number CJL 2083

Documented by CAR in Kramators'k on 17 September 2019



7.62 × 54 mm R PKM medium machine gun

On 19 December 2018, CAR documented two 7.62 × 54 mm R PKM medium machine guns. Kovrov Mechanical Plant JSC manufactured these machine guns in 1975 and 1977 (see Figures 55 and 56, respectively).

→ In response to a trace request sent by CAR, Ukrainian authorities reported that the two PKM machine guns had never been in service with the Armed Forces of Ukraine, that they were not recorded as stolen, lost, or written-off, and that they were never transferred to any other military units.³⁷ Russian authorities have yet to respond to CAR's trace requests, which sought more information on these items.³⁸

Figure 55

A 7.62 × 54 mm R PKM machine gun with the serial number AC383

Documented by CAR in Severodonets'k on 19 December 2018



Figure 56

A 7.62 × 54 mm R PKM machine gun with the serial number ЭР504

Documented by CAR in Severodonets'k on 19 December 2018



7.62 × 54 mm R PKT medium machine gun

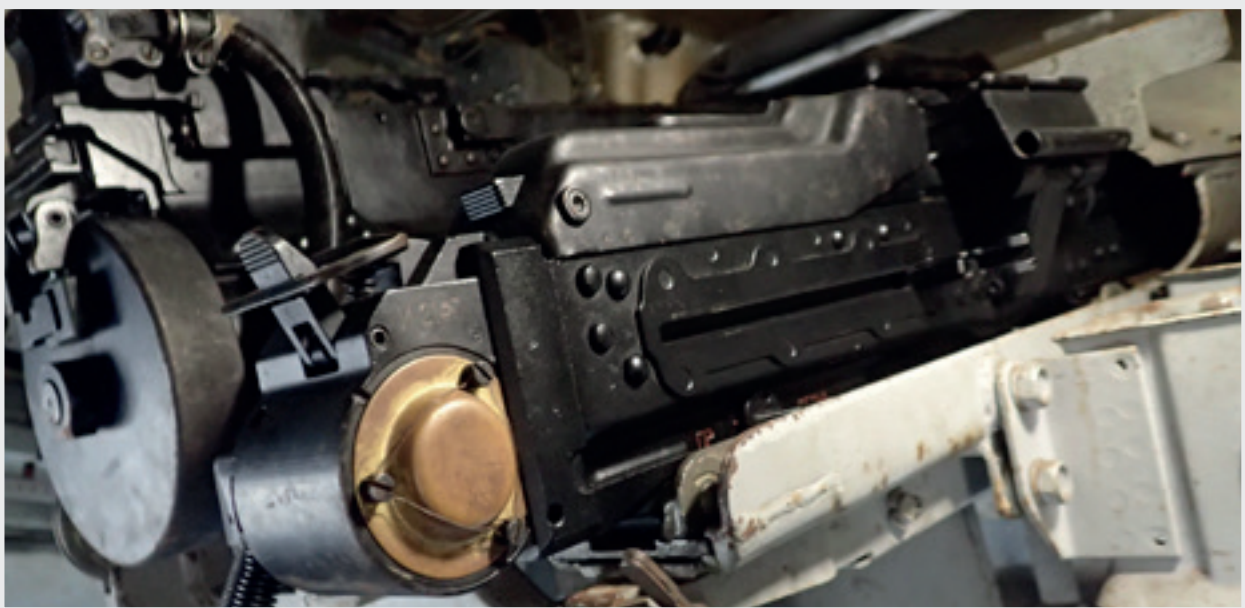
On 9 May 2019, CAR documented one 7.62 × 54 mm R PKT medium machine gun installed onto a BTR-80 armoured personnel carrier (see Figures 57 and 194). Tula Arms Plant manufactured the machine gun in 1980.

→ In response to a trace request sent by CAR, Ukrainian authorities reported that the PKT machine gun had never been in service with the Armed Forces of Ukraine, that it was not recorded as stolen, lost, or written-off, and that it was never transferred to any other military units.³⁹ Russian authorities have yet to respond to a CAR trace request, which sought more information on this item.⁴⁰

Figure 57

A 7.62 × 54 mm R PKT medium machine gun with the serial number И 2147, installed onto a BTR-80 armoured personnel carrier

Documented by CAR in Sartana on 9 May 2019



14.5 × 114 mm KPVT heavy machine gun

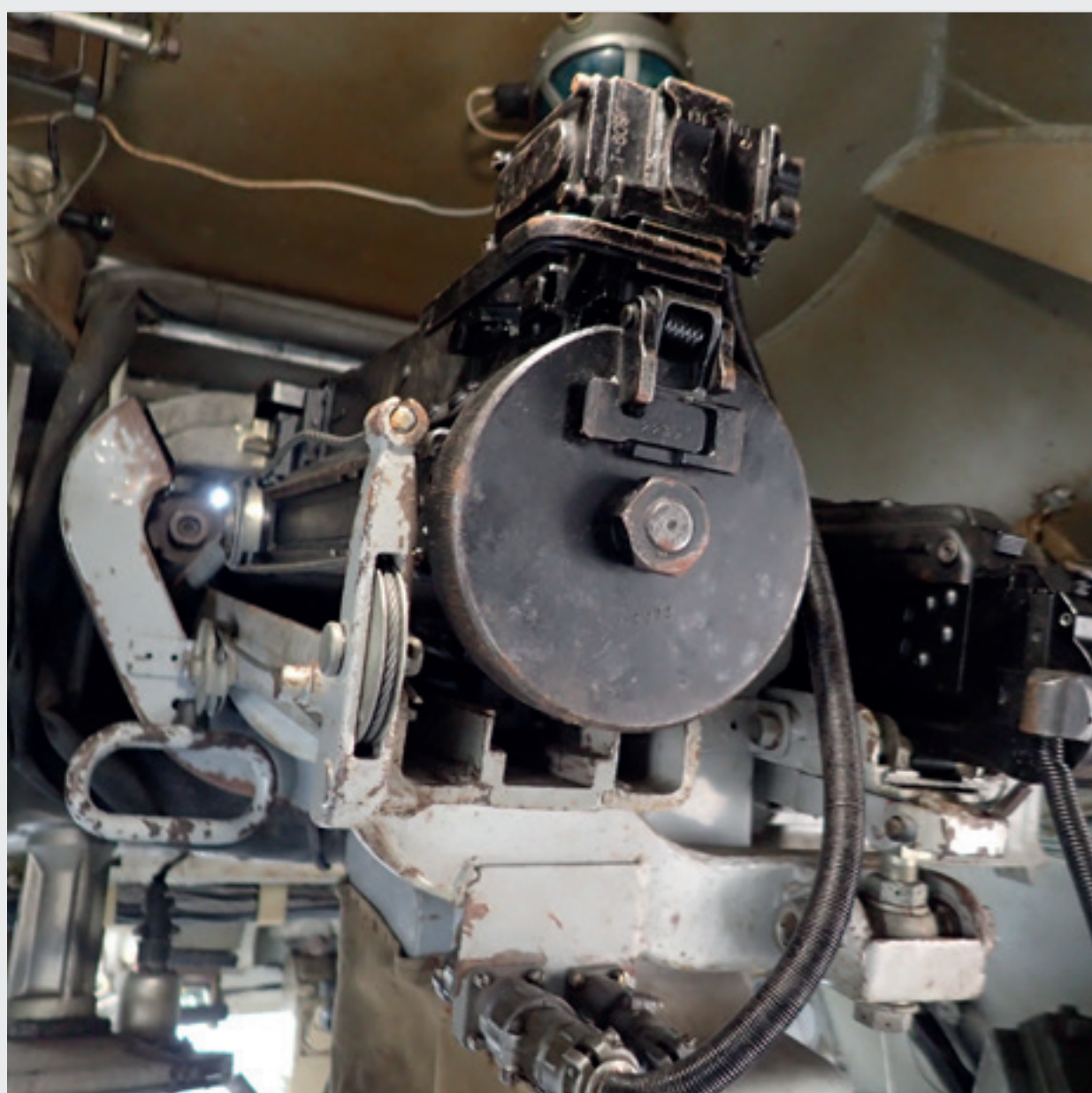
Alongside the PKT machine gun mentioned above, CAR documented one 14.5 × 114 mm KPVT heavy machine gun (see Figure 58). V.A. Degtyarev Plant JSC manufactured this machine gun in 1977.

→ In response to a trace request sent by CAR, Ukrainian authorities reported that the KPVT machine gun had never been in service with the Armed Forces of Ukraine, that it was not recorded as stolen, lost, or written-off, and that it was never transferred to any other military units.⁴¹ Russian authorities have yet to respond to a CAR trace request, which sought more information on this item.⁴²

Figure 58

A 14.5 × 114 mm KPVT heavy machine gun with the serial number ЖС-223, installed onto a BTR-80 armoured personnel carrier

Documented by CAR in Sartana on 9 May 2019



ROCKET LAUNCHERS

40 mm RPG-7V shoulder-fired recoilless weapon

On 9 May 2019, CAR documented one 40 mm RPG-7V shoulder-fired recoilless weapon (see Figure 59). Kovrov Mechanical Plant JSC manufactured the weapon in 1977.

→ In response to a trace request sent by CAR, Ukrainian authorities reported that the RPG-7V recoilless weapon had never been in service with the Armed Forces of Ukraine, that it was not recorded as stolen, lost, or written-off, and that it was never transferred to any other military units.⁴³ Russian authorities have yet to respond to a CAR trace request, which sought more information on this item.⁴⁴

Figure 59

A 40 mm RPG-7V recoilless weapon with the serial number БГ-750

Documented by CAR in Mariupol on 9 May 2019



▼ View of a train in Mariupol.



GRENADE LAUNCHERS

30 mm AGS-17 automatic grenade launcher

In May and September 2019, CAR documented three 30 mm AGS-17 automatic grenade launchers. Vyatskie Polyany Machine-Building Plant Molot manufactured these launchers in 1995, 1996, and 1999 (see Figures 60, 61, and 62, respectively).

→ In response to a trace request sent by CAR, Ukrainian authorities reported that none of the AGS-17 grenade launchers had ever been in service with the Armed Forces of Ukraine, that they were not recorded as stolen, lost, or written-off, and that they were never transferred to any other military units.⁴⁵ Russian authorities have yet to respond to a CAR trace request, which sought more information on these items.⁴⁶

Figure 60

A 30 mm AGS-17 automatic grenade launcher with the serial number ГК656

Documented by CAR in Paraskoviivka on 8 May 2019

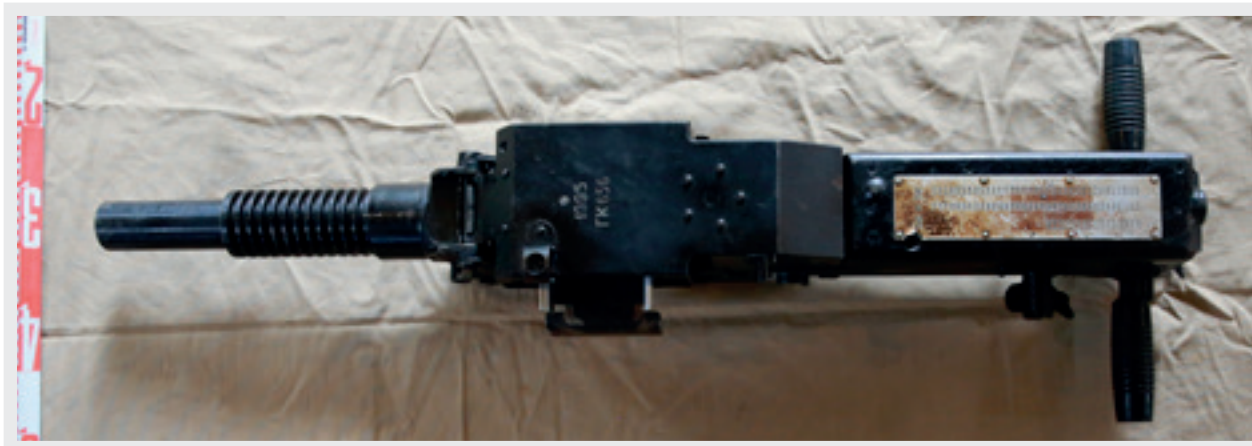


Figure 61

A 30 mm AGS-17 automatic grenade launcher with the serial number ГК949

Documented by CAR in Paraskoviivka on 8 May 2019



Figure 62

A 30 mm AGS-17 automatic grenade launcher (with tripod) with the serial number ПГ104

Documented by CAR in Mariupol on 18 September 2019



40 mm GP-25 under-barrel grenade launcher

On 18 September 2019, CAR documented two 40 mm GP-25 under-barrel grenade launchers (see Figures 63–64).

While CAR was able to determine that the items were manufactured on Russian territory, it was not able to identify their manufacturer or year of manufacture.

→ In response to a trace request sent by CAR, Ukrainian authorities reported that none of the GP-25 grenade launchers had ever been in service with the Armed Forces of Ukraine, that they were not recorded as stolen, lost, or written-off, and that they were never transferred to any other military units.⁴⁷ Russian authorities have yet to respond to a CAR trace request, which sought more information on these items.⁴⁸

Figure 63

A 40 mm GP-25 under-barrel grenade launcher with the serial number 52 6734

Documented by CAR in Mariupol on 18 September 2019



Figure 64

A 40 mm GP-25 under-barrel grenade launcher with the serial number 15 4657

Documented by CAR in Mariupol on 18 September 2019



40 mm GP-34 under-barrel grenade launcher

On 20 December 2018, CAR documented one 40 mm GP-34 under-barrel grenade launcher (see Figure 65).

Izhmash manufactured the launcher on an unknown date.

→ In response to a trace request sent by CAR, Ukrainian authorities reported that the GP-34 grenade launcher was not in service with the Armed Forces of Ukraine.⁴⁹ Russian authorities have yet to respond to a CAR trace request, which sought more information on this item.⁵⁰

Figure 65

A 40 mm GP-34 under-barrel grenade launcher with the serial number 71101

Documented by CAR in Mariupol on 20 December 2018



MORTARS

82 mm M-37-pattern medium-calibre mortar

On 6 May 2019, CAR documented one 82 mm M-37-pattern medium-calibre mortar (see Figure 66). CAR has not identified the manufacturer of this item, or the year in which it was produced. In CAR's assessment, this weapon appears to be a modernised version of the BM-37 mortar, as it features a lighter base plate and a collar device to prevent double loading. Given the lack of identifying marks, and the fact that multiple countries produced variants of mortars in this pattern, CAR cannot confirm the country of manufacture.

- In response to a trace request sent by CAR, Ukrainian authorities reported that the M-37-pattern mortar was not in service with the Armed Forces of Ukraine.⁵¹

Figure 66

An 82 mm M-37-pattern medium-calibre mortar

Documented by CAR in Sarny on 6 May 2019



▼ Two SVD designated marksman rifles documented by CAR in Paraskoviivka on 8 May 2019.





WEAPONS OF THE WAR IN UKRAINE

AMMUNITION

AMMUNITION

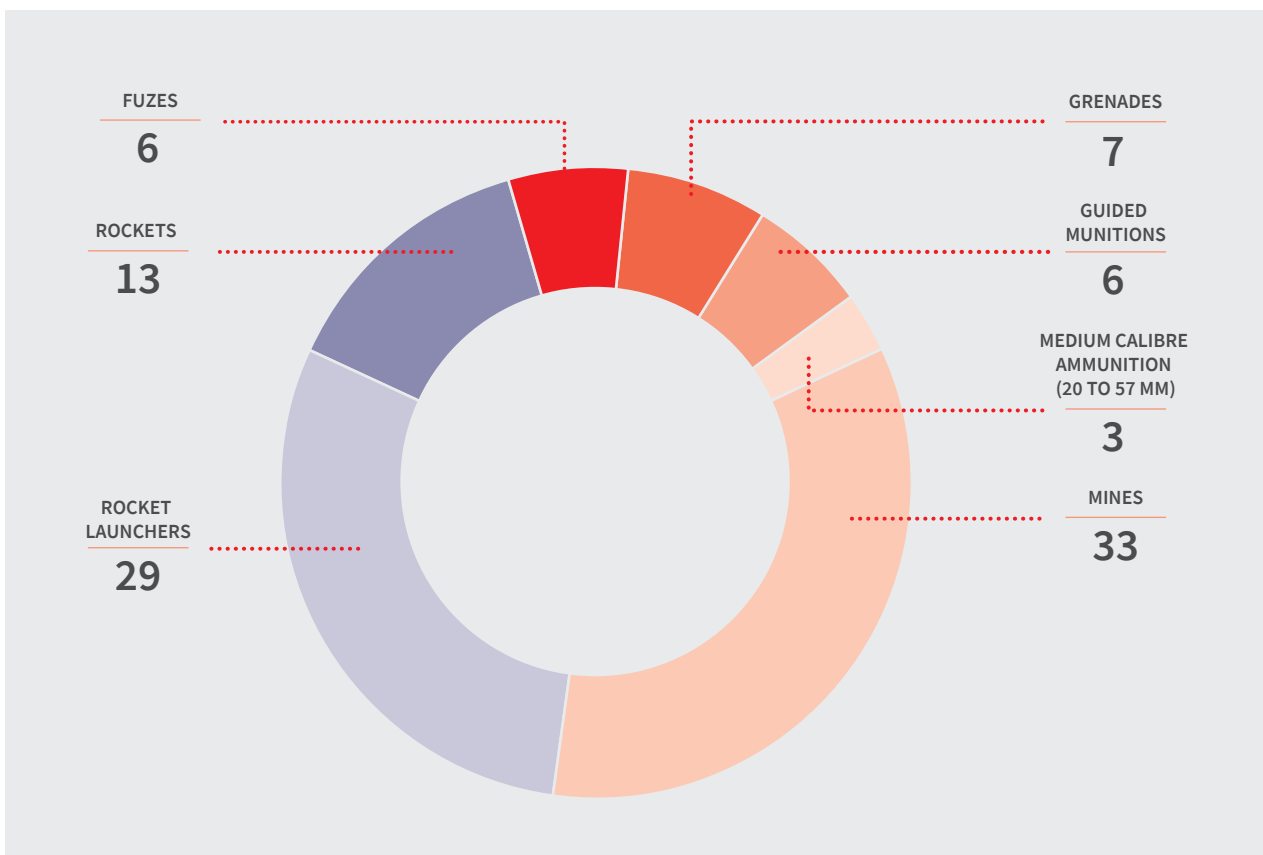
Between 2018 and 2020, CAR documented 4,890 units of ammunition in Ukraine, spanning 65 years of production. The oldest item dates from 1948 (7.62 × 54 mm R ammunition), while the newest was produced in 2013 (RShG-1 disposable rocket launcher). Apart from small-calibre ammunition (4,793 rounds), CAR also documented fuzes, grenades, guided

munitions, medium-calibre ammunition, mines, disposable rocket launchers,⁵² and rockets (see Figure 67).⁵³

This section of the report addresses each of these ammunition types in order, looking first at CAR's sample of small-calibre ammunition, and then addressing other types from page 70.

Figure 67

Ammunition documented by CAR in Ukraine (not including small-calibre ammunition)



▼ Monument of the Eternal Flame, Kyiv.



SMALL-CALIBRE AMMUNITION

CAR documented 4,793 rounds of small-calibre ammunition in Ukraine, with 64 unique headstamps.⁵⁴ Nine different production facilities manufactured this ammunition, located in what are today four different countries (see Figure 68).

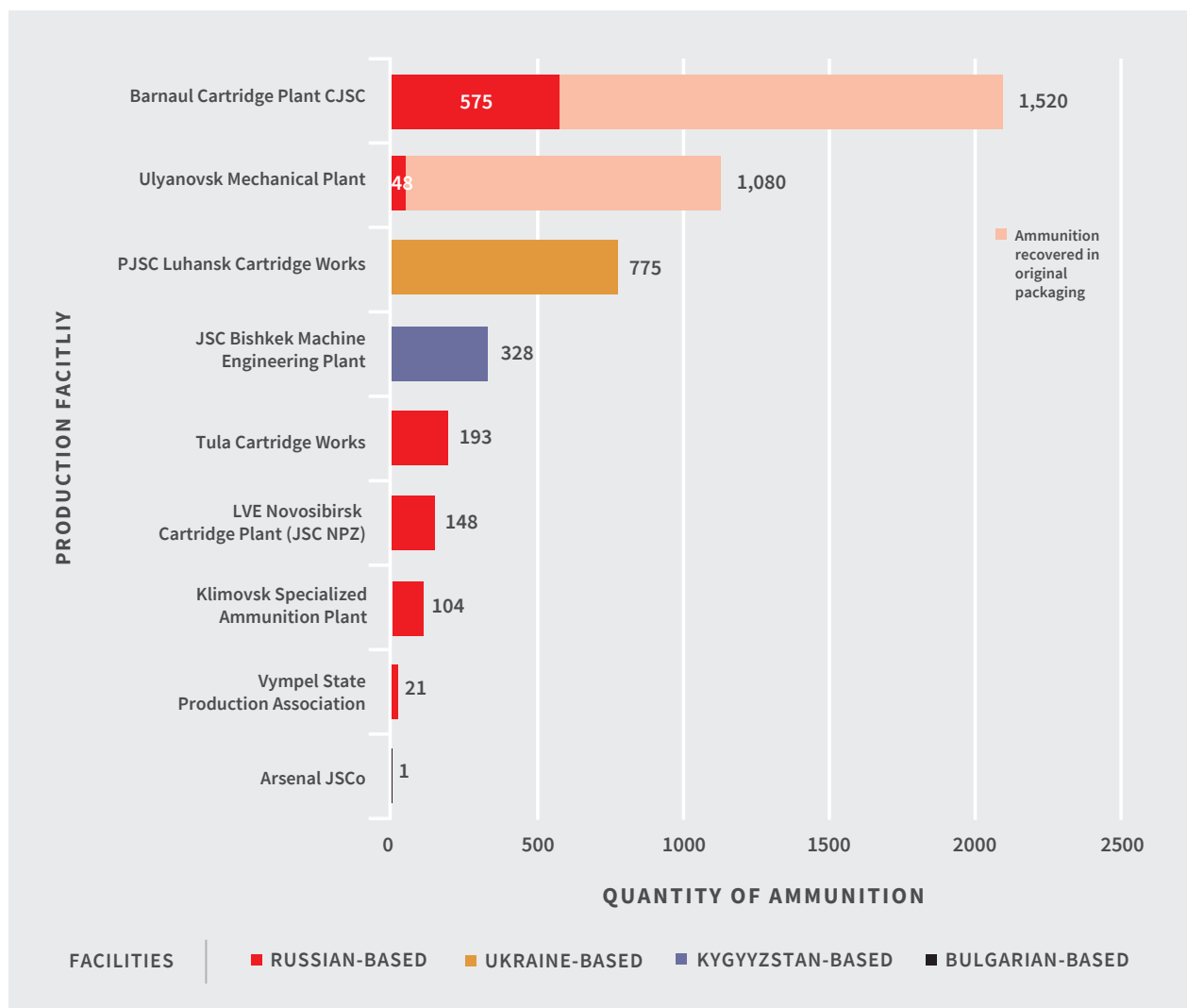
Three unopened tins of ammunition, containing 2,600 cartridges, make up most of the items in the small-calibre ammunition sample (see Annexes).⁵⁵ Since CAR documented large numbers of a single headstamp in these tins, an evaluation of the number of unique identifiable headstamps is a useful metric in this context, as the presence of a particular headstamp may reflect a new supply source. Accordingly, and in

view of the relatively small size of the Ukraine sample, this section focuses on unique headstamps to assess diversion patterns.

CAR documented 64 identifiable headstamps, 45 of which are unique to the conflict in Ukraine in CAR's global database (see Annexes). In this sample, the ammunition produced by Ukraine-based manufacturer PJSC Luhansk Cartridge Works accounts for a particularly high proportion of headstamps documented only in the Ukrainian conflict: 11 of 12. CAR's database also shows high proportions of Ukraine-specific ammunition in the documented items produced by Ulyanovsk Mechanical Plant (5 of 7) and Vypel State Production Association (4 of 4).

Figure 68

Quantity of small-calibre ammunition documented by CAR in Ukraine, by producer country (n=4,793)



Of the nine small-calibre ammunition production facilities CAR identified in relation to the documented sample, six are located in the what is today the Russian Federation. Barnaul Cartridge Plant CJSC produced the largest proportion of ammunition in CAR's Ukraine sample, both in terms of the number of unique headstamps (14)⁵⁶ and in terms of the total documented quantity (see Figure 68). The second- and third-largest number of unique headstamps in the sample were produced by PJSC Luhansk Cartridge Works (12) and LVE Novosibirsk Cartridge Plant (11).

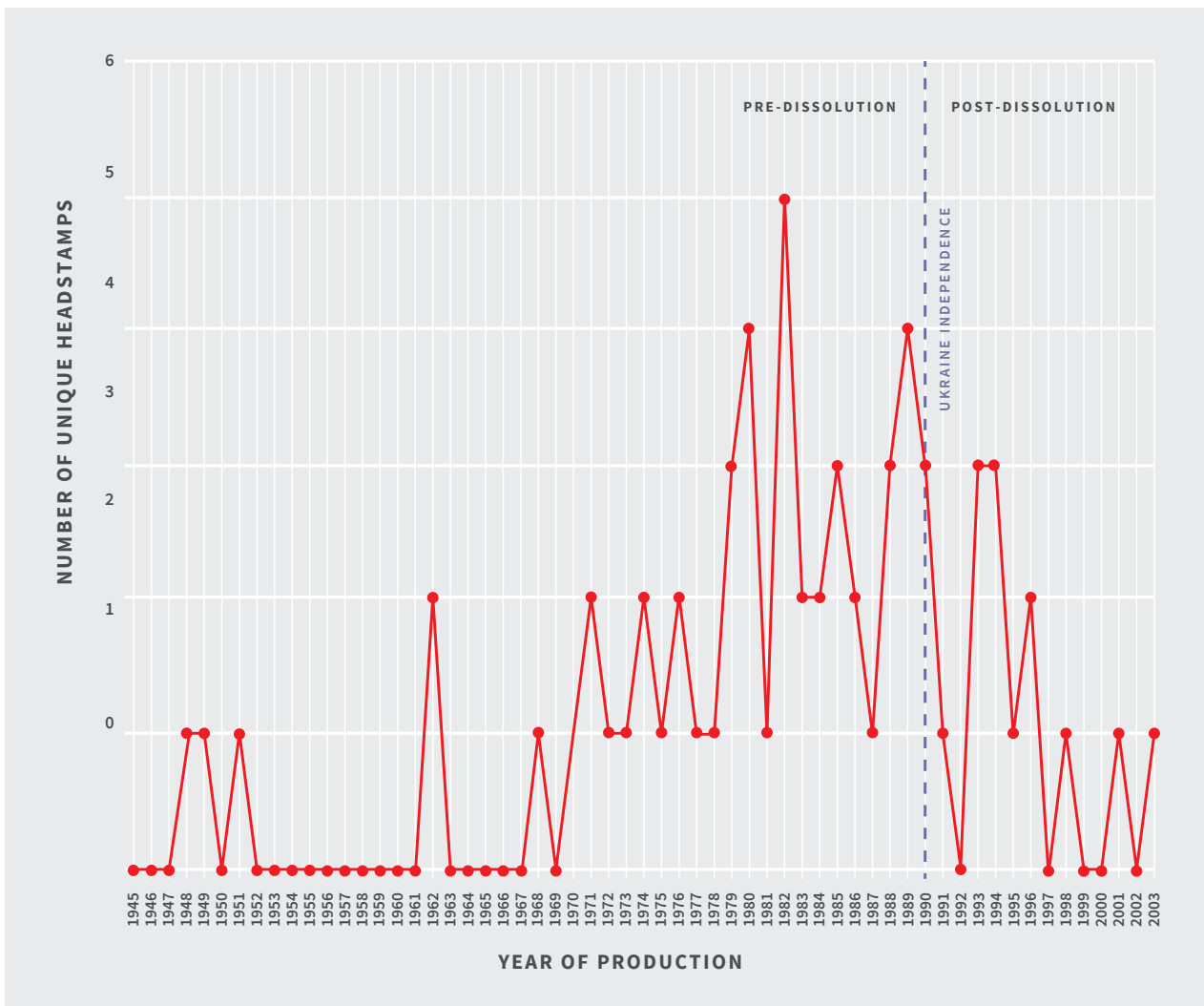
CAR documented 103 unmarked 9 × 39 mm ammunition cartridges which, according to a specialist in Soviet and Russian ammunition consulted by CAR, were originally manufac-

tured by Klimovsk Specialized Ammunition Plant for the Soviet Ministry of Internal Affairs, to be used by their Special Purpose Police Unit. In response to a CAR trace request, the Government of Ukraine indicated that such ammunition was not in service with the Armed Forces of Ukraine.⁵⁷

The small-calibre ammunition CAR documented in Ukraine spans a 55-year production period. The most recently manufactured rounds in the sample were produced almost 20 years ago, in 2003 (three rounds of 5.45 × 39 mm 270_03 ammunition produced by PJSC Luhansk Cartridge Works, based in Ukraine). CAR did not observe any small-calibre ammunition that post-dates the outbreak of the conflict in Ukraine in 2014 (see Figure 71).

Figure 71

Number of unique headstamps of small-calibre ammunition documented by CAR in Ukraine, by year of production, if known, and in relation to the dissolution of the Soviet Union (n=62)



CAR was able to determine the year of manufacture of 62 of the 64 unique headstamps, as well as 12 headstamps that were manufactured after the dissolution of the Soviet Union (see Annexes). If the three headstamps that were recovered in large quantities in their original packaging are included, the post-Soviet small-calibre ammunition accounts for 19 per

cent of the different headstamps and nearly 75 per cent of the total quantity of CAR's small-calibre ammunition sample (3,493 of 4,793 rounds).

All the post-Soviet small-calibre ammunition CAR documented in Ukraine originated in five facilities: Barnaul, LVE Novosibirsk, PJSC Luhansk, Ulyanovsk, and Vypmel (see Table 4).

Table 4
Headstamps manufactured after 1991, documented by CAR in Ukraine

Year of manufacture	Headstamp	Calibre	Manufacturer	Quantity documented	Recovery details
1993	17_93	5.45 × 39 mm	Barnaul Cartridge Plant CJSC	82 rounds	Donets'kyi (29 rounds, June 2017) Holubivka (53 rounds, 2017)
1993	270_93	5.45 × 39 mm	PJSC Luhansk Cartridge Works	79 rounds	Amvrosiivka (65 rounds, August 2014) Schchastya (14 rounds, March 2016)
1993	7_93	5.45 × 39 mm	Vypmel State Production Association	10 rounds	Holubivka (2017)
1994	17_94	5.45 × 39 mm	Barnaul Cartridge Plant CJSC	38 rounds	Holubivka (2017)
				1,080 rounds (tin)	Mariinka (2019)
1994	270_94	5.45 × 39 mm	PJSC Luhansk Cartridge Works	667 rounds	Amvrosiivka (August 2014)
1994	3_94	5.45 × 39 mm	Ulyanovsk Mechanical Plant	1,080 rounds (tin)	Mariinka (June 2019)
1995	270_95	5.45 × 39 mm	PJSC Luhansk Cartridge Works	1 round	Holubivka (2017)
1996	17_96	7.62 × 54 mm R	Barnaul Cartridge Plant CJSC	440 rounds (tin)	Mariinka (June 2019)
1996	17_96	5.45 × 39 mm	Barnaul Cartridge Plant CJSC	1 round	Holubivka (2017)
1998	7_98	5.45 × 39 mm	Vypmel State Production Association	3 rounds	Holubivka (2017)
2001	188_01	7.62 × 54 mm R	LVE Novosibirsk Cartridge Plant (JSC NPZ)	9 rounds	Donets'kyi (June 2017)
2003	270_03	5.45 × 39 mm	PJSC Luhansk Cartridge Works	3 rounds	Holubivka (1 round, 2017) Schchastya (2 rounds, March 2016)

BOX 1 — POST-2014 ACTIVITY AT PJSC LUHANSK CARTRIDGE WORKS

PJSC Luhansk Cartridge Works (LCW), a subsidiary of the state-owned defence corporation Ukroboronprom, is Ukraine's most significant producer of military small arms ammunition. Armed formations took over the plant when they captured Luhansk in mid-2014, an act which the Government of Ukraine regards as an illegal expropriation of state assets.

In March 2016, the self-declared 'Luhansk People's Republic' (LPR) released video footage of alleged new production at LCW and claimed that the reopened plant was supplying the ammunition needs of the 'People's militias' (Luhansk Media Centre, 2016). Activists have also suggested that exports of LCW products to commercial customers in Georgia and Kazakhstan may have been carried out or attempted since 2014 (InformNapalm, 2017).

CAR has sought to examine available evidence of production and exports from LCW since the beginning of the war in 2014. CAR has not documented any post-2014 LCW ammunition production, although it has documented LCW 9 × 18 mm ammunition with undated headstamps (see Annexes).

CAR interviewed three ammunition dealers in Canada, Ukraine, and the United States who had previously purchased ammunition from LCW or

supplied goods to them. All stated that they had no evidence of post-2014 production or exports. The Canadian and US dealers confirmed that they had received their last shipments of ammunition from LCW between December 2013 and May 2014.⁵⁸ All three interviewees reported that they had been informed by industry contacts that production had stopped when the plant was badly damaged in fighting in mid-2014.⁵⁹

Satellite imagery showing the condition of the plant supports the interviewees' accounts. Imagery indicates that during August 2014, buildings on the LCW site sustained significant damage from fire and possible ordnance impacts. The roof of the southern wing of the main 19th-century building was destroyed, possibly by fire, between 16 and 26 August 2014 (see Figure 69). The northern wing sustained similar damage between 26 and 31 August 2014.

The Office of the National Security and Defence Council of Ukraine reports that during this period, on 22–23 August 2014, a Russian convoy purportedly carrying humanitarian aid transported looted machinery from LCW (Euromaidan Press, 2014). CAR was unable to corroborate this claim directly. At some point between December 2014 and July 2015, LCW placed an advertisement on its website stating its interest in purchasing:

Figure 69

Satellite imagery of the main LCW building, 16–31 August 2014



Source: Google Earth (Imagery: CNES/Airbus/Maxar Technologies) © 2021 Google

BOX 1 — POST-2014 ACTIVITY AT PJSC LUHANSK CARTRIDGE WORKS

(CONTINUED)

used equipment for the production of cartridges for rifled weapons of various calibres. Pressing equipment, automatic rotary and rotary-conveyor lines for the manufacture of casings, bullets and cartridges with a capacity of 60 to 200 pcs.⁶⁰

While this advertisement points to a need for replacement machinery, the loss of equipment may have been due to physical war damage rather than looting. Analysis of vehicle presence around the plant over time (2015–19) shows no significant indicators of renewed activity. Finally, there is no evidence that LCW’s former suppliers restarted supply.

Russian and Ukrainian bill-of-lading-level trade data indicates that, up to 2014, LCW depended on Russian suppliers for primers; steel, brass, and bimetallic strips for casings; and nitrocellulose (propellant).⁶¹ Using this data, CAR mapped seven Russian suppliers of these goods to LCW between 2011 and 2014. Available trade data shows only one shipment of goods from these suppliers to LCW after February 2014: 1.6 tonnes of polypropylene packaging for primers, shipped on 9 December 2015 by LCW’s main pre-2014 supplier of primers, Murom Apparatus-producing Plant.⁶²

It is possible that LCW built up sufficient stocks of key materials up to 2014 to allow for some production thereafter, without further resupplies. The December 2015 shipment is suggestive of attempts to restart production. Nonetheless, the testimonies and satellite imagery discussed above challenge assertions that the plant resumed large-scale production.

Two indicators—neither of which is conclusive—do suggest that the self-declared LPR may have attempted to restart production from 2018 onwards. First, some building renovations appear to have taken place on the LCW site between September and November 2018. Imagery from this period shows that the dilapidated roof of a large, multi-storey building to the northeast of the factory’s main gate, directly adjacent to its prominent main chimney, was remodelled and replaced with a red material (see Figure 70). The southern face of this building also appears to have been resurfaced or repainted.

Secondly, shortly before this renovation work, on 12 April 2018, a Moscow-based company called Tenal LLC shipped a 500-kg consignment of pressed lead pipes to the LCW address, consigned to a company called Redut LLC.⁶³ Owned by two

Figure 70

Satellite imagery of the PJSC Luhansk Cartridge Works site, September 2018–June 2019



Source: Google Earth (Imagery: CNES/Airbus/Maxar Technologies) © 2021 Google

BOX 1 — POST-2014 ACTIVITY AT PJSC LUHANSK CARTRIDGE WORKS

(CONTINUED)

Russian citizens, Tenal had been registered just seven months earlier, in September 2017 (USRLE, n.d.).⁶⁴ According to Russian trade data, this shipment is the only export shipment that Tenal has made. Redut does not appear on Ukraine's company registry. In June 2018, however, the Ministry of Justice of the self-declared LPR issued a company registration certificate for Redut at the LCW address.⁶⁵ The certificate, seen by CAR, lists Redut's business purpose as the 'production of weapons and ammunition'. Its official representative—who was reportedly a former power engineer at LCW—is wanted by Ukraine's Ministry of Internal Affairs for allegedly undermining the country's national integrity. In July 2015, the

self-declared LPR appointed this individual as the plant's new director (MIA, n.d.). Notably, neither Redut nor Tenal appear on EU sanctions lists.⁶⁶

The site renovation, the establishment of a new legal entity listed at LCW's address, and its receipt of goods from a Russian supplier all occurred within seven months in 2018. The timing suggests that individuals who control Redut (and possibly Tenal) made efforts to re-establish industrial activity at LCW. Nonetheless, CAR has found no direct evidence of successful ammunition production or export since 2018, and other indicators, such as vehicle activity around the LCW plant visible on satellite imagery, remain inconclusive.

▼ Interior of a recovered BTR-80 armoured personnel carrier documented by CAR in Sartana on 9 May 2019.

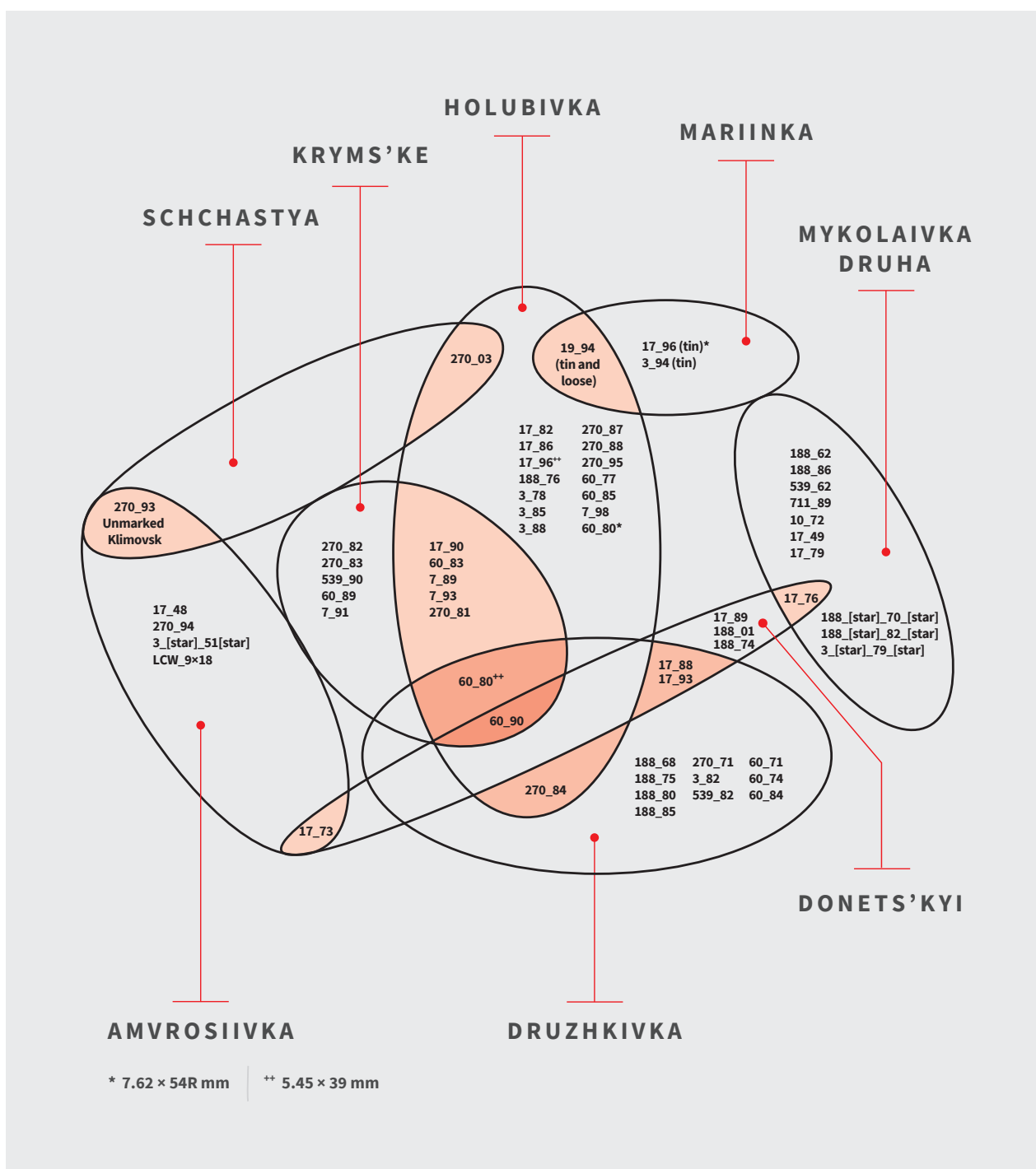


Ukraine defence and security forces recovered small-calibre ammunition at eight different locations between 2014 and 2019. To determine what small-calibre ammunition is the most widely diverted in the sample, CAR looked at the unique headstamps recovered in more than one location. Figure 72 presents a diagram of all the unique headstamps documented in

Ukraine, by their common points of recovery. It shows that sixteen different headstamps were recovered in multiple locations. The most prevalent were headstamps 60_90 and 60_80, manufactured in 5.45 × 39 mm calibre in 1990 and 1980, respectively, by JSC Bishkek Machine Engineering Plant, in what is today Kyrgyzstan (see Figure 72).

Figure 72

Unique headstamps documented by CAR in Ukraine, by prevalence across different recovery locations



BOX 2 — SMALL-CALIBRE AMMUNITION: COMPARING CAR'S SAMPLE WITH A UKRAINIAN SEIZURE SAMPLE

In 2020, Ukrainian authorities provided CAR with documentation relating to the acceptance and inspection of arms and ammunition recovered from armed formations in 2014 and stored in Okhlyrka, Sumy region, Ukraine.

CAR has not visually inspected or verified these items and cannot vouch for the accuracy of the identification of markings. Further, the data set cannot be indicative of overall trends as it covers a limited recovery sample. However, it does provide a point of comparison against which to qualify, contextualise, and validate CAR's own ammunition documentation in Ukraine.⁶⁷

Table 5 provides a full breakdown of acceptance data from Okhlyrka. Ukrainian defence and security forces recovered small-calibre ammunition in four calibres (primarily '5.45 mm', which is assumed to be shorthand for 5.45 × 39 mm calibre), rifle grenades in 30 mm and 40 mm calibres, hand grenades, large-calibre rockets and mortars, and components for man-portable air defence system (MANPADS) and anti-tank guided weapon (ATGW) systems.

This box compares the small-calibre ammunition documented by CAR in 2018–19 and that recovered from armed formations by Ukrainian defence and security forces at the outset of the conflict, in 2014.

Table 5

Contents of crates recovered from armed formations by Ukrainian defence and security forces in 2014

Reference	Content type	Stated calibre	Stated quantity
Crate 1 (16/03/20)	Small-calibre ammunition	5.45 mm	2,160
Ref. 11 Crate 1	Small-calibre ammunition	7.62 mm	2
Ref. 11 Crate 2	Small-calibre ammunition	14.5 mm	163
Ref. 11 Crate 3	Small-calibre ammunition	5.45 mm	116
Ref. 11 Crate 4	Rifle grenades	30 mm	1
Ref. 11 Crate 5	MANPADS launch tube	Not provided	1
Ref. 11 Crate 6	Training cartridges	7.62 mm	803
Ref. 6 Crate 1	Small-calibre ammunition	7.62 mm	18,480
Ref. 6 Crate 2	Small-calibre ammunition	7.62 mm	43,998
Ref. 6 Crate 3	Small-calibre ammunition	14.5 mm	413
Ref. 6 Crate 4	Small-calibre ammunition	14.5 mm	1,260
Ref. 6 Crate 5	Crate for cartridges	Not provided	75
Ref. 6 Crate 6	Rifle grenades	40 mm	5,200
Ref. 6 Crate 7	Crate for rifle grenades	Not provided	43
Ref. 6 Crate 8	Rifle grenades	30 mm	960
Ref. 6 Crate 9	Rifle grenades	30 mm	3,815

BOX 2 — SMALL-CALIBRE AMMUNITION: COMPARING CAR'S SAMPLE WITH A UKRAINIAN SEIZURE SAMPLE (CONTINUED)

Reference	Content type	Stated calibre	Stated quantity
Ref. 6 Crate 10	Crate for rifle grenades	Not provided	39
Ref. 6 Crate 11	Small-calibre ammunition	12.7 mm	5,190
Ref. 6 Crate 12	Small-calibre ammunition	12.7 mm	960
Ref. 6 Crate 13	Small-calibre ammunition	12.7 mm	160
Ref. 6 Crate 14	Crate for cartridges	Not provided	33
Ref. 6 Crate 15	Hand grenades	Not provided	3
Ref. 6 Crate 16	MANPADS launch tube	Not provided	2
Ref. 6 Crate 17	MANPADS launch tube	Not provided	1
Ref. 6 Crate 18	ATGW missile	Not provided	3
Ref. 6 Crate 19	Crate for ATGW	Not provided	3
Ref. 6 Crate 20	ATGW missile	Not provided	2
Ref. 6 Crate 21	Crate for ATGW	Not provided	1
Ref. 6 Crate 22	Rocket launcher	Not provided	2
Ref. 6 Crate 23	Crate for rocket launcher	Not provided	1
Ref. 6 Crate 24	Rockets	120 mm	12
Ref. 6 Crate 25	Rocket propellant charge	120 mm	48
Ref. 6 Crate 26	Crate for rockets	Not provided	6
Ref. 6 Crate 27	Mortar	120 mm	16
Ref. 6 Crate 28	Mortar main charges	120 mm	16
Ref. 6 Crate 29	Crate for mortars	Not provided	8
Ref. 6 Crate 30	Crate for cartridges	Not provided	156
Ref. 6 Crate 31	Small-calibre ammunition	5.45 mm	596,004 (572,400 identified)

For small-calibre ammunition, Ukrainian defence and security forces recovered cartridges manufactured between 1944 and 1996⁶⁸ and spanning four calibres that CAR also documented:

- 5.45 × 39 mm: 574,676 rounds
- '7.62 mm':⁶⁹ 62,480 rounds
- 12.7 × 108 mm: 6,310 rounds
- 14.5 × 114 mm: 1,836 rounds.

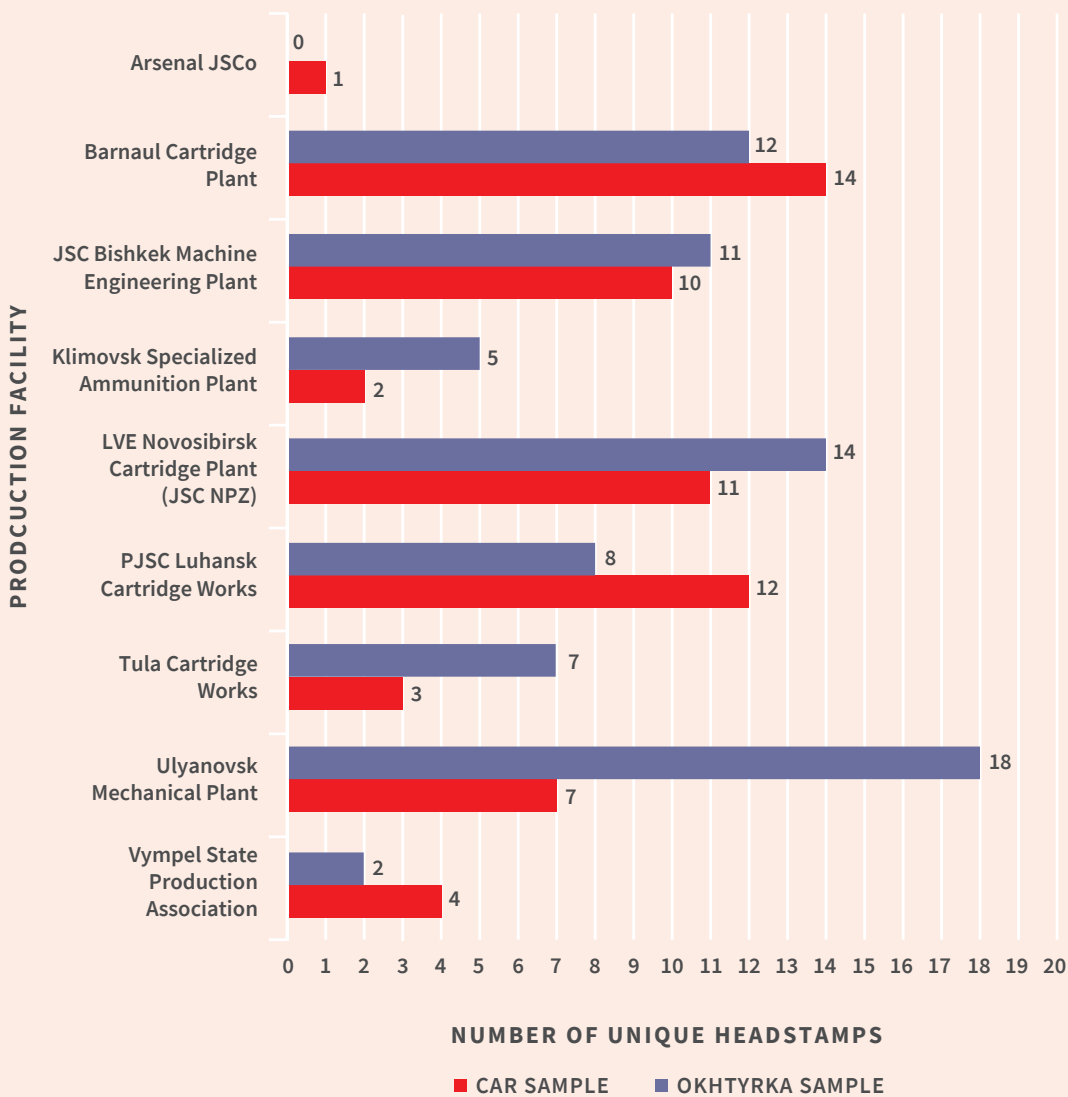
BOX 2 — SMALL-CALIBRE AMMUNITION: COMPARING CAR’S SAMPLE WITH A UKRAINIAN SEIZURE SAMPLE (CONTINUED)

CAR’s analysis of the Okhtyrka sample identified 77 unique headstamps. The date marks of three of these headstamps (17_93 from Barnaul Cartridge Plant CJSC, 188_96 from LVE Novosibirsk Cartridge Plant, and 3_95 from Ulyanovsk Mechanical Plant) indicate that production occurred after the dissolution of the Soviet Union in 1991. They account for 35 per cent of the seized small-calibre ammunition but only 4 per cent of the observed headstamps.

A comparison of the number of individual headstamps in the Okhtyrka and CAR samples shows some similarities, including that two producers account for the largest proportions of headstamps (Barnaul and LVE Novosibirsk). It also reveals differences, such as a higher representation of Ulyanovsk headstamps in the Okhtyrka data (see Figure 73).

Figure 73

Number of unique headstamps in the CAR sample vs. the Okhtyrka sample, by production facility



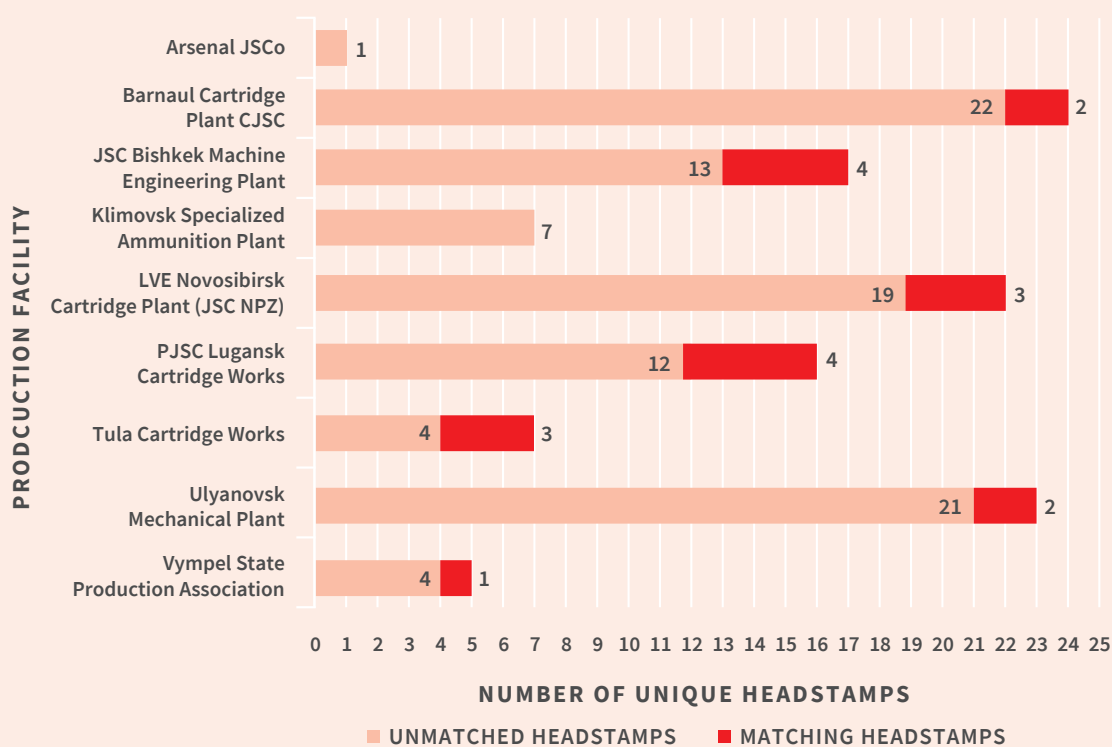
BOX 2 — SMALL-CALIBRE AMMUNITION: COMPARING CAR'S SAMPLE WITH A UKRAINIAN SEIZURE SAMPLE (CONTINUED)

On the whole, CAR and the Ukrainian defence and security forces documented a similar spread of relevant production facilities, but the production years differ somewhat across the ammunition samples. Indeed, CAR documented only 18 of the 77 unique small-calibre cartridge headstamps

recorded in the Okhtyrka sample (see Figure 74). These 18 headstamps, which are present in both samples, include the ones CAR documented at more than one location (see Figure 72), indicating that the scale of their diversion is probably higher than CAR estimated based on its sample alone.

Figure 74

Number of unique headstamp matches between the CAR and Okhtyrka samples



KEY FINDING

Unique headstamps

Forty-five of the 64 unique headstamps in CAR's Ukraine data set are unique to the conflict, meaning that CAR has not observed them anywhere else in its global operations. In relation to other regions covered in CAR's database, Ukraine exhibits significantly less intermixing of types. Given that CAR has not previously operated in the region, this is to be expected. The lack of model matches with other areas where CAR operates indicates

that the conflict in Ukraine is not dependent on extra-regional supply chains.

Headstamps 60_90 and 60_80, each produced by JSC Bishkek Machine Engineering Plant, were the most frequently documented headstamps in CAR's sample. Headstamp 60_90 was recovered by Ukraine security forces in four different locations in Donetsk and Luhansk regions (see Figure 72).

OTHER AMMUNITION

Besides small-calibre ammunition, CAR documented 29 different models of ammunition in Ukraine.

Almost none of these models have been encountered by CAR outside of Ukraine (see Table 6).

Table 6
Ammunition models documented by CAR in Ukraine, excluding small-calibre ammunition

Note: = Highlighted items are unique to Ukraine in CAR's global database.

Type	Model	Quantity documented	Calibre	Manufacturer	Country (present-day)	Year(s) of manufacture
Disposable rocket launchers	MRO-A	5	72.5 mm	JSC Scientific Production Association 'Bazalt'	Russian Federation	2008
	RPG-18	1	64 mm	State Enterprise 'Signal'	Russian Federation	1980
	RPG-22	4	72.5 mm	Vazovski Mashinostroitelni Zavodi (VMZ) EAD	Bulgaria	1985 1988 1990 (2)
	RPG-26	5	72.5 mm	State Enterprise 'Signal'	Russian Federation	1988 1990 1991 (3)
	RPO-A	11	93 mm	Krasnozavodsk Chemical Plant (9)	Russian Federation	1991 (2) 1996 2000 (2) 2002 (3) 2009
				KBP Instrument Design Bureau (2)		1997 (2)
	RShG-1	3	105 mm	FGUP Chemical Plant 'Planta'	Russian Federation	2004 2005 2013
Fuzes	MVCh-62	4	N/A	Scientific-Research Engineering Institute, JSC	Russian Federation	1976 (2) 1977 (2)
	NVU-P	1	N/A	Kazan Precision Machinery	Russian Federation	1989
	ML-8	1	N/A	Saranskiy Mechanical Plant	Russian Federation	2002

Type	Model	Quantity documented	Calibre	Manufacturer	Country (present-day)	Year(s) of manufacture
Grenades	RG 42	1	N/A	Unidentified	Unknown	1949
	RGN	2	N/A	State Enterprise 'Signal'	Russian Federation	1988
	ZMG-1	1	N/A	Unknown	Russian Federation	Unknown
	3D6	3	81 mm	State Enterprise 'Signal'	Russian Federation	1982
Guided munitions: ATGW missiles	9M133F-1 Kornet missile	1	152 mm	KBP Instrument Design Bureau	Russian Federation	2012
Guided munitions: MANPADS	GROM E2	2	72 mm	MESKO SA	Poland	2007
	GROM gripstock	1	N/A	MESKO SA	Poland	2005
Mines	OZM-72	5	N/A	Unknown	Russian Federation	1980 1988 (3) Unknown
	PMN-2	8	N/A	Saranskiy Mechanical Plant (2) FGUP Nerekhtskiy Mechanical Plant (6)	Russian Federation	1985 (2) 1988 (6)
	TM-62M	8	N/A	Factory 2516 (6) Baza No. 55 (2)	Russian Federation	1974 (6) 1976 1979
	MON-50	3	N/A	Unknown (1) JSC Promsintez (2)	Russian Federation	2000 (2) 2005
	KPOM-2	6	N/A	FGUP 'Plant named after I.M. Sverdlov'	Russian Federation	1990 (6)
	POM-2	3	N/A	FGUP 'Plant named after I.M. Sverdlov'	Russian Federation	1990 1993 (2)
	Medium-calibre ammunition	[arrow]_84	2	23 × 152B mm	GNNP 'Pribor'	Russian Federation
184_83_M		1	23 × 152B mm	Plant n.a. Sergo - POZIS	Russian Federation	1983
Precision-guided munitions	3OF39	2	152 mm	Izhmash	Russian Federation	Unknown

Type	Model	Quantity documented	Calibre	Manufacturer	Country (present-day)	Year(s) of manufacture
Other munitions and components	OG-7	2	40 mm	FGUP Chemical Plant 'Planta'	Russian Federation	2005
	PG-7PM	3	40 mm	State Enterprise 'Signal'	Russian Federation	1980
	PG-9S	3	73 mm	FGUP Chemical Plant 'Planta'	Russian Federation	1975 (2) 1980
	PG-15P	5	73 mm	Solikamsk Plant Ural (3) Samara Plant 'Kommunar' (2)	Russian Federation	1974 1980 (2) 1984 (2)

Disposable rocket launchers

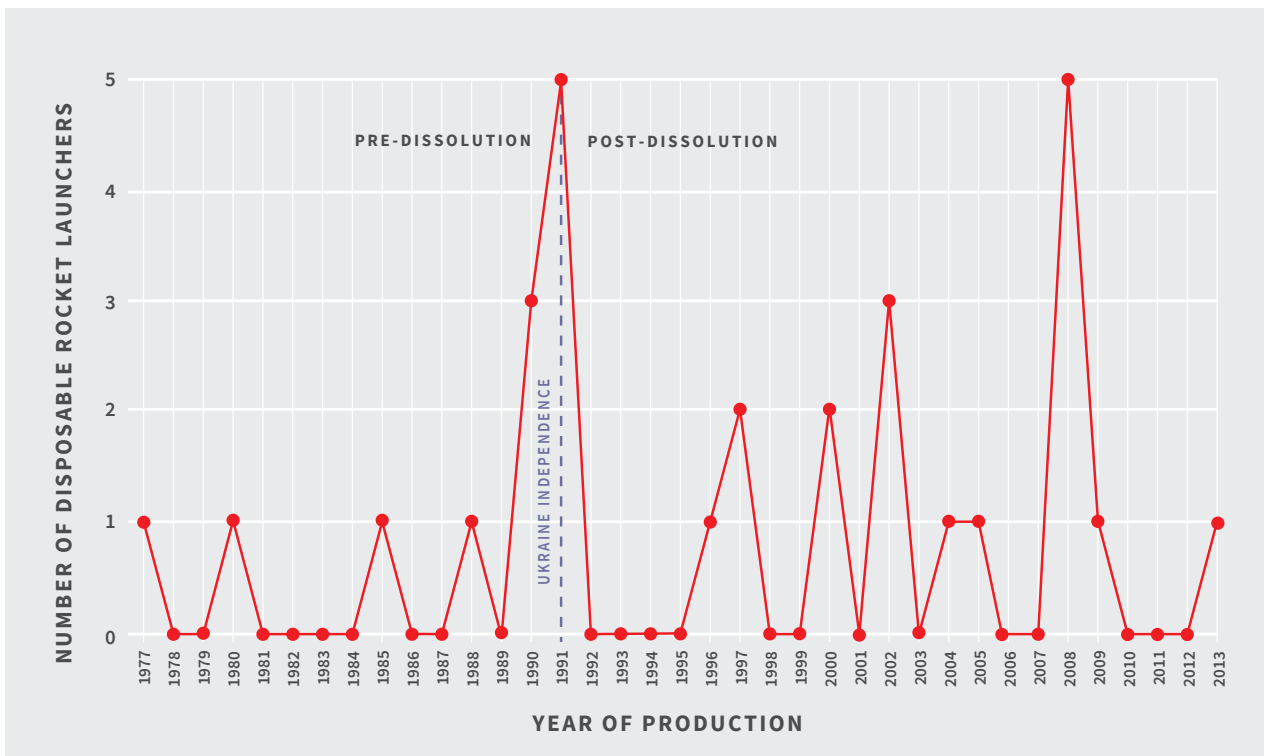
More than half of the disposable rocket launchers documented by CAR were manufactured after the dissolution of the Soviet Union. In contrast, 18 per cent of other ammunition types (excluding small-calibre ammunition) were produced after the dissolution (see Figure 75).

► MRO-A

In September and December 2018, CAR documented five empty launch tubes of 72.5 mm MRO-A disposable rocket launchers, which the Ukrainian defence and security forces had recovered between 2014 and 2018 (see Figures 76–80). JSC Scientific Production Association 'Bazalt' manufactured these launchers in or around 2008.

Figure 75

Production year of disposable rocket launchers documented by CAR in Ukraine, in relation to the dissolution of the Soviet Union (n=29)



Unknown parties deliberately obliterated the factory marks, lot numbers, and serial numbers on all the MRO-A launchers documented by CAR. The remaining marks are stencilled model designations, glued-on labels, and other debossed marks.

→ In response to a trace request sent by CAR, Ukrainian authorities reported that they did not have MRO-A launchers in service with the Armed Forces of Ukraine.⁷⁰ Russian authorities have yet to respond to a CAR trace request, which sought more information on these items.⁷¹

Figure 76

An MRO-A disposable rocket launcher with the secondary mark 2309-2008

Documented by CAR in Kyiv on 26 September 2018



Figure 77

An MRO-A disposable rocket launcher with the secondary mark 3625-2008

Documented by CAR in Mariupol on 20 December 2018



Figure 78

An MRO-A disposable rocket launcher with the secondary mark 4200-2008

Documented by CAR in Mariupol on 20 December 2018



Figure 79

An MRO-A disposable rocket launcher with the secondary mark 4275-2008

Documented by CAR in Horodok on 27 September 2018



Figure 80

An MRO-A disposable rocket launcher with the secondary mark 5311-2008

Documented by CAR in Horodok on 27 September 2018



UNKNOWN PARTIES DELIBERATELY OBLITERATED THE FACTORY MARKS, LOT NUMBERS, AND SERIAL NUMBERS ON ALL THE MRO-A LAUNCHERS DOCUMENTED BY CAR. THE REMAINING MARKS ARE STENCILLED MODEL DESIGNATIONS, GLUED-ON LABELS, AND OTHER DEBOSSSED MARKS.

The degree of care given to removing only some unique identifying marks suggests that obliterating parties intentionally left some marks intact, such as stencilled system designations and small, stamped unique numbers. A plausible reason for this would be to preserve the ability to inventory and account for the materiel, which suggests that the users operated weapon and ammunition management processes in line with military standards.

Items in CAR's sample display varying degrees of sanitisation and reflect the use of different obliteration methods. These inconsistencies indicate that the sanitisation process may have taken place further down the chain of custody, perhaps once the stock of MRO-A had already been divided and assigned to their respective units. They also suggest that approaches to obliteration may have evolved over time. CAR observed similar variations on recovered RPO-A launchers, as noted below.

In the case of one MRO-A with the secondary mark 3625-2008, for instance, obliterating parties may have used a cutting disk attachment on a die-cutting tool to erase the third and fourth line of the main lot and serial number group (see Figure 81). The tool marks left on the firing tube indicate that the obliterating parties applied the disk cutting attachment in a broadly vertical motion and obliterated each

individual character separately. Despite the obvious care taken to conduct the obliteration, remnants of the characters remain visible (see Figure 82). CAR did not detect any attempts to re-cover the area of obliteration or to apply chemicals to remove the stencil and leave camouflage coatings intact, as CAR observed on some RPO-A launchers (see below).

Figure 81

Obliterated markings on an MRO-A disposable rocket launcher with the secondary mark 3625-2008

Documented by CAR in Mariupol on 20 December 2018

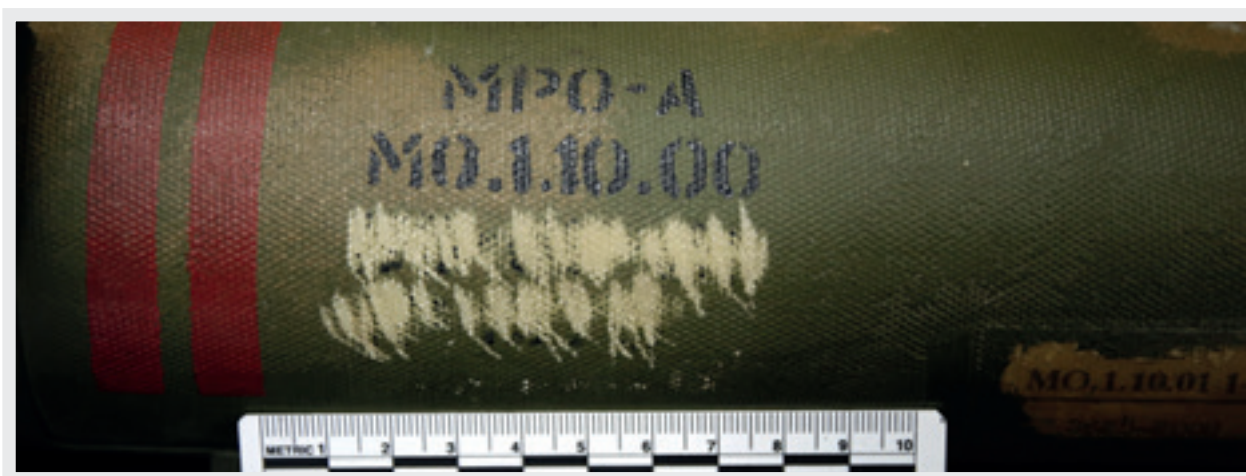


Figure 82

Details of obliterated markings on an MRO-A disposable rocket launcher with the secondary mark 3625-2008

Documented by CAR in Mariupol on 20 December 2018



In another case, unknown parties obliterated the MRO-A launcher's main serial and lot numbers through hand sanding. There is also evidence of over-painting in this area and on the item's glued-on label, but the paint appears to have been removed through deliberate action or simply because it failed to adhere to the

smooth, fibre-glass material that constitutes this section of the tube (see Figures 83–84). As Figure 83 suggests, unknown parties may have obliterated some marks on the tube using an abrasive material, such as emery paper or other fine sanding medium, leaving behind remnants of stencilled markings in the pitted areas.

Figure 83

Obliterated markings on an MRO-A disposable rocket launcher with the secondary mark 4200-2008

Documented by CAR in Mariupol on 20 December 2018



Figure 84

Glued-on label on MRO-A rocket launcher with the secondary mark 4200-2008, with evidence of run-off of paint



Unknown parties also tried to obliterate three characters from a stamped mark (КЛ 4 6 8 4) on the same launcher, possibly with a metal cutting handsaw (hacksaw), rather than an electric die-cutting tool (such as a Dremel). Indeed, tool marks indicate that some skidding occurred as the cutting tool passed over the surface, which is unlikely to occur with a high-speed die-cutting tool, fitted with a cutting disk that is thin enough to make the tool marks witnessed (see Figure 85).

Obliterating parties painted the surface on and around the debossed marks with black aerosol paint. They applied additional layers of spray paint in the area closest to the debossed characters, which caused some run-off of excess paint from the surface. CAR infers that the paint was applied to cover exposed metal, perhaps to reduce shine for camouflage and concealment reasons, or in the hope of reducing corrosion, rather than as an attempt to conceal the marks.

KEY FINDING

Obliterated markings

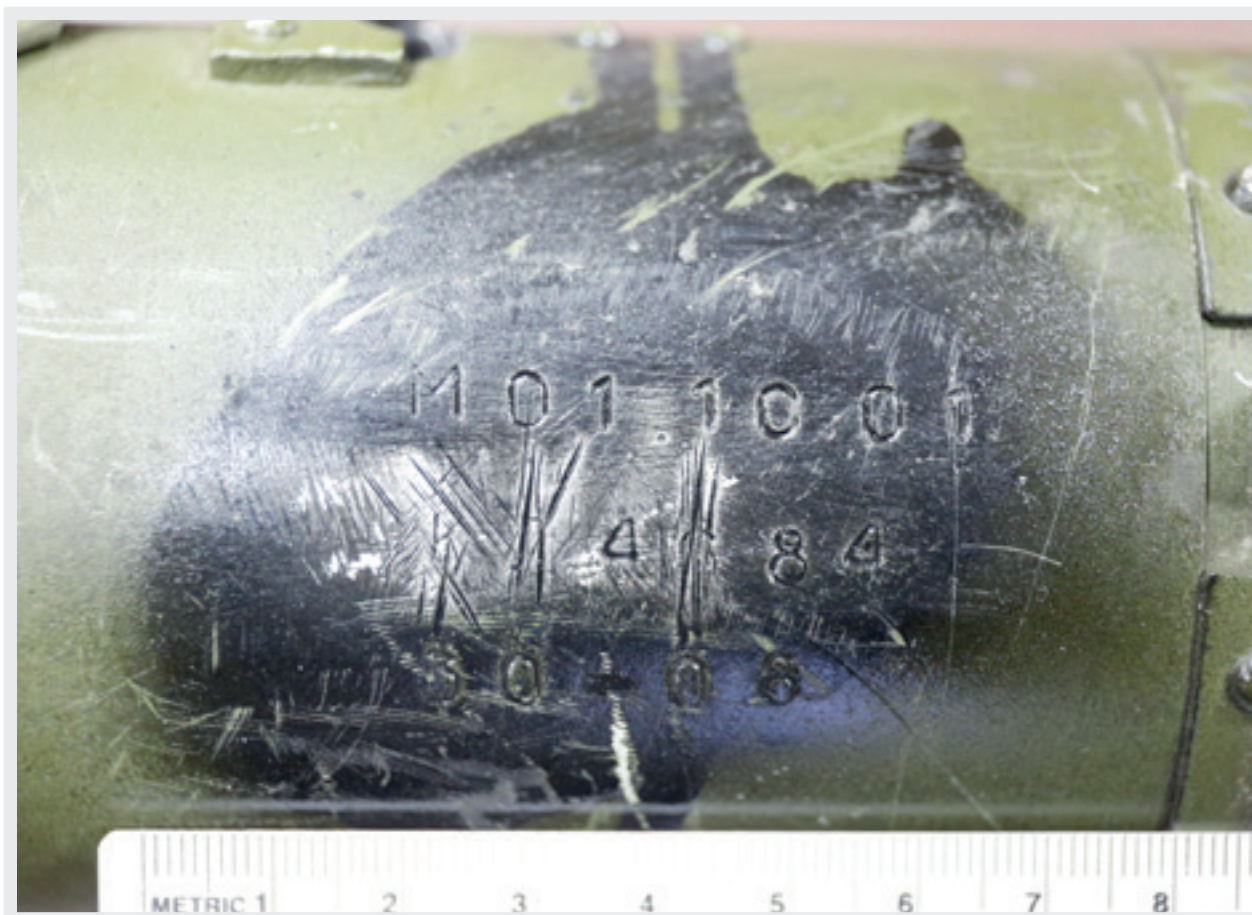
Unknown parties deliberately obliterated identifying markings—including the factory marks, lot numbers, and serial numbers—on all the MRO-A launchers and seven of the 11 RPO-A launchers documented by CAR in Ukraine (see Figures 76–80 and 97–119).

The obliteration of unique identifying marks is often an indicator of attempts to obscure provenance or supply chains.

Figure 85

Obliterated markings on an MRO-A disposable rocket launcher with the secondary mark 4200-2008

Documented by CAR in Mariupol on 20 December 2018



▶ **RPG-18**

On 11 December 2019, CAR documented the empty tube of a 64 mm RPG-18 disposable rocket launcher (see Figure 86). State Enterprise 'Signal' manufactured the launcher in 1980.

→ Ukrainian authorities responded to a CAR trace request, indicating that the item was not in service with the Armed Forces of Ukraine and that it was not recorded as stolen or lost.⁷² Russian authorities have yet to respond to a CAR trace request, which sought more information on this item.⁷³

Figure 86

An RPG-18 disposable rocket launcher with the lot number 254-8-80

Documented by CAR in Severodonets'k on 11 December 2019



▶ **RPG-22**

In September and December 2019, CAR documented four 72.5 mm RPG-22 disposable rocket launchers.

Vazovski Mashinostroitelni Zavodi (VMZ) EAD, a production facility based in Bulgaria, manufactured the items in 1985, 1988, and 1990 (see Figures 87, 88, and 89–90, respectively).

→ In response to a trace request sent by CAR, Ukrainian authorities reported that these items were not in service with the Armed Forces of Ukraine.⁷⁴ In their response to a trace request, Bulgarian authorities indicated that the manufacturer could not provide details regarding the export of the launcher bearing the lot number 11-6-88, as it had been manufactured more than ten years previously (see Figure 88).⁷⁵ CAR also sent trace requests to Bulgarian authorities for the launchers pictured in Figures 87 and 89–90 and is awaiting more information.⁷⁶

Figure 87

An RPG-22 disposable launcher with lot number 11-6-85

Documented by CAR in Advivka on 12 December 2019



Figure 88

An RPG-22 disposable launcher with lot number 11-6-88

Documented by CAR in Kramators'k on 17 September 2019



Figure 89

An RPG-22 disposable launcher with lot number 11-12-90

Documented by CAR in Adviiivka on 12 December 2019



Figure 90

An RPG-22 disposable launcher with lot number 11-12-90

Documented by CAR in Adviiivka on 12 December 2019



► **RPG-26**

In September and December 2019, CAR documented five 72.5 mm RPG-26 disposable rocket launchers. State Enterprise 'Signal' manufactured these items in 1988, 1990, and 1991 (see Figures 91, 93, and 94–96, respectively). CAR observed missing marks around the glued-on label of the RPG-26 launcher bearing the lot number 254-15-88, which CAR recovered. These could have been erased by wear and tear (see Figures 91–92).

→ In response to a trace request sent by CAR, Ukrainian authorities reported that the RPG-26 launcher bearing the lot number 254-15-88 was not in service with the Ukrainian Armed Forces.⁷⁷ They confirmed, however, that Unit A1352 field artillery storage had RPG-26 launchers bearing the lot numbers 254-6-90, 254-3-91, and 254-9-91 in its inventory, and that none of the launchers have been recorded as lost or stolen.⁷⁸ Russian authorities have yet to respond to a CAR trace request, which sought more information on these items.⁷⁹

Figure 91

An RPG-26 disposable rocket launcher with the lot number 254-15-88
Documented by CAR in Kramators'k on 17 September 2019



Figure 92

Detail of the glued-on label on RPG-26 with the lot number 254-15-88 (left) and recovered marks (right)

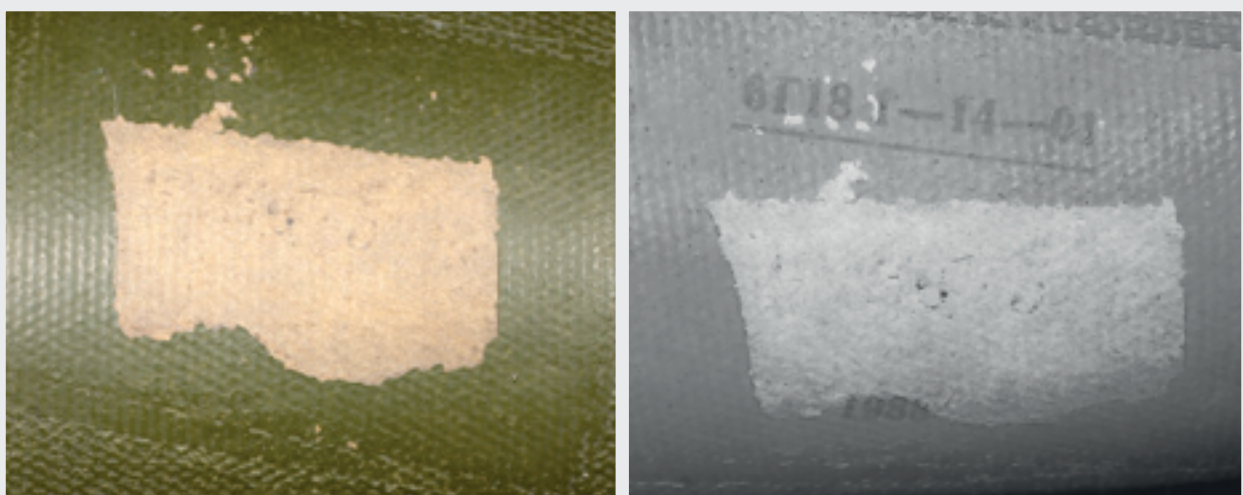


Figure 93

An RPG-26 disposable rocket launcher with the lot number 254-6-90

Documented by CAR in Adviiivka on 12 December 2019



Figure 94

An RPG-26 disposable rocket launcher with the lot number 254-9-91

Documented by CAR in Adviiivka on 12 December 2019



Figure 95

An RPG-26 disposable rocket launcher with the lot number 254-3-91

Documented by CAR in Adviiivka on 12 December 2019



Figure 96**An RPG-26 disposable rocket launcher with the lot number 254-3-91**

Documented by CAR in Adviiivka on 12 December 2019

**► RPO-A**

In 2018 and 2019, CAR documented 11 93 mm RPO-A disposable rocket launchers. Krasnozavodsk Chemical Plant and KBP Instrument Design Bureau manufactured these items in 1991, 1996, 1997, 2000, 2002, and 2009 (see Table 7 and Figures 97–119).

Seven of these launchers exhibit evidence of deliberate obliteration of key markings, including the factory mark, lot number, and serial number (see Table 7). CAR was able to recover some of the obliterated marks and, in other cases, inferred the date of manufacture from secondary marks.

The launcher produced in 1996 shows signs that unknown parties obliterated the model designation, part of the lot-date and factory marks, and the serial number, possibly using a coarse hand-held file, such as a ‘bastard file’ (see Figure 102). On two items manufactured in 2002, parties used a variety of methods to obliterate marks, such as a hand-held file, abrasive material, and chemical paint removal, while preserving the camouflage (see Figure 117). In some cases, they took care to conceal

the act of obliteration, perhaps to maintain the benefits of camouflage on the battlefield (see Figures 112 and 117).

The two launch tubes that were produced in 1991 in what is today the Russian Federation bear no sign of obliteration; both feature additional marks indicating that the Ukrainian factory Shostka State Plant ‘Zvezda’ refurbished them in 2014, suggesting the items were once part of the Ukrainian inventory (see Figure 99).

→ Ukrainian authorities corroborated these findings in their response to CAR’s trace requests, stating that some RPO-A launchers that were produced before 2001 were in service with the Ukrainian Armed Forces.⁸⁰ However, Ukrainian authorities reported that neither the RPO-A launchers with serial numbers 1247 and 1248, both manufactured in 1997, nor the ones produced after 2001 were in service with the Armed Forces of Ukraine.⁸¹ Russian authorities have yet to respond to a CAR trace request, which sought more information on these items.⁸²

▼ Part of a Forpost UAV recovered in Ukraine.

НЕ ПРИКАСАТЬСЯ

Table 7**RPO-A rocket launchers documented by CAR in Ukraine**

Note: = Highlighted items display signs of attempted or successful obliteration of marks.

Figure nos.	Recovery date and location	Year of manufacture	Serial number	Lot-date marking
97 and 99	12 June 2019 (Mariinka)	1991	372	14-91
98-99	12 June 2019 (Mariinka)	1991	863	14-91
100-02	1 February-31 March 2018 (Kramators'k)	1996	Obliterated	Obliterated
103-05	6 April 2014-31 December 2014 (unknown)	1997	1247 [recovered]	1-97 [recovered]
106-08	6 April 2014-31 December 2014 (unknown)	1997	1248 [recovered]	1-97 [recovered]
109-10	6 April 2014-31 December 2015 (unknown)	2000	683 [recovered]	1-00 [recovered]
111-13	6 April 2014-31 December 2015 (unknown)	2000	Obliterated	1-00
114-15	6 April 2014-31 December 2015 (unknown)	2002	223	5-02
116-17	6 April 2014-31 December 2015 (unknown)	2002	Obliterated	Obliterated
116-17	6 April 2014-31 December 2015 (unknown)	2002	Obliterated	Obliterated
118-19	13 September 2017 (Pavlopil)	2009	215	1-09

Figure 97

An RPO-A disposable launcher manufactured by Krasnozavodsk Chemical Plant, with the serial number 372

Documented by CAR in Mariupol on 18 September 2019



Figure 98

An RPO-A disposable launcher manufactured by Krasnozavodsk Chemical Plant, with the serial number 863
Documented by CAR in Mariupol on 18 September 2019



Figure 99

Details of the markings on the tubes of RPO-A launchers with the serial numbers 372 and 863, with additional marks indicating Shostka State Plant 'Zvezda' refurbished the items in Ukraine in 2014



Figure 100

An RPO-A disposable launcher manufactured by Krasnozavodsk Chemical Plant, with the serial number obliterated
Documented by CAR in Kyiv on 25 September 2018



Figure 101

Obliterated marks on the tube of an RPO-A launcher

Documented by CAR in Kyiv on 25 September 2018



Figure 102

Attempted recovery of the obliterated model designation (left, first line), part of the lot-date and factory marks (left, second line), and serial number (right) of an RPO-A launcher

Documented by CAR in Kyiv on 25 September 2018

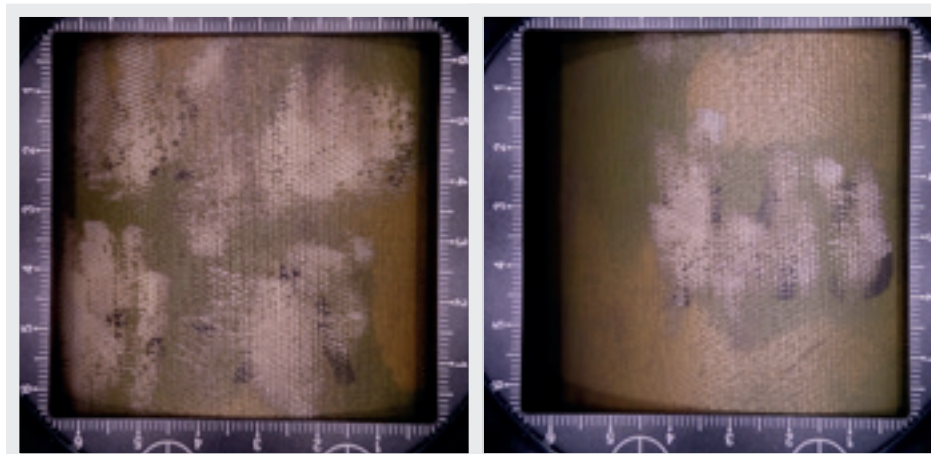


Figure 103

An RPO-A disposable rocket launcher manufactured by KBP Instrument Design Bureau, with the serial number 1247 (recovered)

Documented by CAR in Klymentove on 10 December 2019



Figure 104

Detail of the obliterated marks on the tube of an RPO-A disposable rocket launcher with the serial number 1247 (recovered),

Documented by CAR in Klymentove on 10 December 2019



Figure 105

Recovered lot-date mark (left), factory mark (centre), and serial number (right) of an RPO-A disposable rocket launcher with the serial number 1247 (recovered)

Documented by CAR in Klymentove on 10 December 2019



Figure 106

An RPO-A disposable rocket launcher manufactured by KBP Instrument Design Bureau, with the serial number 1248 (recovered)

Documented by CAR in Klymentove on 10 December 2019



Figure 107

Detail of the obliterated marks on the tube of an RPO-A disposable rocket launcher with the serial number 1248 (recovered)

Documented by CAR in Klymentove on 10 December 2019

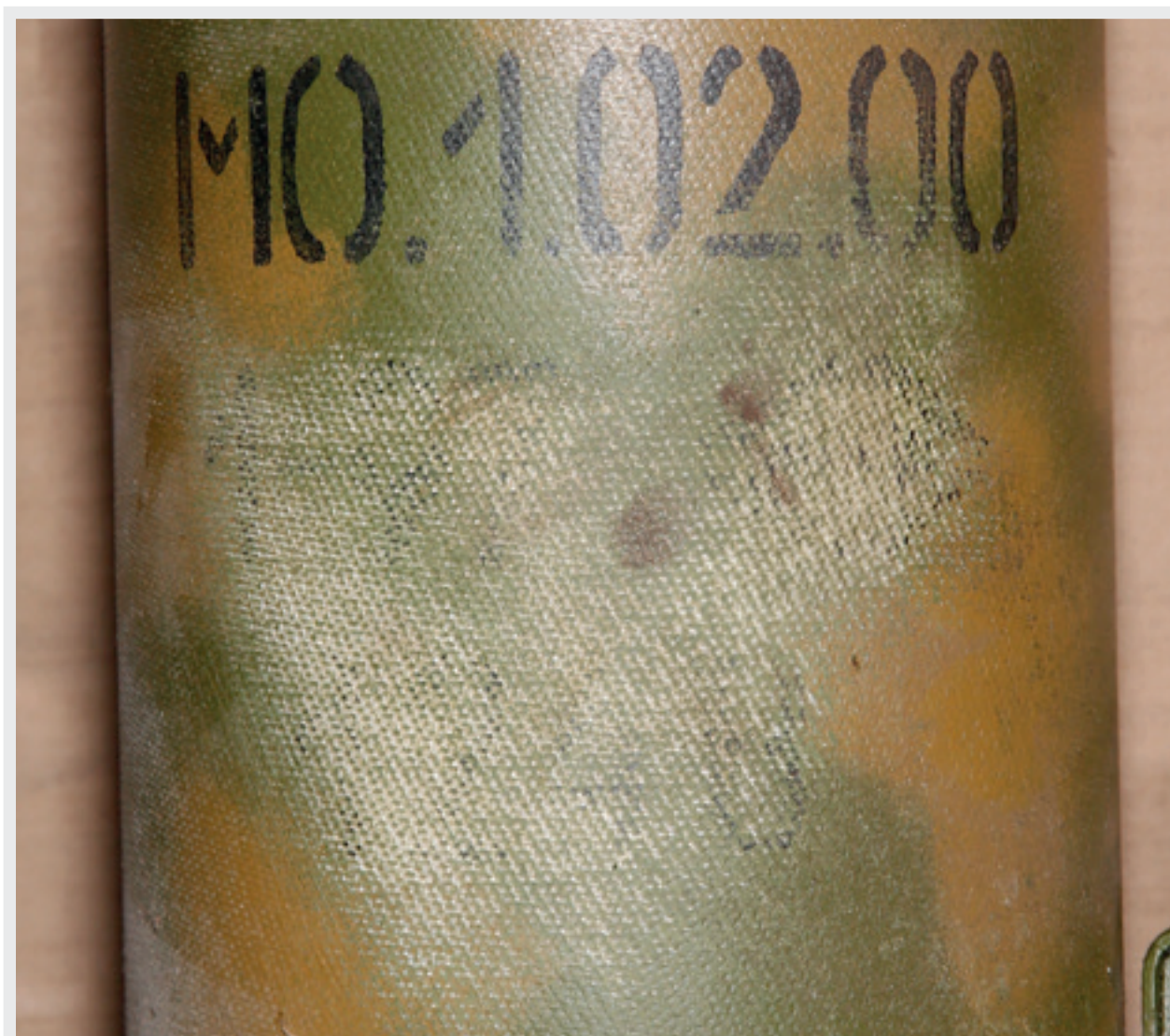


Figure 108

Recovered lot-date mark (left), factory mark (centre), and serial number (right) of an RPO-A disposable rocket launcher with the serial number 1248 (recovered)

Documented by CAR in Klymentove on 10 December 2019

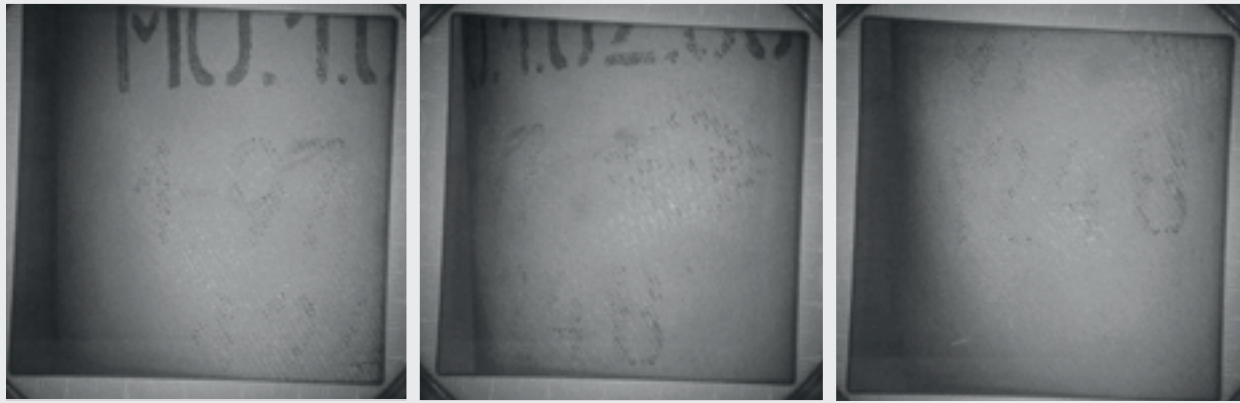
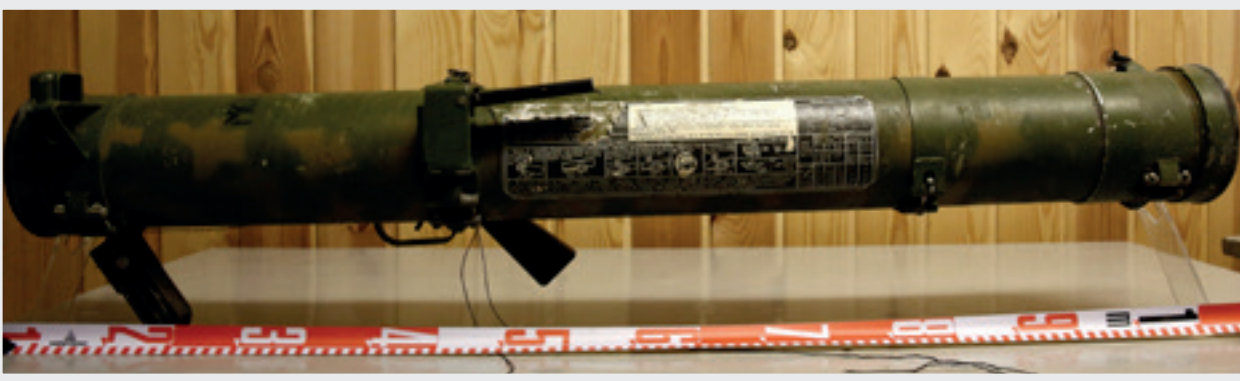


Figure 109

An RPO-A disposable rocket launcher manufactured by Krasnozavodsk Chemical Plant, with the serial number 683 (recovered)

Documented by CAR in Horodok on 27 September 2018



▼ Birth of the Mother
of God Church, Kyiv.

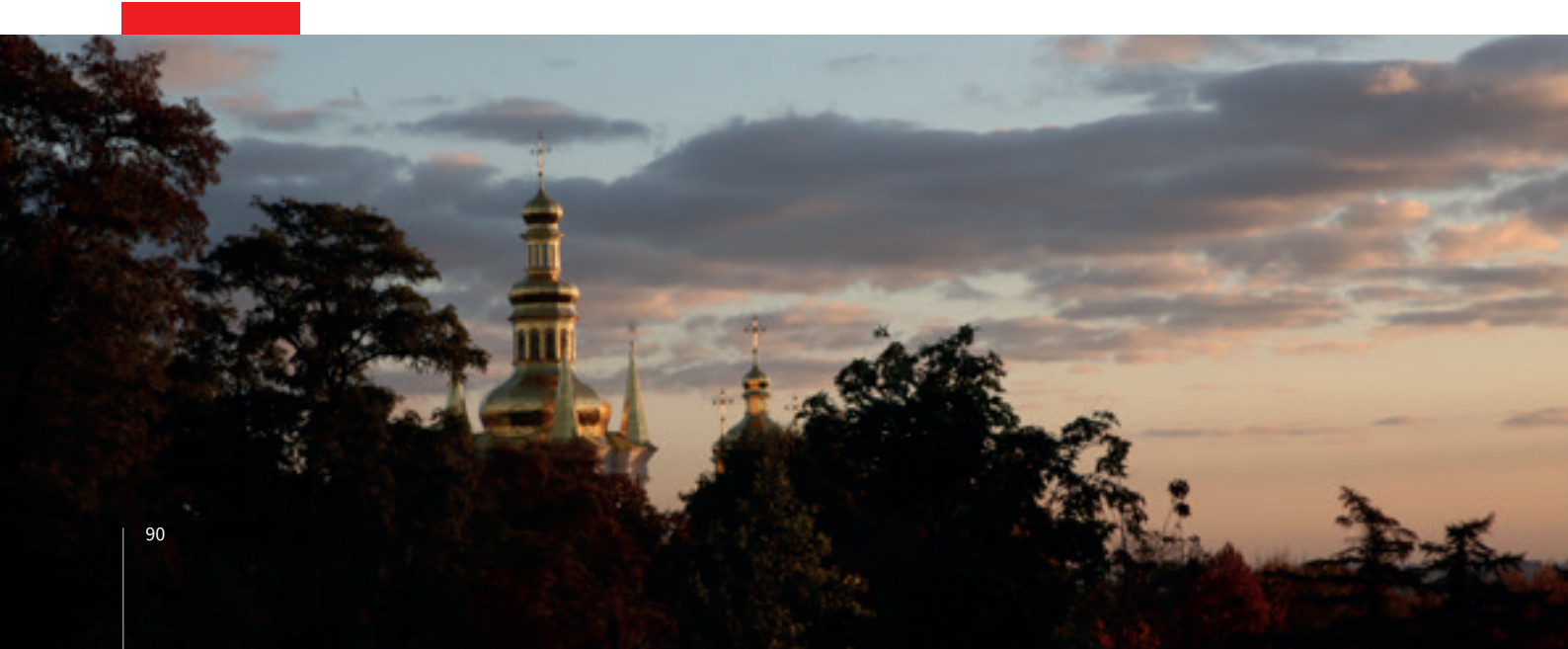


Figure 110

Recovered lot-date mark (top, left and right), factory mark (bottom, left), and serial number (bottom, right) of an RPO-A disposable rocket launcher with the serial number 683 (recovered)

Documented by CAR in Horodok on 27 September 2018

**Figure 111**

An RPO-A disposable rocket launcher manufactured by Krasnozavodsk Chemical Plant, with the serial number obliterated (not recovered)

Documented by CAR in Horodok on 27 September 2018



Figure 112

Details of the obliterated marks on the tube of an RPO-A disposable rocket launcher

Documented by CAR in Horodok on 27 September 2018

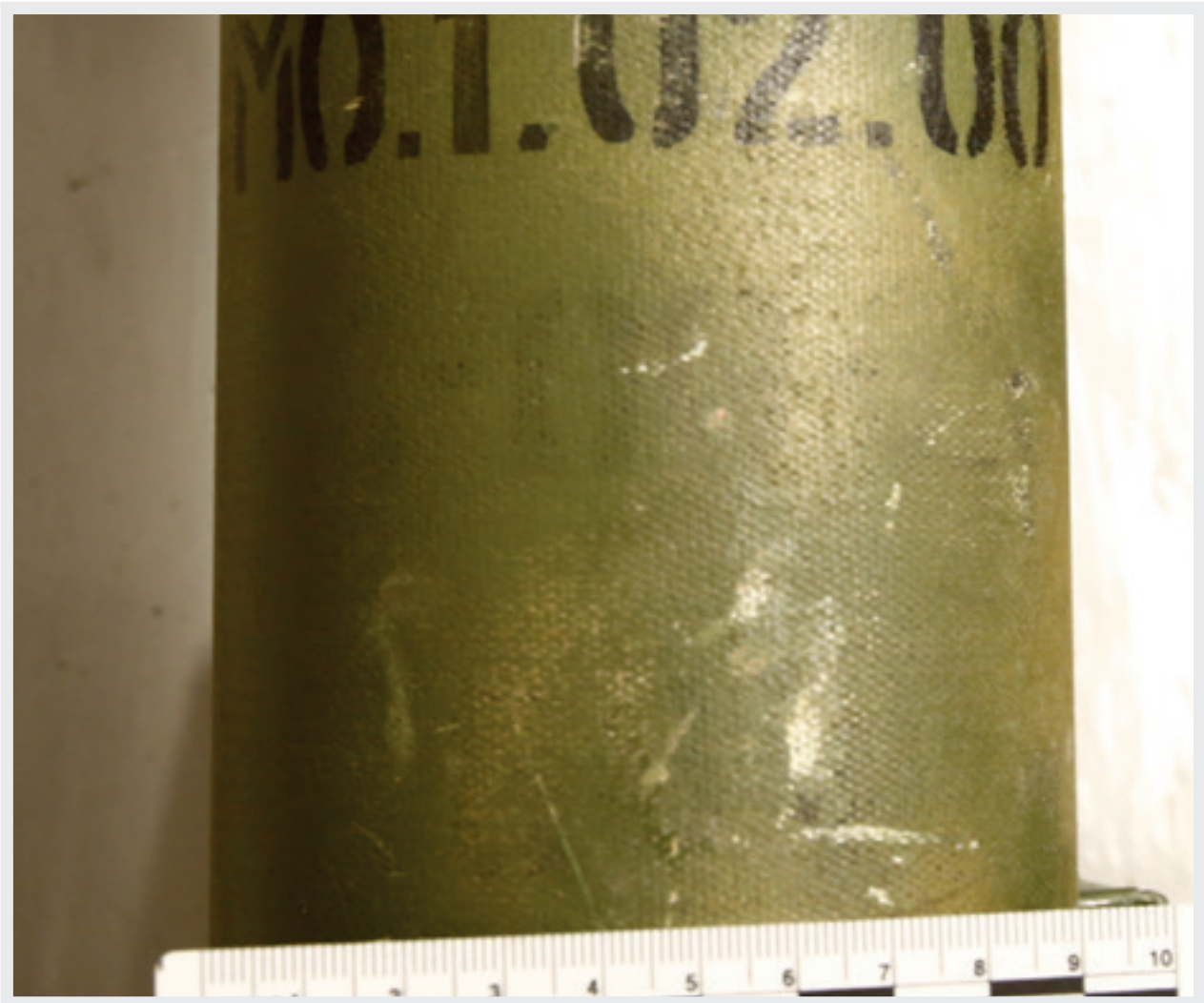


Figure 113

A recovered lot-date mark (left), a recovered factory mark (centre), and a partially recovered serial number (right) of an RPO-A disposable rocket launcher

documented by CAR in Horodok on 27 September 2018



Figure 114

An RPO-A disposable rocket launcher manufactured by Krasnozavodsk Chemical Plant, with the serial number 223
Documented by CAR in Horodok on 27 September 2018



Figure 115

Details of the marks on the tube of an RPO-A disposable rocket launcher with the serial number 223
Documented by CAR in Horodok on 27 September 2018



Figure 116

Two RPO-A disposable launchers with serial numbers obliterated (not recovered)

Documented by CAR in Horodok on 27 September 2018



Figure 117

Details of the obliterated markings (not recovered) on two RPO-A launchers

Documented by CAR in Horodok on 27 September 2018



Figure 118

An RPO-A disposable rocket launcher manufactured by Krasnozavodsk Chemical Plant, with the serial number 215
Documented by CAR in Mariupol on 20 December 2018



Figure 119

Details of marks on the tube of an RPO-A disposable rocket launcher with the serial number 215
Documented by CAR in Mariupol on 20 December 2018



DIFFERENCES IN THE DEGREE OF SANITISATION SUGGEST THAT OBLITERATION TECHNIQUES EVOLVED OVER TIME.

Like the above-mentioned MRO-A launchers, the sanitised RPO-A launchers exhibit only stencilled system designations and small, intact, stamped unique numbers. In both cases, the users may have operated weapon and ammunition management processes in line with military standards.

A further similarity across the MRO-A and RPO-A launchers is that obliterating parties

► RShG-1

In 2018 and 2019, CAR documented three 105 mm RShG-1 disposable rocket launchers. FGUP Chemical Plant 'Planta' manufactured these launchers in 2004, 2005, and 2013 (see Figures 120, 121, and 122, respectively).

used various approaches to remove marks. Differences in the degree of sanitisation suggest that obliteration techniques evolved over time. They also indicate that materiel may have been sourced through different supply channels with different approaches to obliteration, but with a similar intent: to conceal incriminating evidence of the precise point of diversion or of the country of origin and thereby hamper tracing investigations.

→ In response to a trace request sent by CAR, Ukrainian authorities reported that these items were not in service with the Armed Forces of Ukraine.⁸³ Russian authorities have yet to respond to a CAR trace request, which sought more information on these items.⁸⁴

Figure 120

An RShG-1 disposable rocket launcher with the lot number 56-1-04

Documented by CAR in Mariupol on 18 September 2019



Figure 121

An RShG-1 disposable rocket launcher with the lot number 56-1-05

Documented by CAR in Kramators'k on 17 September 2019



Figure 122

An RShG-1 disposable rocket launcher with the lot number 56-1-13

Documented by CAR in Mariupol on 20 December 2018



Fuzes

► MVCh-62

On 8 May 2019, CAR documented four MVCh-62 landmine fuzes, which are associated with the TM-62M anti-vehicle landmine. Scientific-Research Engineering Institute JSC manufactured them in 1976 and 1977 (see Figures 123 and 124, respectively).

→ In response to a trace request sent by CAR, Ukrainian authorities reported that these items were not in service with the Armed Forces of Ukraine.⁸⁵ Russian authorities have yet to respond to a CAR trace request, which sought more information on these items.⁸⁶

Figure 123

Two MVCh-62 fuzes

Documented by CAR in Paraskoviivka on 8 May 2019



Figure 124

Two MVCh-62 fuzes

Documented by CAR in Paraskoviivka on 8 May 2019



▼ A recovered BTR-80
armoured personnel
carrier documented
by CAR in Sartana on
9 May 2019.



► NVU-P

On 20 December 2018, CAR documented an NVU-P system. Kazan Precision Machinery manufactured the system, which is designed for the successive detonation of up to five anti-personnel mines, in 1989 (see Figure 125).

The NVU-P system allows users to initiate the selected mines either via command or seismic influence. The NVU-P kit contains all the components required to deploy the system in the chosen setting. Command initiation involves the use of a twin-core cable and the included MZU remote switch, which is designed to be reused. When deploying the system in the seismic setting, the user places a sensor near the selected anti-personnel mine and connects it to the control unit by electrical lead. In the active mode, the

sensor monitors the local environment and is programmed to identify human movements (to avoid accidental initiation by animals or other motion). Once it detects movement, the control unit selects the mine located closest to the target and sends a firing pulse to that mine. In normal conditions, initiation occurs when the target is approximately 15 m from the sensor, to ensure maximum effect from the main charge.

→ In response to a trace request sent by CAR, Ukrainian authorities reported that this item was not in service with the Armed Forces of Ukraine, and that it was not recorded as stolen or lost.⁸⁷ Russian authorities have yet to respond to a CAR trace request, which sought more information on this item.⁸⁸

Figure 125**An NVU-P system**

Documented by CAR in Mariupol on 20 December 2018



► **ML-8 anti-handling device**

On 8 May 2019, CAR documented one ML-8 anti-handling device (see Figure 126). Saranskiy Mechanical Plant produced the item in 2002.

The ML-8 is classified as an anti-lift firing device. It is designed to be placed under a buried landmine or any other suitable object that weighs at least 250 g. Once the mine or other object is removed, the pressure plate elevates and allows the spring-loaded striker to be driven into the fuze. The fuze then initiates the 80-gram explosive main charge (PVV-5A) contained in the body of the firing device. When used in conjunction with a conventional land-

mine, initiation of the ML-8 main charge results in the detonation of the explosive contained in the landmine, increasing the overall explosive effects. The ML-8 is used to deter conventional explosive clearance operations and as booby traps.

→ In response to a trace request sent by CAR, Ukrainian authorities reported that this item was not in service with the Armed Forces of Ukraine, and that it was not recorded as stolen or lost.⁸⁹ Russian authorities have yet to respond to a CAR trace request, which sought more information on this item.⁹⁰


► RPO-A disposable rocket launchers documented by CAR in Horodok on 27 September 2018.

Figure 126

An ML-8 anti-handling device with the lot number 583-3-02

Documented by CAR in Paraskoviivka on 8 May 2019



A close-up photograph of a green military mortar tube, showing its cylindrical body and various mechanical components. The tube is positioned diagonally across the frame. A red-bordered text box is overlaid on the right side of the image, containing white text. The background is a light-colored wooden surface.

CAR'S ANALYSIS OF MARKING OBLITERATION TECHNIQUES SUGGESTS THAT MATERIEL MAY HAVE BEEN SOURCED THROUGH DIFFERENT SUPPLY CHAINS, WITH DIFFERENT APPROACHES, BUT ALL WITH A SIMILAR INTENT TO CONCEAL INCRIMINATING EVIDENCE OF THE PRECISE POINT OF DIVERSION.

Grenades

CAR documented three types of hand grenade (RG-42, RGN, and ZMG-1) and one vehicle-launched grenade (3D6).

► Hand grenades

RG 42

On 10 December 2019, CAR documented one RG 42 grenade (see Figure 127). An unidentified factory manufactured the item in 1949. Ukrainian defence and security forces recovered it with a UZRGM fuze that GUP Novosibirsk Mechanical Plant 'Iskra' manufactured in 1971.

→ In response to a trace request sent by CAR, Ukrainian authorities reported that this item was not in service with the Armed Forces of Ukraine, and that it was not recorded as stolen or lost.⁹¹ Russian authorities have yet to respond to a CAR trace request, which sought more information on this item.⁹²

Figure 127

An RG 42 grenade with a UZRGM fuze

Documented by CAR in Hrytsenkove on 10 December 2019



RGN

On 10 December 2019, CAR documented one RGN grenade (see Figure 128). State Enterprise 'Signal' produced the item in 1988. Ukrainian defence and security forces recovered it with a UDZ fuze manufactured by JSC Velta in 1988.

On 12 December, CAR documented another RGN hand grenade, also produced by State Enterprise 'Signal' in 1988 (see Figure 129).

Ukrainian defence and security forces recovered it with a UDZ fuze manufactured by Nizhniy Lomov Electro-Mechanical Factory NL-EMZ in 1988.

→ In response to a CAR trace request, Ukrainian authorities indicated that RGN grenades with the same lot numbers were present in their national stockpile.⁹³ Russian authorities have yet to respond to a CAR trace request, which sought more information on these items.⁹⁴

Figure 128

An RGN grenade with a UDZ fuze

Documented by CAR in Hrytsenkove on 10 December 2019



Figure 129

An RGN grenade with a UDZ fuze

Documented by CAR in Avdiivka on 12 December 2019



ZMG-1

On 8 May 2019, CAR documented one ZMG-1 incendiary grenade (see Figure 130). The General Staff of the Armed Forces of Ukraine has stated that Russian sabotage groups have used this type of munition against Ukrainian ammunition depots (GDMCPO, 2016). CAR could not confirm this allegation.

→ In response to a trace request sent by CAR, Ukrainian authorities reported that this item was not in service with the Armed Forces of Ukraine, and that it was not recorded as stolen or lost.⁹⁵ Russian authorities have yet to respond to a CAR trace request, which sought more information on this item.⁹⁶

Figure 130

A ZMG-1 incendiary grenade

Documented by CAR in Paraskoviivka on 8 May 2019



▶ Vehicle-launched grenades

3D6 smoke grenades

On 17 September 2019, CAR documented three 81 mm 3D6 vehicle-launched smoke grenades (see Figure 131). State enterprise 'Signal' manufactured the items in 1982.

→ In response to a trace request sent by CAR, Ukrainian authorities reported that these items were not in service with the Armed Forces of Ukraine.⁹⁷ Russian authorities have yet to respond to a CAR trace request, which sought more information on these items.⁹⁸

Figure 131

Three 3D6 vehicle-launched smoke grenades

Documented by CAR in Kramators'k on 17 September 2019



Guided munitions

CAR documented components for both anti-tank guided weapons (ATGWs) and man-portable air defence system (MANPADS) in Ukraine.

► ATGW

9M133F-1 missile

In September 2018, CAR documented the rocket motor section and actuator assembly of a 9M133F-1 Kornet missile (see Figure 132). KBP Instrument Design Bureau manufactured the item, which is a thermobaric variant of the Kornet missile, in 2012.

→ In response to a trace request sent by CAR, Ukrainian authorities reported that this item was not in service with the Armed Forces of Ukraine.⁹⁹ Russian authorities have yet to respond to a CAR trace request, which sought more information on this item.¹⁰⁰

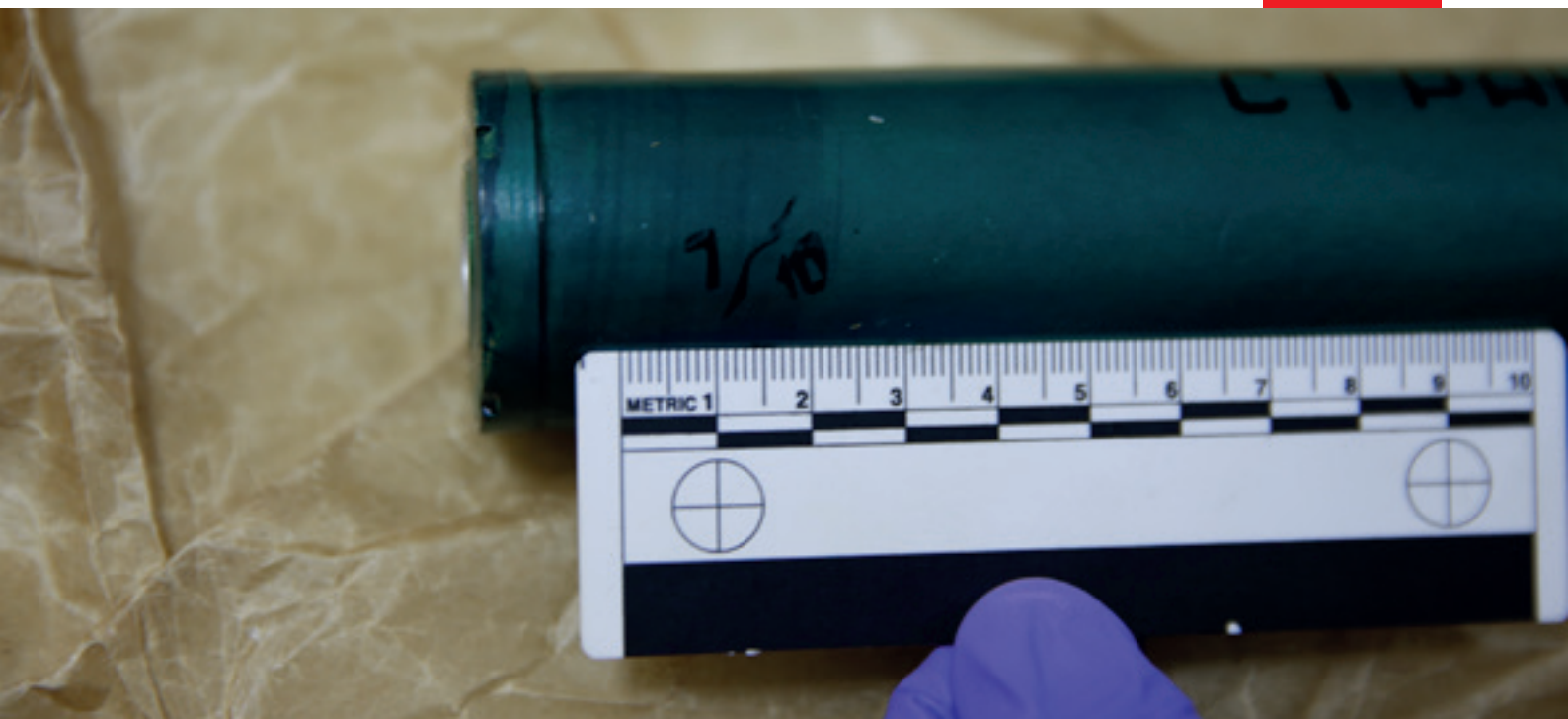
Figure 132

The rocket motor section of a 9M133F-1 Kornet missile

Documented by CAR in Kyiv on 26 September 2018



▼ A CAR field investigation team documenting a 40 mm PG-7PM propelling charge.



► **MANPADS**

GROM E2

On 27 September 2018, CAR documented one GROM MANPADS gripstock and two GROM MANPADS launch tubes (one with a battery coolant unit and one with a missile). Poland-based MESKO SA manufactured the gripstock in 2005 and the tubes in 2007 (see Figures 133–35).

→ In response to a trace request issued by CAR, Polish authorities stated that these items were part of a delivery of 100 GROM MANPADS launch tubes and missiles, together with 16 gripstocks, brokered with the Ministry of Defence of Georgia in late 2007 and stored at a military base in western Georgia. The Polish authorities added that during the Russo-Georgian war of August 2008, many of the missiles, which had been shipped

with the launchers, were used in battle and that at least 26 missiles remained in the possession of the Georgian army. However, some were abandoned on the battlefield and Russian forces may have appropriated them (see Map 3).¹⁰¹

→ CAR subsequently sent a trace request to the Government of Georgia, which replied that the Georgian authorities had not granted any permit for the export of these items.¹⁰² In response to a separate trace request sent by CAR, Ukrainian authorities reported that these items were not in service with the Armed Forces of Ukraine.¹⁰³ Russian authorities have yet to respond to a CAR trace request, which sought more information on these items.¹⁰⁴

Map 3

GROM E2 MANPADS supply chain

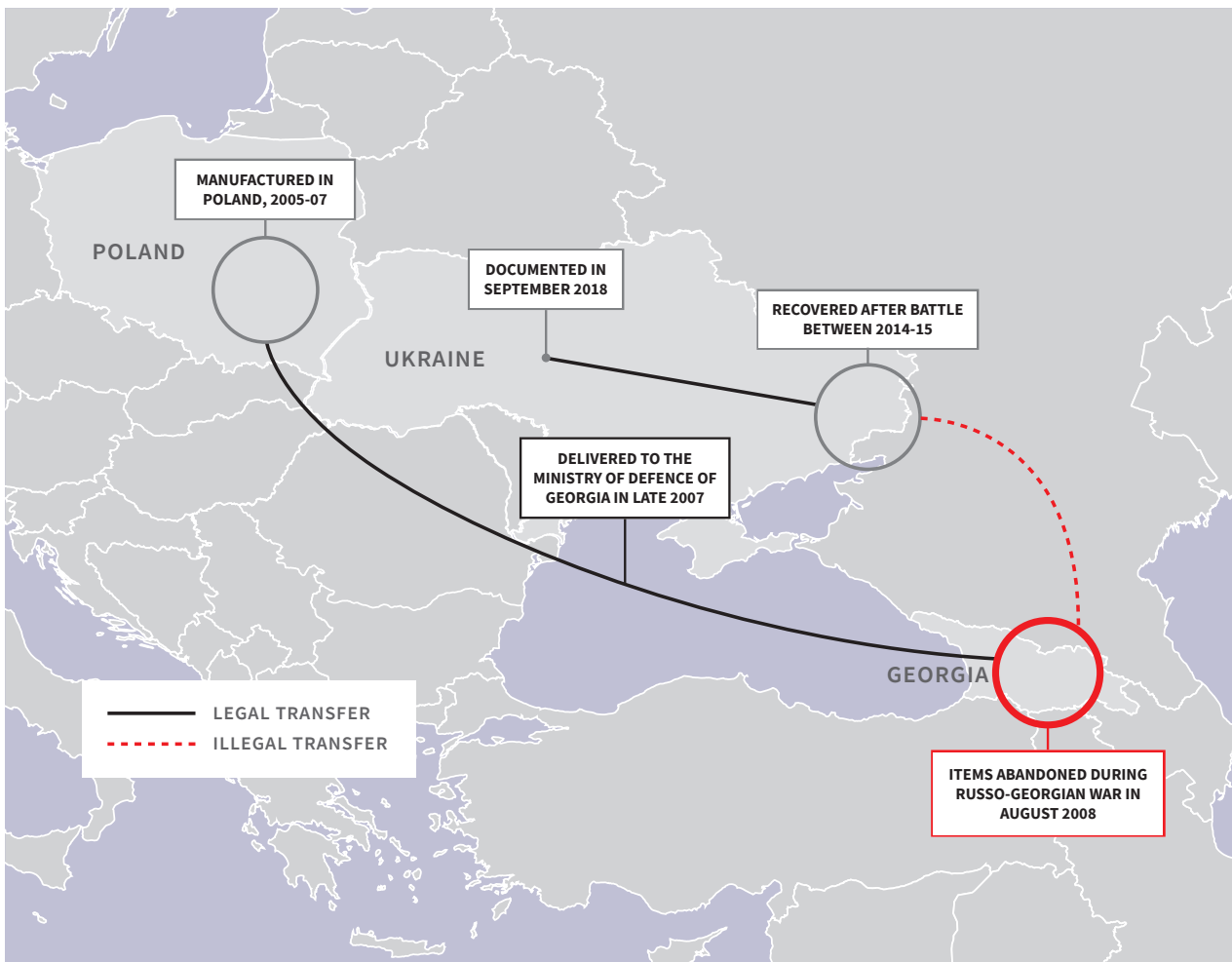


Figure 133

A GROM E2 MANPADS tube with the serial number 1134, with a battery coolant unit

Documented by CAR in Horodok on 27 September 2018



Figure 134

A GROM E2 MANPADS tube with the serial number 1016, with a missile

Documented by CAR in Horodok on 27 September 2018



Figure 135

A GROM MANPADS gripstock

Documented by CAR in Horodok on 27 September 2018



Mines

Eastern Ukraine is one of the most mine-contaminated regions in the world, and millions of Ukrainians face the threat of landmines while going about their daily life

► MON-50

On 20 December 2018, CAR documented one MON-50 anti-personnel directional mine (see Figure 136). JSC Promsintez was involved in the production of this mine in 2000.

On 11 December 2019, CAR documented two additional MON-50 anti-personnel landmines. JSC Promsintez was also involved in the production of these items, in 2000 and 2005 (see Figures 137 and 138, respectively).

(UN in Ukraine, 2021). CAR has documented five different landmine models in Ukraine: the MON-50, the OZM-72, the PMN-2, the POM-2, and the TM-62M.

Unknown parties obliterated the identifying marks of both mines.

→ In response to a trace request sent by CAR, Ukrainian authorities reported that these items were not in service with the Armed Forces of Ukraine, and that they were not recorded as stolen or lost.¹⁰⁵ Russian authorities have yet to respond to a CAR trace request, which sought more information on these three items.¹⁰⁶

Figure 136

A MON-50 mine

Documented by CAR in Mariupol on 20 December 2018



Figure 137

A MON-50 mine

Documented by CAR in Rubezhnoye on 11 December 2019



Figure 138

A MON-50 mine

Documented by CAR in Rubezhnoye on 11 December 2019



► **OZM-72**

On 20 December 2018, CAR documented five OZM-72 anti-personnel landmines (see Figure 139). Unidentified factories manufactured one in 1980 and three in 1988.

One mine is so damaged that its markings are illegible.

→ In response to trace requests sent by CAR, Ukrainian authorities reported that these items were not in service with the Armed Forces of Ukraine, and that they were not recorded as stolen or lost.¹⁰⁷ Russian authorities have yet to respond to a CAR trace request, which sought more information on these items.¹⁰⁸

Figure 139

OZM-72 mines

Documented by CAR in Mariupol on 20 December 2018



► PMN-2

In 2018 and 2019, CAR documented eight PMN-2 mines (see Figures 140–42). Saranskiy Mechanical Plant and JSC Promsintez were involved in the production of two of these mines in 1985; FGUP Nerekhtskiy Mechanical Plant and JSC Promsintez were involved in the production of the remaining six mines in 1988.

→ In response to a trace request sent by CAR, Ukrainian authorities reported that these items were not in service with the Armed Forces of Ukraine, and that they were not recorded as stolen or lost.¹⁰⁹ Russian authorities have yet to respond to a CAR trace request, which sought more information on these items.¹¹⁰

Figure 140

Two PMN-2 mines, manufactured in 1985

Documented by CAR in Mariupol on 18 September 2019



Figure 141

Five PMN-2 mines, manufactured in 1988

Documented by CAR in Mariupol on 20 December 2018



Figure 142

A PMN-2 mine, manufactured in 1988

Documented by CAR in Mariupol on 18 September 2019



► **POM-2 mines and KPOM-2 cluster units**

On 19 December 2018, CAR documented the empty launching case for a scatterable mine marked 'POM-2' (see Figure 143). FGUP 'Plant named after I.M. Sverdlov' manufactured the item in 1990.

On 18 September 2019, CAR documented another two empty launching cases for scatterable mines marked 'POM-2', produced by the same factory in 1993 (see Figure 144).

On 18 September 2019, CAR documented six cluster units marked 'KPOM-2' (see Figure 145).

The same plant manufactured these items in 1990. A cluster unit can contain four POM-2 scatterable mines.

→ In response to a trace request sent by CAR, Ukrainian authorities reported that these items were not in service with the Armed Forces of Ukraine, and that they were not recorded as stolen or lost.¹¹¹ Russian authorities have yet to respond to a CAR trace request, which sought more information on these items.¹¹²

Figure 143

An empty launching case for a scatterable mine marked 'POM-2', with the lot number 80-34-90

Documented by CAR in Severodonets'k on 19 December 2018

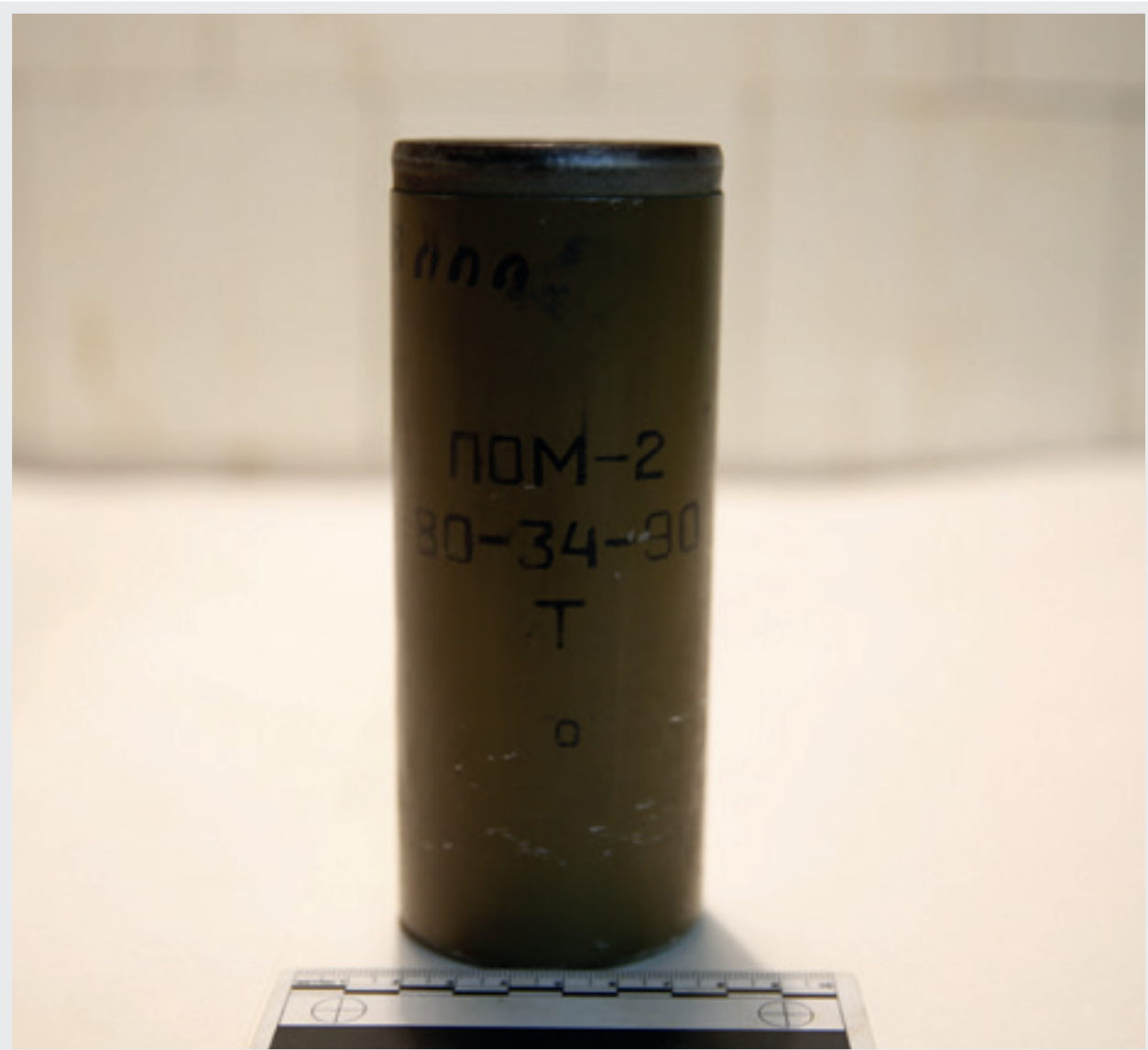


Figure 144

Two empty launching cases for scatterable mines marked 'POM-2', with the lot number 80-5-93 and some cluster unit components

Documented by CAR in Mariupol on 18 September 2019



CAR INVESTIGATORS DOCUMENTED FIVE DIFFERENT LANDMINE MODELS IN UKRAINE. UKRAINIAN AUTHORITIES REPORTED THAT NONE OF THESE MODELS WAS IN SERVICE WITH THE ARMED FORCES OF UKRAINE, AND THAT THEY WERE NOT RECORDED AS STOLEN OR LOST.

Figure 145

Six empty cluster units marked 'KPOM-2'

Documented by CAR in Mariupol on 18 September 2019



► **TM-62M**

On 8 May 2019, CAR documented eight TM-62M anti-vehicle landmines. Baza No. 55 and Factory 2516 were involved in the manufacture of these mines in 1974, 1976, and 1979 (see Figures 146–47).

→ In response to a trace request sent by CAR, Ukrainian authorities reported that these items were not in service with the Armed Forces of Ukraine and that they were not recorded as stolen or lost.¹¹³ Russian authorities have yet to respond to a CAR trace request, which sought more information on these items.¹¹⁴

Figure 146

Six TM-62M landmines with the lot number B-2516-136-74

Documented by CAR in Paraskoviivka on 8 May 2019



Figure 147

TM-62M landmines with the lot numbers 55-82-76 (left) and 55-492-79 (right)

Documented by CAR in Paraskoviivka on 8 May 2019



Medium-calibre ammunition**▶ 23 × 152B mm**

On 10 December 2019, CAR documented three rounds of 23 × 152B mm medium-calibre cartridge ammunition. Plant n.a. Sergo-POZIS manufactured one in 1983 and GNPP 'Pribor' manufactured two in 1984 (see Figures 148 and 149, respectively).

→ In response to a trace request sent by CAR, Ukrainian authorities reported that these items were not in service with the Armed Forces of Ukraine and that they were not recorded as stolen or lost.¹¹⁵ Russian authorities have yet to respond to a CAR trace request, which sought more information on these items.¹¹⁶

Figure 148

A round of 23 × 152B mm medium-calibre cartridge ammunition and associated headstamp, manufactured in 1983
Documented by CAR in Hrytsenkove on 10 December 2019

**Figure 149**

Two rounds of 23 × 152B mm medium-calibre cartridge ammunition and associated headstamp, manufactured in 1984
Documented by CAR in Hrytsenkove on 10 December 2019



Precision-guided munitions

► 152 mm 3OF39

On 9 May 2019, CAR documented the fragments of two munitions (see Figures 150–51). The position, shape, and features of the fins closely resemble that of 3OF39 precision-guided artillery munitions, which belong to the 2K25 Krasnopol weapon system produced by Izhmash in the Russian Federation. Before firing a Krasnopol guided projectile, a forward observer works with an artillery unit to illuminate the target with a laser target designator, which has a reported maximum range of 7 km (but preferably 5 km), for 5–15 seconds.

- In response to a trace request sent by CAR, Ukrainian authorities reported that these items were not in service with the Armed Forces of Ukraine and that they were not recorded as stolen or lost.¹¹⁷
- They also stated that elements associated with the 9th and 11th Motor Rifle Brigades of the 1st Army Corps of the self-declared ‘Donetsk People’s Republic’ (DPR) fired these munitions on Ukrainian defence and security forces in Shyrokyne and Novoluhansk on 12 February and 10 April 2019, respectively.¹¹⁸ Russian authorities have yet to respond to a CAR trace request, which sought more information on these items.¹¹⁹

Figure 150

Fragments of an apparent 3OF39 precision-guided munition belonging to the 2K25 Krasnopol weapon system

Documented by CAR in Mariupol on 9 May 2019



Figure 151

Fragments of an apparent 3OF39 precision-guided munition belonging to the 2K25 Krasnopol weapon system

Documented by CAR in Mariupol on 9 May 2019



Other munitions and components

► 40 mm OG-7 projectiles

On 25 September 2018, CAR documented two 40 mm OG-7 projectiles (see Figure 152). FGUP Chemical Plant 'Planta' manufactured both items in 2005.

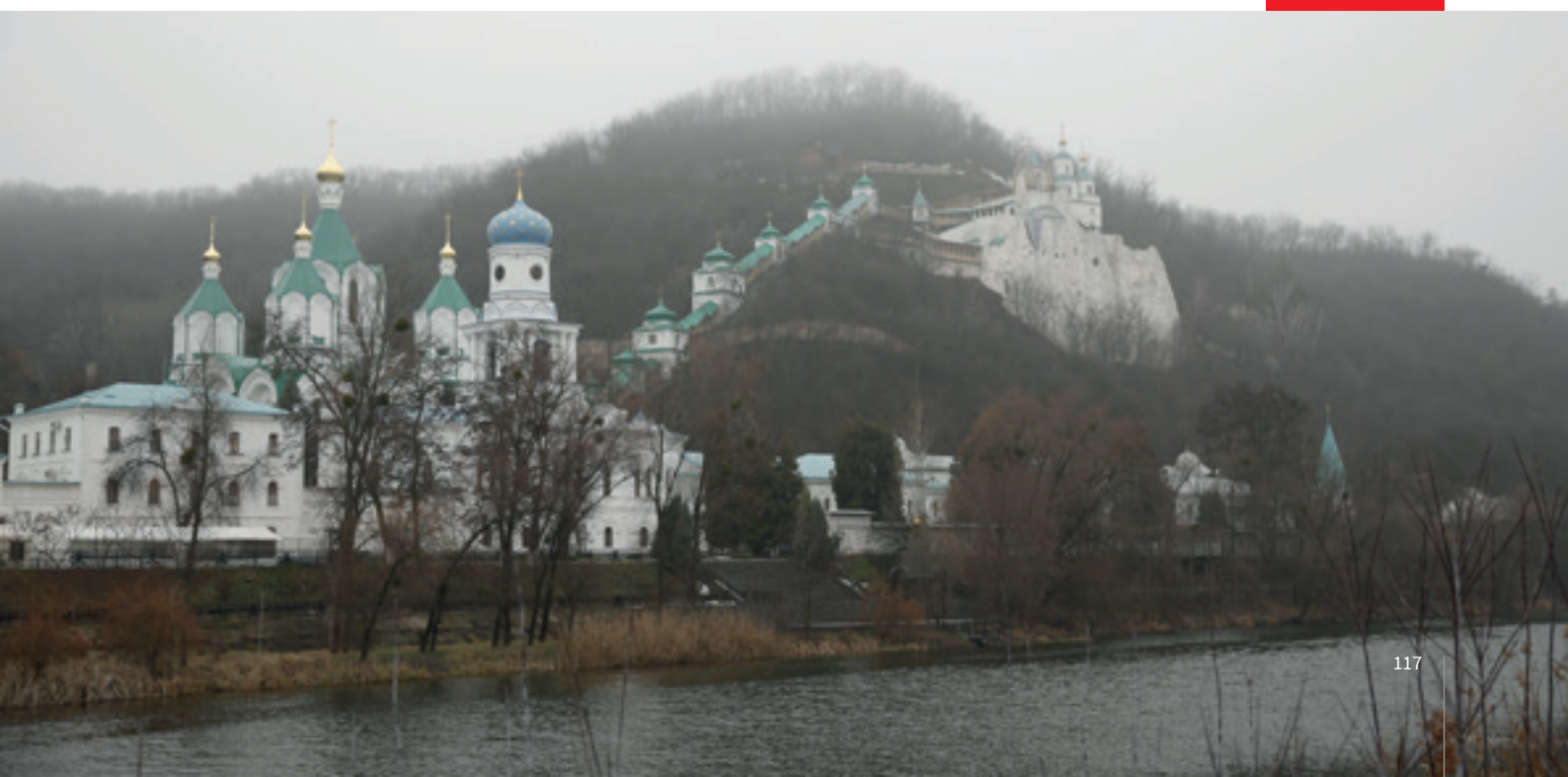
→ In response to a trace request sent by CAR, Ukrainian authorities reported that these items were not in service with the Armed Forces of Ukraine.¹²⁰ Russian authorities have yet to respond to a CAR trace request, which sought more information on these items.¹²¹

Figure 152

Two 40 mm OG-7 projectiles with the lot number 56-2-05
Documented by CAR in Kyiv on 25 September 2018



▼ View of the
Sviatohirsk Lavra Cave
Monastery.



► **40 mm PG-7PM propelling charges**

On 25 September 2018, CAR documented three 40 mm PG-7PM propelling charges (see Figure 153). State Enterprise 'Signal' manufactured the items in 1980.

→ In response to a trace request sent by CAR, Ukrainian authorities reported that these items were not in service with the Armed Forces of Ukraine.¹²² Russian authorities have yet to respond to a CAR trace request, which sought more information on these items.¹²³

Figure 153

Three 40 mm PG-7PM propelling charges with the lot number 85-80-254

Documented by CAR in Kyiv on 25 September 2018



▶ 73 mm PG-9S rockets

On 17 September 2019, CAR documented three 73 mm PG-9S rockets (see Figures 154–56). FGUP Chemical Plant ‘Planta’ manufactured two of the rockets in 1975 and one in 1980.

→ In response to a trace request sent by CAR, Ukrainian authorities reported that these items were not in service with the Armed Forces of Ukraine and that they were not recorded as stolen or lost.¹²⁴ Russian authorities have yet to respond to a CAR trace request, which sought more information on these items.¹²⁵

Figure 154**A 73 mm PG-9S rocket with the lot number 56-32-75**

Documented by CAR in Kramators’k on 17 September 2019

**Figure 155****A 73 mm PG-9S rocket with the lot number 56-32-75**

Documented by CAR in Kramators’k on 17 September 2019

**Figure 156****A 73 mm PG-9S rocket with the lot number 56-73-80**

Documented by CAR in Kramators’k on 17 September 2019



► **73 mm PG-15P expelling charges**

On 17 September 2019, CAR documented five 73 mm PG-15P expelling charges (see Figure 157). Solikamsk Plant Ural manufactured three of them (one in 1974 and two in 1980) and Samara Plant 'Kommunar' manufactured two in 1984.

→ In response to a trace request sent by CAR, Ukrainian authorities reported that these items were not in service with the Armed Forces of Ukraine and that they were not recorded as stolen or lost.¹²⁶ Russian authorities have yet to respond to a CAR trace request, which sought more information on these items.¹²⁷

Figure 157

Five 73 mm PG-15P expelling charges

Documented by CAR on 17 September 2019 in Kramators'k



WEAPONS OF THE WAR IN UKRAINE

EQUIPMENT AND ACCESSORIES



Для каждой модели, не специализируясь
По большому укомплектованию можно считать
1. Убедитесь, что в исправности жгу и др.
комплектации соответствует Вашей др.
2. При помощи предельных точек
и гайки так, чтобы вершина края
находилась на высоте 10 см от опоры на 50.
Отрегулируйте длину ленточного ремня,
внутри торца ленточного ремня.
Поддерживайте зенит в исправном со-
ответствии с требованиями модели при



EQUIPMENT AND ACCESSORIES

CAR field investigation teams also documented optical sights, as well as protective and medical equipment that Ukrainian defence and security forces had recovered from armed formations operating in certain areas of the Donetsk and

Luhansk regions of Ukraine. These items, and findings about their chains of custody, provide additional information on the conflict's dynamics.

OPTICAL SIGHTS

In 2018 and 2019, CAR documented three PSO-1 optical sights, which Ukrainian defence and security forces had recovered alongside SVD rifles (see Figures 158–60). Factories located in what is today the Russian Federation manufactured these three sights. In addition, in September 2019, CAR documented a POSP 6 × 24 and a POSP 8 × 42V optical sight (see Figures 161–62). The Belarusian company JSC Zenit-BeLOMO manufactured both sights for commercial markets. These sights are not believed to be stock items in use by either Ukrainian or Russian conventional forces. This may indicate that

individuals are supplied with or are sourcing their own commercial-grade equipment in the absence of readily available military-grade equipment.

→ In response to a trace request sent by CAR, Ukrainian authorities reported that these items were not in service with the Armed Forces of Ukraine and that they were not recorded as stolen or lost.¹²⁸ Belarusian and Russian authorities have yet to respond to CAR trace requests, which sought more information on these items.¹²⁹

Figure 158

A PSO-1 optical sight, manufactured in 1970

Documented by CAR on 19 December 2018 in Severodonets'k



Figure 159

A PSO-1 optical sight, manufactured in 2001

Documented by CAR on 19 December 2018 in Severodonets'k



Figure 160

A PSO-1 optical sight, manufactured on an unknown date

Documented by CAR on 18 September 2019 in Mariupol

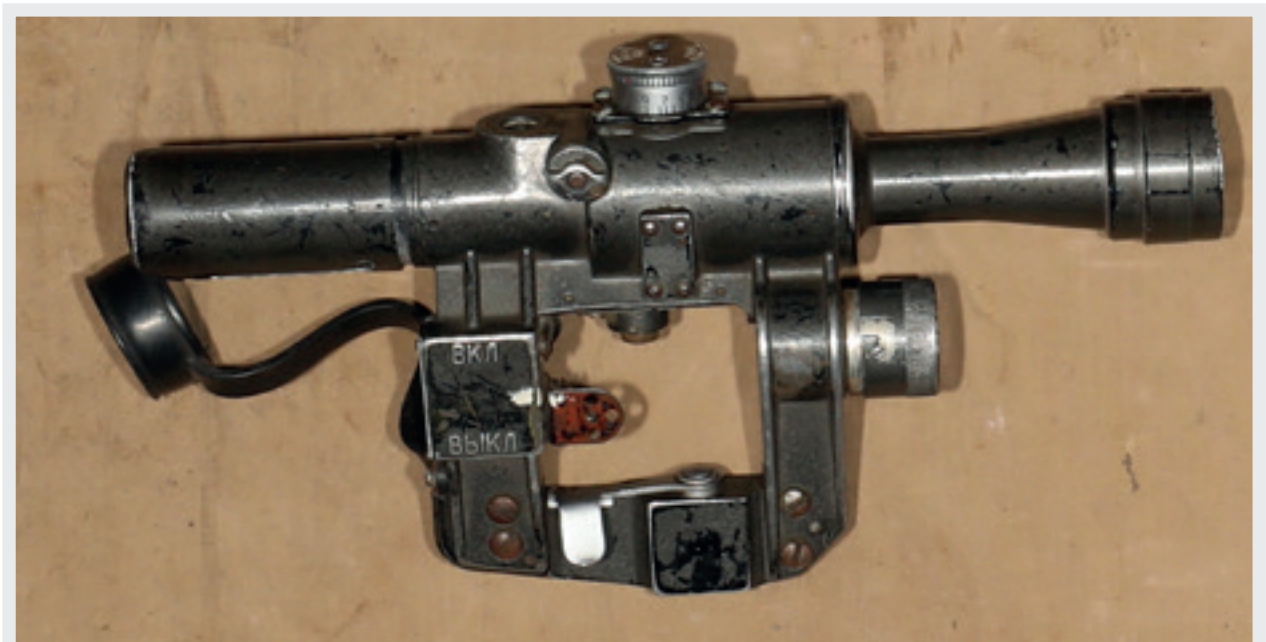


Figure 161

A POSP 6 × 24 optical sight, manufactured on an unknown date

Documented by CAR in Kramators'k on 17 September 2019



Figure 162

A POSP 8 × 42V optical sight, manufactured on an unknown date

Documented by CAR in Kramators'k on 17 September 2019



MEDICAL EQUIPMENT

On 20 July 2017, in the northern outskirts of Krasnohorivka, in Mariinka district (Donetsk region), forces associated with the 2nd Company, 1st Army Corps of the self-declared DPR engaged Ukrainian Armed Forces.¹³⁰ After the engagement, the Ukrainian Armed Forces recovered medical supplies and protective equipment from the armed formations.

Among other things, a CAR field investigation team documented the following medical items on 20 December 2018 at the Mariupol office of the Ukrainian General Prosecutor:

- 18 disposable syringes produced by Becton Dickinson (Spain) in 2016;¹³¹
- 1 bandage produced by Vladeks (Russian Federation) on an unknown date;¹³²
- 10 vials of analgesic produced by Sandoz (Germany) in 2013;¹³³
- 8 vials of analgesic produced by Terapia (Romania) on an unknown date;¹³⁴

- some medical gauze produced by Kanskaya Gigrovata,¹³⁵ Gigrovata-Sankt-Peterburg, and TDL Textil (Russian Federation) in 2006, 2007, and 2016, respectively;

- 1 SIM card from the Tajik telecom company Tacom;

- 1 bottle of hydrogen peroxide produced by Ekotex (Russian Federation) in 2017; and

- 1 bottle of chlorhexidine digluconate produced by Yuzhpharm (Russian Federation) in 2017.¹³⁶

CAR documented five disposable syringes with the lot number 1606239, ten with the lot number 1607151, and three with the lot number 1606181 (see Figure 163). The manufacturer, Becton Dickinson, replied to a trace request and provided information on the syringes' chains of custody (see Table 8). CAR has no evidence that any of the named companies or individuals have been responsible for support or supply to armed formations operating in Ukraine, or any other wrongdoing.

Figure 163

One of the disposable syringes

Documented by CAR in Mariupol on 20 December 2018



Table 8

Purchasers of syringes from the lots numbered 1606181, 1606239, and 1607151, in order of shipment date, prior to clashes in Krasnohorivka on 20 July 2017¹³⁷

Purchaser	Quantity purchased	Lot number	Date shipped
Vogt Medical Vertrieb (Germany)	480,000	1607151	1 September 2016
	432,000	1606181	2 September 2016
	36,000		9 September 2016
Pharmkomplekt (Russian Federation)	288,000	1606181	13 September 2016
Protek (Russian Federation)	90,000	1607151	18 October 2016
	360,000	1606239	15 November 2016
Gerda Group (Russian Federation)	10,800	1606181	21 December 2016
SF Medical Products (Germany) ¹³⁸	396,000	1606239	13 February 2017
	300,000	1607151	13 February 2017
	360,000		28 March 2017

As Table 8 shows, each purchaser's orders fit within a discrete time period, but no single company received syringes from all three lots recovered in Krasnohorivka. Based on the information provided by the manufacturer, the syringes recovered in Ukraine must therefore have been shipped to at least two different purchasing companies. The items are of the same brand with proximate manufacture dates, indicating that a purchase from the manufacturer may have been coordinated via multiple channels—rather than a single distributor on the Russian commercial market.

Thus far, CAR has not been able to identify any military connections or contracts for any of these companies, yet such links cannot be ruled out without further investigation. One of the companies, Protek, is controlled by a prominent Russian businessman who appeared on the 'Russian oligarchs' list produced by the US Treasury in January 2018, in accordance with the Countering America's Adversaries Through Sanctions Act of 2017 (US Treasury, 2018). The individual appears to have met the listing criteria simply due to his net wealth rather than based on evidence of direct support to Russian activities in Ukraine, and he has not been sanctioned. Protek and

Pharmkomplekt were also among 16 Russian companies that received a batch of the above-mentioned analgesics manufactured by Sandoz (Germany), which was shipped to the Russian Federation in February and March 2014.¹³⁹

In replying to CAR's trace request, Becton Dickinson provided two addresses that do not match those of the companies listed as the purchasers of syringes: Gerda Group and SF Medical Products. These two companies may have been buying the syringes on behalf of an onward consignee. In each case, CAR identified a small private medical clinic at the provided purchasing address. These clinics may be the intended end users of the syringe consignments. CAR has contacted both clinics and is awaiting their responses.

There is nothing necessarily suspicious about medical equipment distributors shipping items directly to customers such as clinics. Nonetheless, the quantity delivered to the address of one of these clinics—more than 1 million syringes—seems large for a small clinic, founded in 2014, with nine employees and an operating turnover of around USD 148,000 (RUB 8.98 million) in 2016.¹⁴⁰

In response to a CAR trace request, SF Medical Products reported that it had supplied products to the Russian Federation in 2017.¹⁴¹ CAR is currently seeking information from the distributor companies to be able to determine whether these two clinics were in fact the ultimate intended customers, and whether they are long-term customers of the distributors.

CAR has been unable to identify any commonalities of ownership or personnel among the companies listed as purchasers of these three batches and the two private clinics that were possible consignees. All the purchasing companies appear to be genuine medical industry companies, providing real medical goods or services. CAR has been unable to identify any connections between these companies and the Russian military or defence industry. CAR sought additional information from the producers of all items that display lot or serial numbers.

PROTECTIVE EQUIPMENT

Following the above-mentioned clashes in Krasnohorivka on 20 July 2017, Ukrainian defence and security forces also recovered protective equipment worn by their adversaries, including:

- a ballistic plate made by LLC Splav (Russian Federation);¹⁴²
- a 6Sh112 chest rig, a copy of the Universal Modular Transport-Combat System 6Sh112 (developed by the Russian company Tekhinkom), made by LLC Betaprom (Russian Federation), with a pocket in which CAR found advertisement cards for a Donetsk restaurant (see Figure 164);¹⁴³
- 4 helmets: 2 ShBM-L (lightweight) helmets manufactured by LLC Omnitek-N (Russian Federation) and 2 whose models and manufacturers are not known;¹⁴⁴
- a plate carrier supplied through LLC Splav (Russian Federation);¹⁴⁵ and
- a 6B23-1 ballistic vest produced by JSC Scientific Research Institute of Steel 'Stal' (Russian Federation).¹⁴⁶

► Looking west along Yaroslav Val, Kyiv

ALL THE PURCHASING COMPANIES APPEAR TO BE GENUINE MEDICAL INDUSTRY COMPANIES, PROVIDING REAL MEDICAL GOODS OR SERVICES.

CAR sought additional information from the producers of all items that display lot or serial numbers.

Some of these companies have dealings with the Russian defence and security sector. For instance, in November 2011, the Russian Ministry of Defence granted a contract to Betaprom for the supply of 44,000 6Sh112 chest rigs (Kommersant, 2013). LLC Omnitek-N supplied helmets of the documented model to the Russian Ministry of Internal Affairs (OMNITEK-H Ltd., n.d.). JSC Scientific Research Institute of Steel ‘Stali’ signed a contract with the Ministry of Defence of the Russian Federation in December 2012 for the supply of

6B23-1 ballistic vests and transferred the last batch of vests under this contract in March 2015 (FAS, 2016). However, CAR notes that all this equipment is also likely to be available on the open market.

On 18 September 2019, CAR documented additional items:

- two 6B7-1M helmets, which were probably manufactured by Armocom (Russian Federation); and
- another 6B23-1 ballistic vest, this one manufactured by JSC NPP KLASS (Russian Federation).¹⁴⁷

Figure 164

A 6Sh112 chest rig

Documented by CAR in Mariupol on 20 December 2018





WEAPONS OF THE WAR IN UKRAINE

VEHICLES



VEHICLES

Between 2018 and 2020, CAR documented 21 vehicles that Ukrainian defence and security forces had recovered from armed formations operating in certain areas of the Donetsk and

Luhansk regions of Ukraine. These vehicles comprise 8 UAVs, 3 main battle tanks, 1 multiple-rocket launcher system, 4 armoured personnel carriers, and 5 truck tractors.

UNMANNED AERIAL VEHICLES

CAR documented six different models of Russian military UAV and one non-military UAV model, all recovered from armed formations operating in certain areas of the Donetsk and Luhansk regions of Ukraine. Each of the military UAVs is made of commercial and dual-use components such as GPS modules, electronic parts, cameras, and engines sourced in Asia, the EU, the Middle East, and the United States.

CAR has no evidence that any of the companies or individuals named in this report were responsible for support or supply to armed formations operating in certain areas of the Donetsk and Luhansk regions of Ukraine, or any other wrongdoing.

Orlan-10

On 26 September 2018, CAR documented an Orlan-10 UAV bearing the number 10264 (see Figure 165). Special Technology Centre, which manufactured the UAV in or around 2014, is sanctioned under US Executive Order 13757 (29 December 2016) for involvement in malicious cyber-activities threatening US national security (US, 2017).

Ukrainian defence and security forces recovered the UAV on 6 April 2016, after it crash-landed near the city of Adviiivka (Donetsk region).

Russian authorities have yet to respond to a CAR trace request, which sought more information on this item.¹⁴⁸

Bar code stickers on the UAV indicate that it was manufactured in or around 2014 (see Figure 166). The UAV is fitted with a GPS module produced by u-blox AG, which is headquartered in Switzerland (see Figure 167). The same circuit-board that contains the u-blox component also holds an MNP-M7 GPS receiver, produced by the Russian company Izhevsk Radio Plant.

Figure 165

Main frame (view from below) of the Orlan-10 UAV with the number 10264

Documented by CAR in Kyiv on 26 September 2018

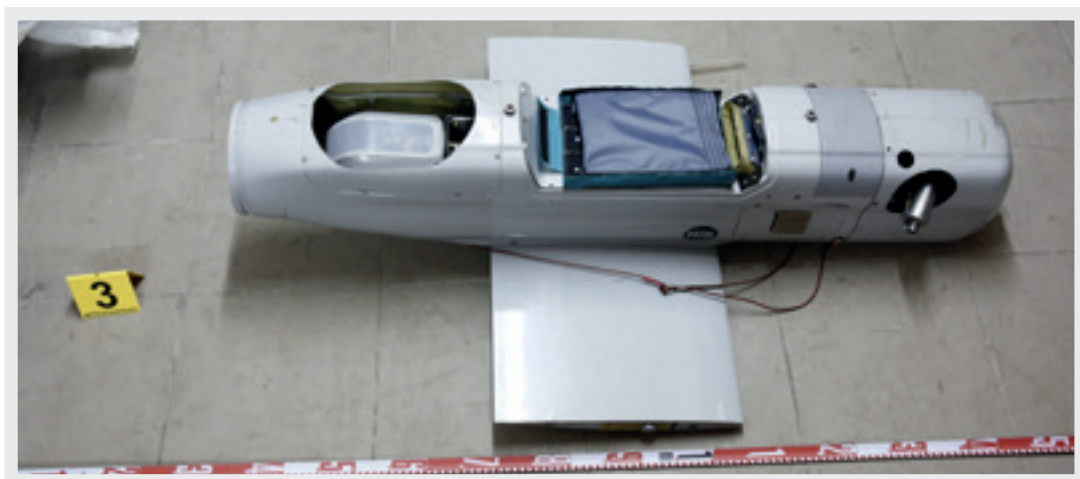


Figure 166

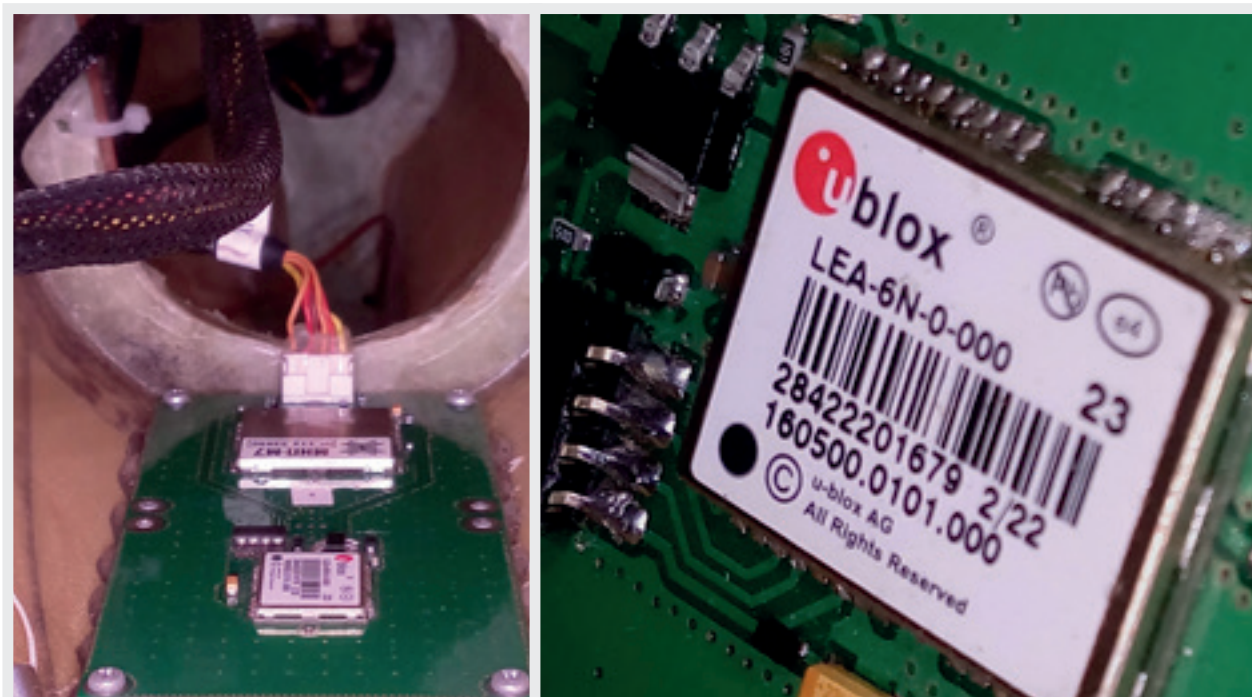
Bar codes indicating dates in 2014 on the Orlan-10 UAV with the number 10264

Documented by CAR in Kyiv on 26 September 2018

**Figure 167**

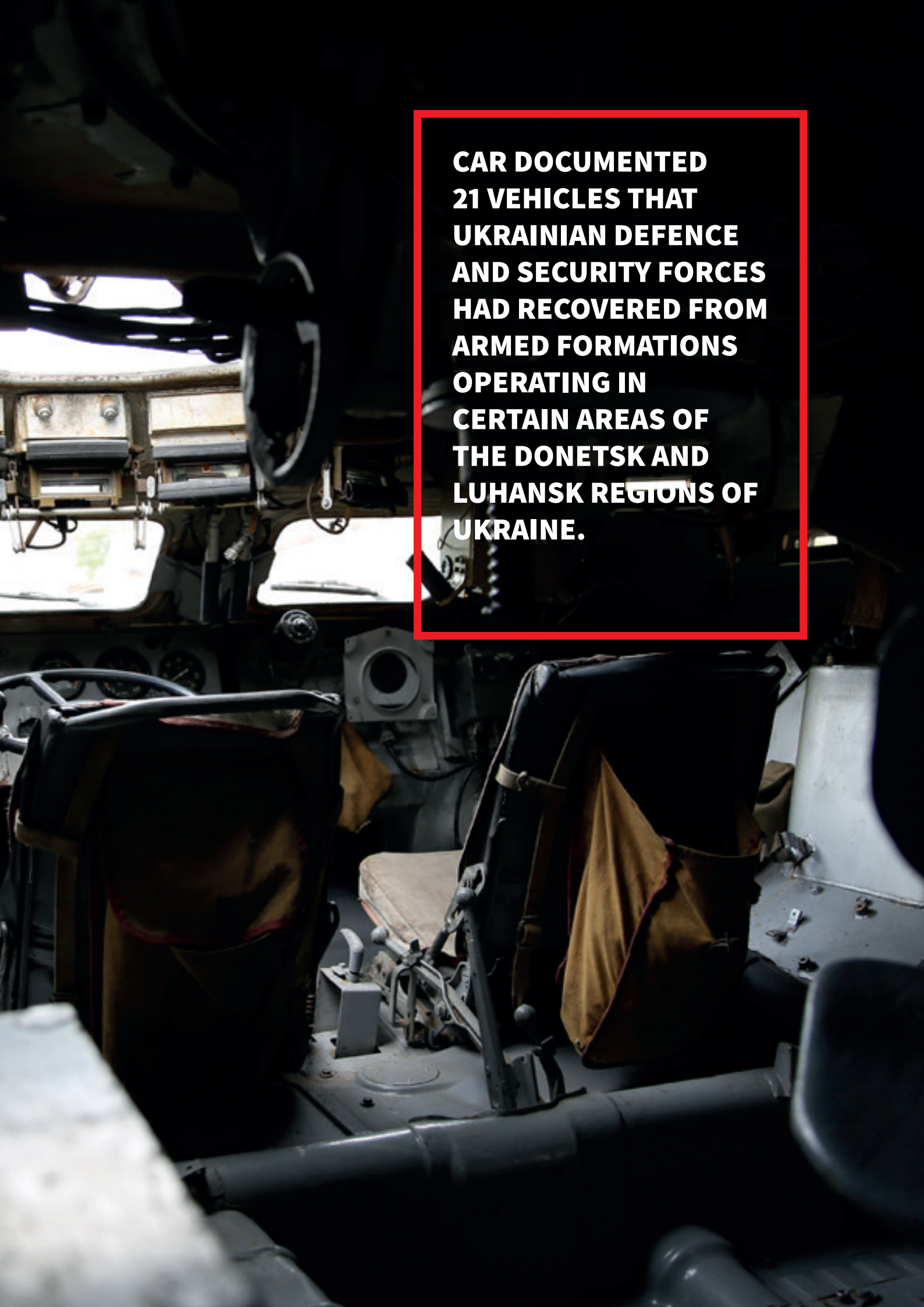
A GPS module, part of the Orlan-10 UAV with the number 10264

Documented by CAR in Kyiv on 26 September 2018



Through tracing operations and the extensive cooperation of the parties involved, CAR found that the Swiss company u-blox sold the GPS module as part of a delivery to Microdis, a German electronics distributor, which exported the item in June 2012 to a partner company, Micro-EM, a major Russian electronics component distributor. At the time of export, there were no restrictions on transfers of such items to the Russian Federation and MicroEM declared the

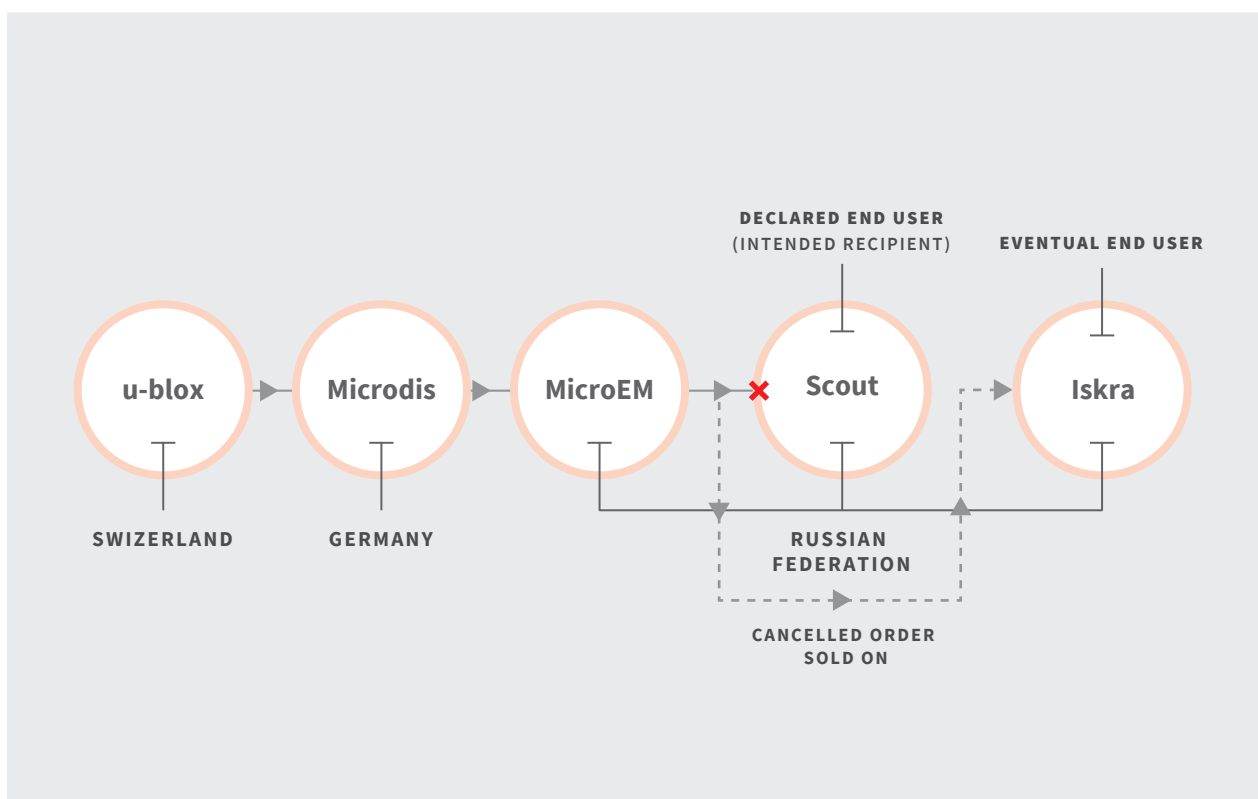
intended end customer to be Scout, a Russian producer of civilian GPS trackers. Scout's order was subsequently cancelled, however, and the modules were sold on to a Russian producer of automated cash registers, Iskra, and unnamed third parties (see Figure 168).¹⁴⁹ CAR found no connection between the key personnel or ownership structures of Scout, Iskra, and Izhevsk Radio Plant. CAR contacted Iskra and is awaiting a response.¹⁵⁰

The image shows the interior of a military vehicle, likely a tank or armored personnel carrier. The view is from the driver's perspective, looking forward through the windshield. The dashboard is visible with several gauges and control panels. The seats are upholstered in a dark material with a tan-colored fabric draped over them. The overall lighting is dim, with light coming from the windows. A red-bordered text box is overlaid on the right side of the image.

**CAR DOCUMENTED
21 VEHICLES THAT
UKRAINIAN DEFENCE
AND SECURITY FORCES
HAD RECOVERED FROM
ARMED FORMATIONS
OPERATING IN
CERTAIN AREAS OF
THE DONETSK AND
LUHANSK REGIONS OF
UKRAINE.**

Figure 168**Reconstructed supply chain for the GPS module**

Documented by CAR in an Orlan-10 UAV



CAR's analysis of customs data found that Microdis made 941 shipments of various navigation modules and components from the Swiss manufacturer to MicroEM from 2011 to 2020, with a total of at least 771,574 'items' supplied in these shipments from January 2011 to October 2016 (at which point the data stops providing the number of items per shipment). In 2019, Microdis stopped the delivery of LEA-6N modules to MicroEM after CAR documented these modules in Ukraine and traced them with Microdis. At the same time, the Swiss manufacturer, u-blox, began to supply compo-

nents directly to MicroEM.¹⁵¹ These shipments included NEO/LEA-M8T modules, the successor of the LEA-6N model, which is the navigation module that CAR documented in the Orlan-10 UAV (u-blox, n.d.).

These modules are not export-controlled from Switzerland, and CAR has no evidence of their end users, military or otherwise. There is no suggestion that either Microdis or u-blox are in any way complicit in the diversion of their products, or of any other wrongdoing. CAR continues to investigate this supply chain.

Forpost

On 26 September 2018, CAR documented a Forpost UAV bearing the number 923 (see Figure 169). Ukrainian defence and security forces downed the UAV near Pisky (Donetsk region) on 18 May 2015. The UAV's Hobbs meter (the airframe flight hours counter) indicates that the UAV was flown for a total of 723 hours before Ukrainian defence and security forces recovered it.

Ural Works of Civil Aviation manufactured the Forpost, which is a licensed copy of the Israeli IAI Searcher (see Figure 170). Date marks on some of the components documented by CAR indicate that they were produced in Israel in mid-2013. CAR also documented the GPS antenna of the UAV, which was produced in the United States. The manufacturer, Antcom Corporation, produced it in March 2013 and

◀ Interior of a recovered BTR-80 armoured personnel carrier documented by CAR in Sartana on 9 May 2019.

Figure 169

Engine of a Forpost UAV with the number 923

Documented by CAR in Kyiv on 26 September 2018



Figure 170

Identification tag of a Forpost UAV with the number 923

Documented by CAR in Kyiv on 26 September 2018



sold it to another company, NovAtel, which subsequently transferred it to IAI in Israel in May 2013.¹⁵² IAI has yet to respond to CAR's trace request, which sought information on the onward supply of this item.¹⁵³ Similarly, Russian authorities have not yet replied to CAR's trace request, which sought more information on this UAV.¹⁵⁴

CAR documented additional components originating in France, Israel, and the United States and sent several trace requests to the identified component manufacturers. Some have responded but were unable to provide information on their components' onward supply chains.¹⁵⁵

Unidentified UAV model

► UAV with the number 2166

On three separate dates—17 December 2018, 11 May 2019, and 10 November 2020—CAR documented a single intelligence, surveillance, and reconnaissance UAV of unknown designation and with the number 2166 (see Figures 171–72). Ukrainian defence and security forces downed the UAV on 8 February 2017 near Mariupol (Donetsk region). This model resembles the Orlan-10 in some ways, but the two UAVs are fundamentally different (see Table 9).¹⁵⁶

Russian authorities have yet to respond to a CAR trace request that sought more information on this UAV.¹⁵⁷ CAR's tracing of various components found in the UAV suggests it was produced after June 2014.

The UAV is fitted with a fuel-pump cover for an HE Series carburettor, made to look like it was manufactured by the Irish company Tillotson. In its reply to CAR's trace request, Tillotson stated that the documented item was counterfeit, as indicated by the uncharacteristic font, letter placement, and indentation. The company also pointed to added features, missing pins, and a stamp with an unusual orientation.¹⁵⁸

In response to additional CAR trace requests, two other companies responded that some of the UAV's components were fakes. In June 2021, the company Xilinx stated that Spartan XC3S50 field-programmable gate arrays labelled 'Xilinx' were counterfeit.¹⁵⁹ Similarly, in April 2021, Pulse Electronics reported that it had not produced the electronic part that bears its name.¹⁶⁰

CAR also contacted the German company 3W-Modellmotoren Weinhold GmbH, which manufactured the UAV's 3W-55i single-cylinder engine. In response to a CAR trace request, the company indicated that it had sent the part to World Logistic Group, a company based in the Czech Republic, in October 2013.¹⁶¹ Despite numerous requests, World Logistic Group has not replied to CAR's attempts to obtain more information. According to the official business register of the Ministry of Justice of the Czech Republic, World Logistic Group ceased trading in October 2018 (PRCD, n.d.a; see Box 3).

Figure 171

A UAV of unknown designation with the number 2166

Documented by CAR in Kyiv on 10 November 2020

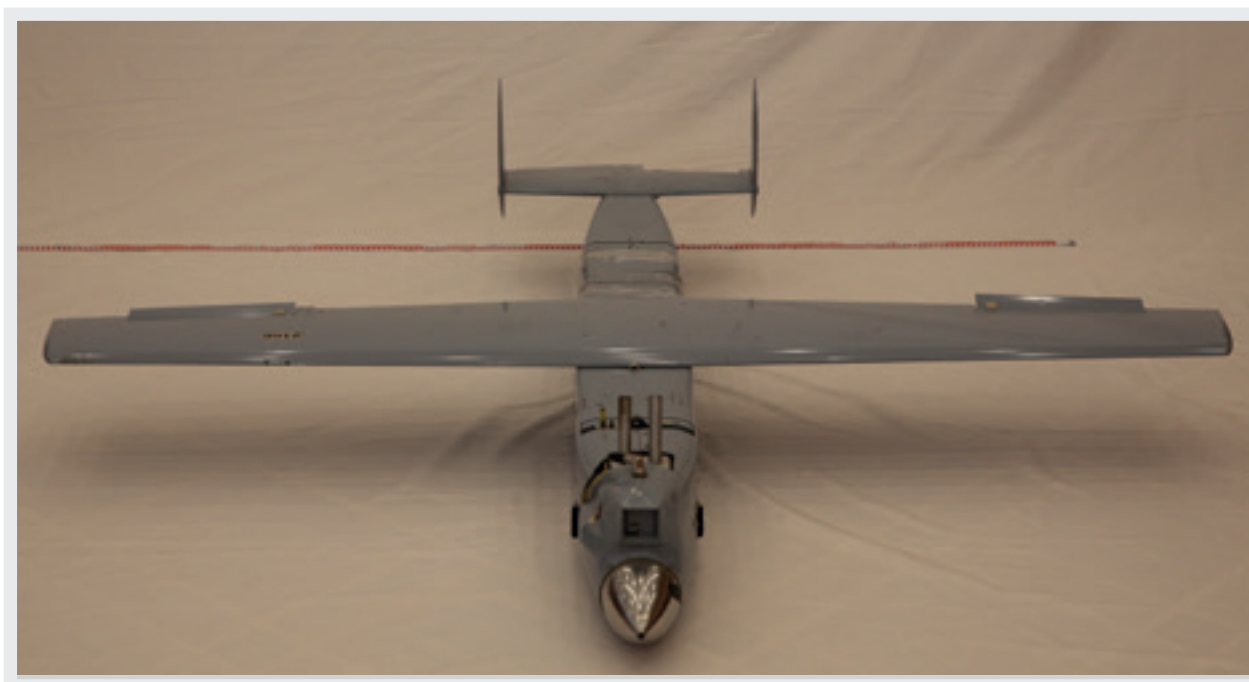


Figure 172

A UAV of unknown designation with the number 2166

Documented by CAR in Kyiv on 10 November 2020

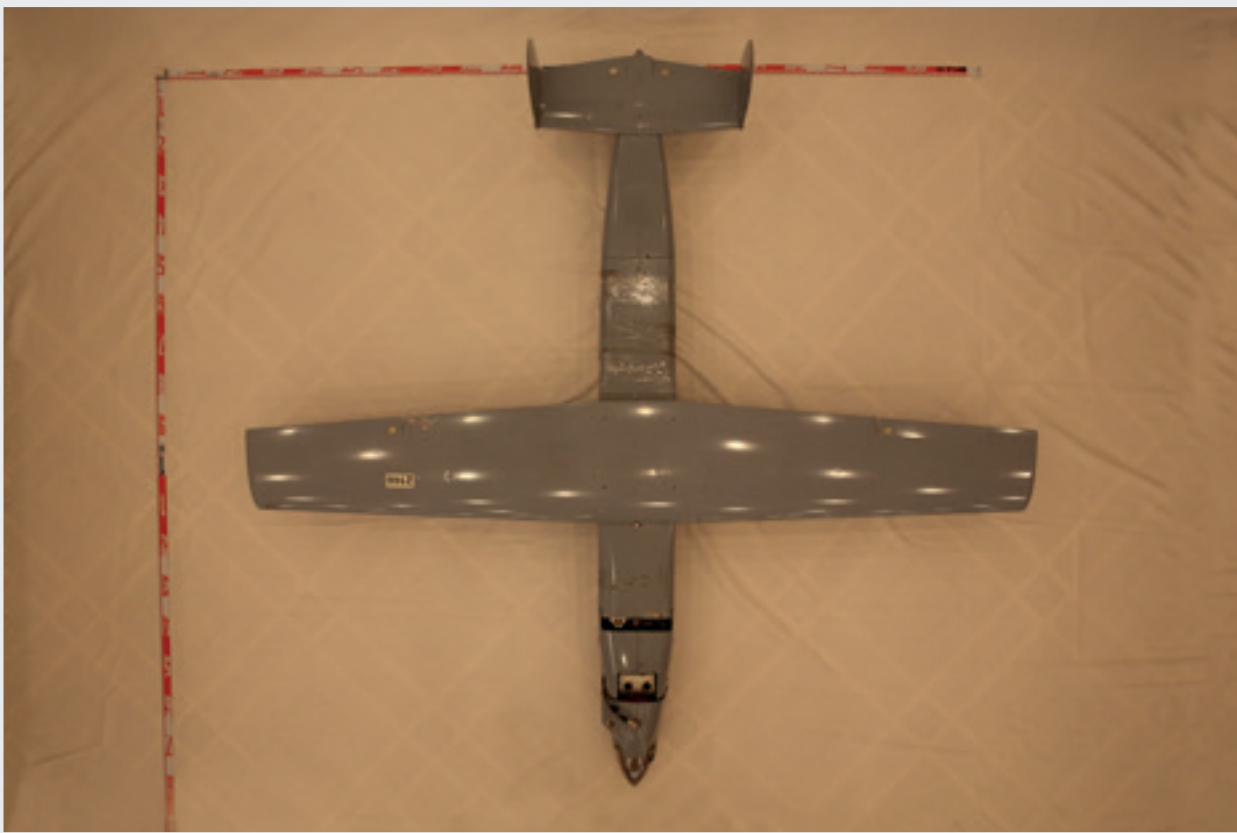





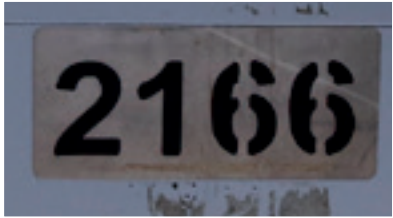


Table 9

Comparison between an Orlan-10 UAV and the UAV of unknown designation

Documented by CAR

	Orlan-10	UAV of unknown designation
Shared characteristics		
Air intake		Single
Battery		Lithium polymer ¹⁶²
Colour		Grey
Engine		Internal combustion
Flaps		2 flaps
Fuselage width		About 15 cm at the forward
Landing		Parachute
Landing gear		No
Take off		Catapult-assisted
Type		Propeller, tractor configuration

	Orlan-10	UAV of unknown designation
Different characteristics		
Barcode labels present	Yes	No
Camera	<p>Moving gimbal inside compartment</p> 	<p>Inside compartment, behind a panel: 12 fixed camera lenses in 4 series of 3</p> 
Empennage	<p>Mounted: fully dismantlable; 80 cm long; each stabiliser is c. 40 cm long; the tip of the tail section is c. 10 cm wide</p> 	<p>Twin tail: 1 horizontal stabilizer; c. 40 cm long; 2 vertical stabilisers attached at each extremity</p> 
Exhaust	<p>Single exhaust exiting the left side</p> 	<p>Double exhaust exiting over the top of the engine</p> 
Fuselage	<p>Length: c. 120 cm</p> 	<p>Length: c. 170 cm</p> 

	Orlan-10	UAV of unknown designation
Position of serial number	Each wing; left-hand side of single vertical stabiliser; top of right-hand-side horizontal stabiliser; right-hand and left-hand side of fuselage; bottom right of main wing section	Top right-hand side of wing section; right-hand and left-hand side of fuselage
Serial numbering	Grey 5-digit serial number in black circle 	Black 4-digit serial number in silver rectangle 
Total length	c. 200 cm	c. 170 cm
Total span	c. 230 cm	c. 180 cm
Wings	Separable: 2 wings (each 120 cm long); main wing section (70 cm long) screwed on top of fuselage with 4 screws; 1 square panel with electronics in the middle 	Inseparable: 1 wing assembly (180 cm), to be screwed on top of the fuselage with 4 screws; no panels but a male-female 10-pin connection 

CAR DOCUMENTED AN INERTIAL SENSOR WITH ACCELEROMETERS, KNOWN AS A DYNAMIC MEASUREMENT UNIT, PRODUCED BY THE BRITISH COMPANY SILICON SENSING SYSTEMS.

While observing the electronic circuits within the UAV, CAR documented an inertial sensor with accelerometers, known as a dynamic measurement unit (DMU02), produced by the British company Silicon Sensing Systems. In response to a CAR trace request, the company stated that it sold the inertial sensor in August 2012 to Radiant-Elcom CJSC, now known as Radiant Group LLC, a Russian civilian electronics distributor, which declared the prospective end customer as a company serving ‘various educational institutions around Russia’.¹⁶³ The end user was ANO ‘PO KSI’, a Russian producer of electro-optics and photogrammetry systems, one of whose major clients for aerial surveillance systems is the Russian Ministry of Defence (AC Moscow, 2020). The US Treasury sanctioned ANO ‘PO KSI’ in December 2016 for allegedly aiding Russian military intelligence agency cyber-operations (US, 2017).

According to Silicon Sensing Systems, the DMU02 unit falls below the performance parameters that would require an export licence under the UK strategic export control list. The unit in question was shipped before 1 August 2014, the date on which the UK added the Russian Federation to its embargoed country list. Licences are required for any items that are known to be for military end use in listed countries. Based on information from Silicon Sensing and trade data, the UK exporter continued to supply various products to the same Russian civilian distributor from 2014 to 2021, including between 14 and 19 shipments of various products annually between 2014 and 2017, one shipment in 2019, and 18 shipments between May 2020 and June 2021.¹⁶⁴ CAR has not been able to determine the end use of these shipments and has no direct evidence that they were diverted to military end use. However, CAR ascertained that one end user—a prominent manufacturer of military UAVs, including Russia’s first medium-altitude long-endurance armed UAV—received 20 of Silicon Sensing’s CMS300 and CMS390 accelerometers in November 2020. CAR has not been able to determine the end users or end use of the subsequent

shipments and has no evidence that they have been diverted to military end use.

CAR also documented an 9XTend 900 MHz radio-frequency module produced by the US company Digi International. The company responded to a CAR trace request, indicating that it had sold the item to a US-based distributor in March 2012, but that the distributor was unable to identify the precise recipient of the item.¹⁶⁵

In addition, CAR traced electronic components that were manufactured by Maxim Integrated, NGK Spark Plugs (UK) Ltd., NVS Technologies AG, STMicroelectronics, and Traco Electronic International. Neither NGK Spark Plugs (UK) Ltd. nor Traco Electronic International were able to determine the origins or supply of their respective products as CAR was unable to provide sufficient information.¹⁶⁶ However, in response to CAR’s trace request about a MAX2769E universal GPS receiver, Maxim Integrated confirmed that it had manufactured the item in 2013 and shipped it to its distributors in January 2014.¹⁶⁷ STMicroelectronics confirmed that it shipped components like the one that CAR documented to five distributors between the end of July and early August 2014, but the company stated that it was impossible to determine the precise chain of custody of the item in question.¹⁶⁸ NVS Technologies AG manufactured a NV08C-CSM GNSS receiver between 2013 and 2015. The company stated that the item could be purchased from NVS Technologies AG directly or from one of its distributors, but that it was impossible to track the item’s full supply chain.¹⁶⁹

CAR also documented an iEthernet W5300 ethernet controller manufactured by the Korean company WIZnet. The manufacturer responded to a CAR trace request, indicating that it had manufactured the item in June 2014 and had sold it between 2014 and 2016. WIZnet was not able to identify the recipient of the item.¹⁷⁰ In addition, CAR observed an obliterated mark on one of the electronic circuits in the UAV’s video unit (see Figures 173–74).

Figure 173
Unidentified UAV's video unit motherboard (obliterated area highlighted)

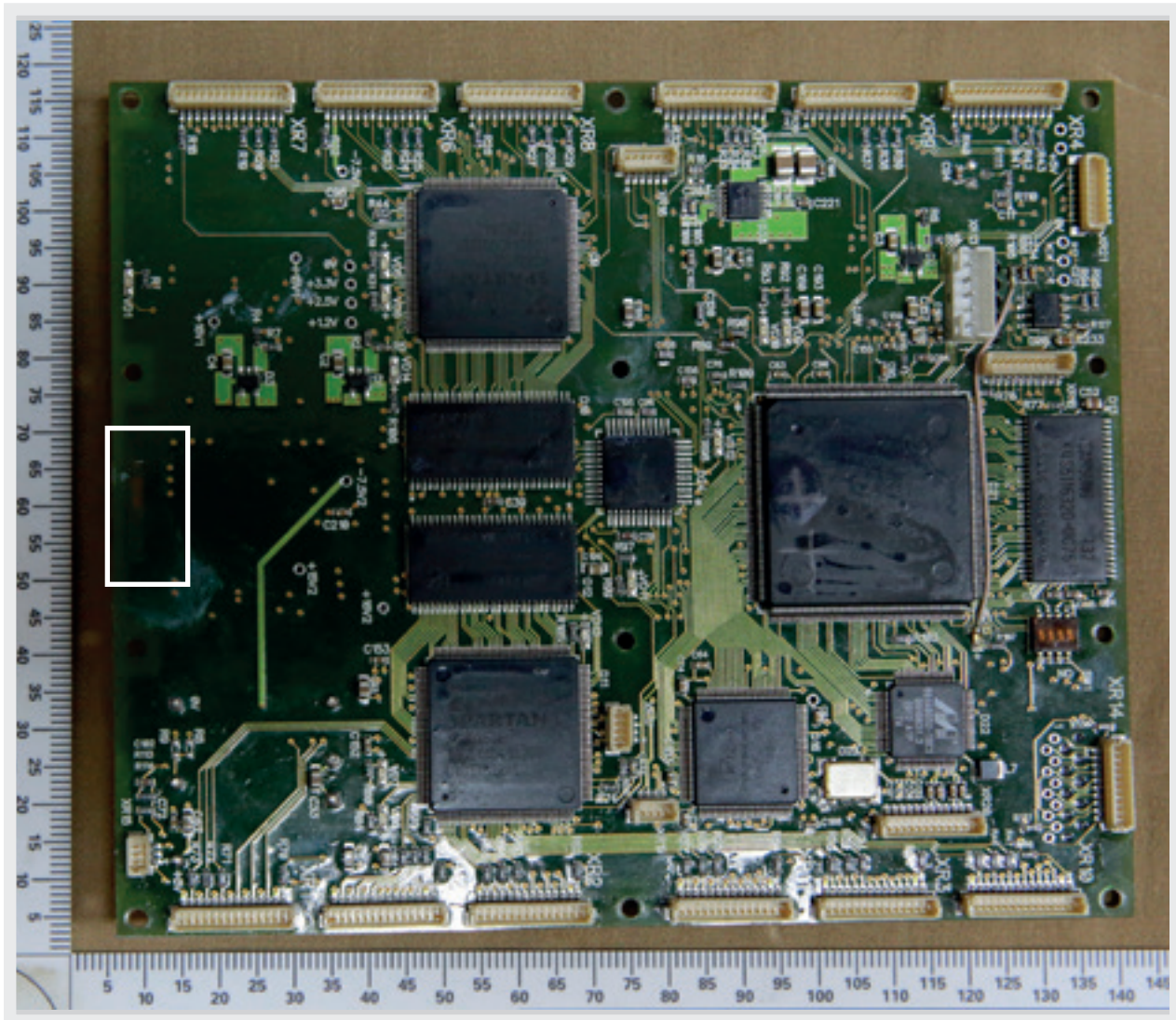
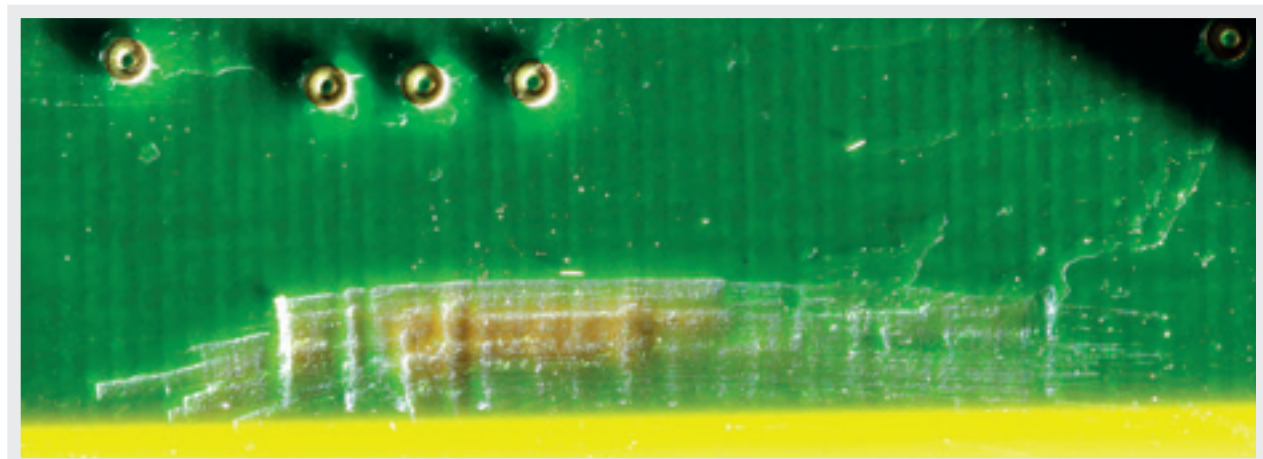


Figure 174
Detail of the obliterated area



BOX 3 — WORLD LOGISTIC GROUP

CAR found that World Logistic Group was (until its liquidation in 2018) a Russian-owned company registered in the Czech Republic. One of its directors was a Russian citizen with links to political and security agencies of the Russian government. These findings do not constitute proof that the company was acting on behalf of the Russian state, and CAR is undertaking further investigation to determine its activities and motivation.

Two Russian Moscow residents registered World Logistic Group in the Czech town of Karlovy Vary in 2008 (PRCD, n.d.b).¹⁷¹ One of these co-owners appears to have remained in Moscow; it is unclear whether the other one stayed in the city. CAR did

not find links between these Russian individuals and Russian military industry, government, or security structures (PRCD, n.d.b).¹⁷²

Between 28 May 2012 and 20 July 2014—during the period when the 3W engine was supplied to World Logistic Group—the company added a third director, who did not become a shareholder.¹⁷³ Also a Russian citizen, this individual was a resident in the Moscow suburb of Lyubertsy (PRCD, n.d.b).¹⁷⁴ CAR found that the individual is also a member of the Public Council of the Main Directorate of Public Security of Moscow Region¹⁷⁵ and of the Public Council of the Federal Penitentiary Service.¹⁷⁶

▼ Area around the Soledar salt mine.



KEY FINDING

Distributors used as conduits for foreign technology acquisition

CAR's tracing of components of Russian-manufactured UAVs identified independent Russian electronics and component distributors as conduits for foreign technology acquisition on behalf of Russian defence and security entities.

► UAV with the number 2207

In 2019, the State Security Department of Lithuania published a report stating that authorities had recovered a UAV in 2016. The report indicates that 'the components of the found UAV were made in several countries. However, it contained Russian software and corresponded to known UAV analogues used by the Russian intelligence and security services' (SSD Lithuania, 2019). According to the State Security Department of Lithuania, the UAV entered Lithuanian airspace near the border with Latvia and Belarus, flew to Poland, and subsequently crashed in north-eastern

Lithuania on its return journey, where the authorities recovered it in October 2016.

On 18 May 2021, CAR documented the UAV, which bears the number 2207, in Vilnius (see Figure 175). CAR documented and traced several internal components¹⁷⁷ and is awaiting replies from some of their manufacturers¹⁷⁸

CAR found that the UAV model documented in Lithuania (number 2207) is identical to the one documented in Ukraine (number 2166). However, unlike the UAV documented in Ukraine, which features the dynamic measurement unit DMU02, the one in Lithuania features a DMU10 unit, which Silicon Sensing introduced between July and September 2014.

Silicon Sensing was unable to locate shipping documents to confirm the end user and precise circumstances of delivery for the item that CAR documented. However, based on an internal review, the company said it very probably sold the item to its Russian distributor, Radiant-Elcom CJSC, now known as Radiant Group LLC, for export between 2014 and 2015.¹⁷⁹

Figure 175

A UAV of unknown designation with the number 2207

Documented by CAR in Vilnius on 18 May 2021



Eleron-3SV

On 12 December 2019, CAR documented two Eleron-3SV UAVs (see Figures 176–77), manufactured by JSC ‘ENICS’. Ukrainian defence and security forces recovered them from armed formations operating in certain areas of the Donetsk and Luhansk regions of Ukraine: the first one near the town of Svitlodars’k (Donetsk oblast) on 11 July 2019, and the second one near the town of Horlivka (Donetsk oblast) on 29 June 2019.

Russian authorities have yet to respond to a CAR trace request, which sought more information on these UAVs.¹⁸⁰ Based on marks found on internal components, CAR’s assessment is that the UAVs were manufactured in or around 2015.

The circuit board of one of the UAVs’ main camera features a 32-bit microcontroller unit. The manufacturer, STMicroelectronics, replied to a CAR trace request, confirming that it had assembled and shipped the unit in 2014.¹⁸¹ The circuit board itself also bears a 2014 date mark.

The main camera in one of the UAVs is a Sony FCB-EX11DP. Inside both UAVs, CAR investigators found secondary Olympus Stylus TG-860 point-and-shoot cameras manufactured in 2015. Both Sony and Olympus have yet to provide more information about the items CAR documented.¹⁸²

Figure 176

An Eleron-3SV UAV without a visible identification number
Documented by CAR in Sviatohirs’k on 12 December 2019



Figure 177

An Eleron-3SV UAV with the number 229
Documented by CAR in Sviatohirs’k on 12 December 2019



Granat-2

On 10 November 2020, CAR documented a Granat-2 UAV manufactured by Izhmash Unmanned Systems (see Figure 178). Ukrainian defence and security forces recovered the item near Chermalyk (Donetsk region) on 18 November 2018. Russian authorities have yet to respond to a CAR trace request, which sought more information on this UAV.¹⁸³

Based on marks found on an internal circuit board, CAR's assessment is that the UAV was manufactured during or after 2016. The UAV was equipped with a modified Canon point-and-shoot camera.¹⁸⁴

In the UAV, CAR documented electronic components produced by two US companies, Intel Corporation and Pulse Electronics. Intel Corporation replied to a CAR trace request, stating that the marks on an item labelled 'Altera' did not exactly match any Altera products, and that

the component that CAR documented could be one of six Altera products.¹⁸⁵ Marks on the component manufactured by Pulse Electronics indicate possible manufacture in late 2013. The company confirmed that it produced 11,360 units of this component with the date code 1348-M and that it sold them to four of its distributors in December 2013.¹⁸⁶

Another US company, MaxAmps, manufactured the UAV's battery, and the Czech company Model Motors manufactured its engine. MaxAmps responded to a CAR trace request, indicating that the battery lacked the necessary unique identifying information to enable traceability. The company further informed CAR that it does not ship batteries to Ukraine.¹⁸⁷ The Czech manufacturer specified that it produced the engine model between 2005 and 2017 and that it did not distribute its products directly to the Russian Federation or Ukraine.¹⁸⁸

Figure 178

A Granat-2 UAV

Documented by CAR in Kyiv on 10 November 2020



Zastava

On 12 October 2020, CAR documented a Zastava UAV with the number 405 (see Figure 179). Ukrainian defence and security forces recovered the UAV near Svitlodars'k (Donetsk region) on 5 April 2020. Ural Works of Civil Aviation manufactured the UAV, a licensed copy of the Israeli IAI BirdEye, in or around 2013 (see Figure 180).

Several components bear marks from the Israeli defence companies Elbit Systems and Data Links (formerly Tadiran Spectralink), while a German company, Hacker Motor, manufactured the engine. CAR also documented an electronic component manufactured by the US company VWeb Corporation. These entities have yet to reply to CAR's trace requests.¹⁸⁹ Similarly, Russian authorities have not yet responded to a CAR trace request, which sought more information on this UAV.¹⁹⁰

Two factors appear to facilitate the export of EU-made components for the manufacture of Russian military UAVs. One is the lack of agreement between European governments and industry representatives over the licensing requirements of dual-use components. The other is the lack of clarity over the end use or end user when components are incorporated into a military system in a non-EU country for further export. This ambiguity persists despite

the EU arms embargo imposed on the Russian Federation in 2014.¹⁹¹

A case in point involves the Spanish company UAV Navigation, the manufacturer of an AP04M autopilot unit that CAR found in the Zastava UAV. The autopilot unit bears the date mark '2013', which was probably added after it was shipped. In response to a CAR trace request, UAV Navigation indicated that it had supplied the item to IAI in December 2012, as part of a larger system. The company stated that, at the time of export, it believed that it was not required to obtain an export licence or end user undertaking, and therefore no such documents were sought. It also reported that Spanish export controls on these goods had since been tightened.¹⁹²

According to the Spanish government, the export controls covering these items have not changed, and exports of any such autopilots in 2012 (and thereafter) would have required a licence.¹⁹³ "Moreover, Spanish court records obtained by CAR indicate that the Spanish police previously charged two directors of UAV Navigation with smuggling dual-use items, including AP04 and AP04R autopilot units, which the company exported to at least 8 countries (including Israel) without the required export licence between June 2007 and June

Figure 179

A Zastava UAV with the number 405

Documented by CAR in Kyiv on 12 October 2020



Figure 180**The identification tag of the Zastava UAV with the number 405**

Documented by CAR in Kyiv on 12 October 2020



2010. According to the court records, Spanish police initiated this prosecution in response to an April 2010 magazine article in which one of the directors described the company's extensive exports of AP04 units. In December 2015 the court ruled that export licences were indeed required for these items, but Spanish law applies only to individuals who knowingly smuggle or intend to export items unlawfully. Consequently, the court acquitted both defendants, as they had not attempted to conceal the exports and could not be considered to have acted recklessly by exporting the items without knowing that they required export licences, given the complexity of EU export control laws governing dual-use items.¹⁹⁴

CAR asked UAV Navigation on what basis, given these court proceedings, the company still believed that their export of AP04M autopilot units in December 2012 did not require an export licence.¹⁹⁵ UAV Navigation did not respond to this question but stated that since 2016 'there was a marked improvement in the way in which the Company has since complied with the legislation relating to the export of dual use material'.¹⁹⁶ They also provided a copy of an August 2016 letter from Spain's Ministry of Economy and Competitiveness regarding the export of 335 Vector-model autopilot units to IAI for military end use. In contrast to the above-mentioned ruling and statements, this letter states that a dual-use export licence was not required for these items, unless the exporter knew or had been told that the items might be destined for military use in an embargoed country. Spanish export licence authorities reviewed this letter and stated to CAR that the letter did not apply to AP04-model autopilots like that documented in Ukraine, which still

required an export licence and have always done so. These differing licensing requirements for different models nonetheless underline the difficulties of enforcing EU military embargoes through current EU dual-use export controls, and varying interpretations of them by national authorities.

Russian trade records show that IAI shipped at least two other UAV Navigation autopilot units to Ural Works of Civil Aviation (the manufacturer of the Zastava UAV) since the imposition of the EU arms embargo in July 2014. In each case, the Russian defence and aerospace conglomerate Oboronprom is listed as the payor. For customs purposes, the items were valued at more than USD 23,500 per unit. Notably, the second UAV Navigation autopilot unit, shipped by IAI to Ural Works of Civil Aviation in July 2016, bears precisely the same part number as the unit in the Zastava UAV downed near Svitlodars'k in April 2020, and its serial number (0506) is five units away from the unit in the recovered UAV.¹⁹⁷ UAV Navigation informed CAR that this unit (0506) was also shipped to IAI in December 2012; that it was not subject to export licensing either; and that the company had no information on the transfer to Ural Works of Civil Aviation.¹⁹⁸

UAV Navigation confirmed to CAR that IAI remains a current customer. While the EU sanctioned Oboronprom in 2014, there is no suggestion that IAI is bound by EU sanctions or has acted unlawfully in transacting with Oboronprom or Ural Works of Civil Aviation. In addition, CAR found that the autopilot unit manufactured by UAV Navigation was fitted with a GPS module manufactured by the Swiss company u-blox.¹⁹⁹

KEY FINDING

Dual-use components licensing

Disagreements between European governments and industry actors pose challenges to the enforcement of embargoes. Opaque licensing requirements for dual-use components, combined with a lack of clarity over the ultimate end use or end user of components, appear to facilitate the integration of key EU-made technology into Russian military UAVs.

Non-military UAV

On 9 May 2019, CAR documented the fuselage of a hobbyist UAV (see Figure 181). Ukrainian defence and security forces downed the UAV in Pavlopol (Donetsk region) on 13 April 2018.

The Chinese company Shenzhen Hobbywing Technology produced the Platinum 100A Pro V3 speed controller CAR documented in this UAV. Another Chinese company, Allegro (Shanghai) Micro Electronics Commercial & Trading Co. Ltd., produced the ACS758 LCB-100B current sensor on the control unit's electronic circuit, possibly in 2012. The control unit is also fitted with a MEGA 328P microcontroller manufactured by the company Atmel (now part of the US company Microchip). CAR contacted these

companies to obtain more information and awaits their responses.²⁰⁰

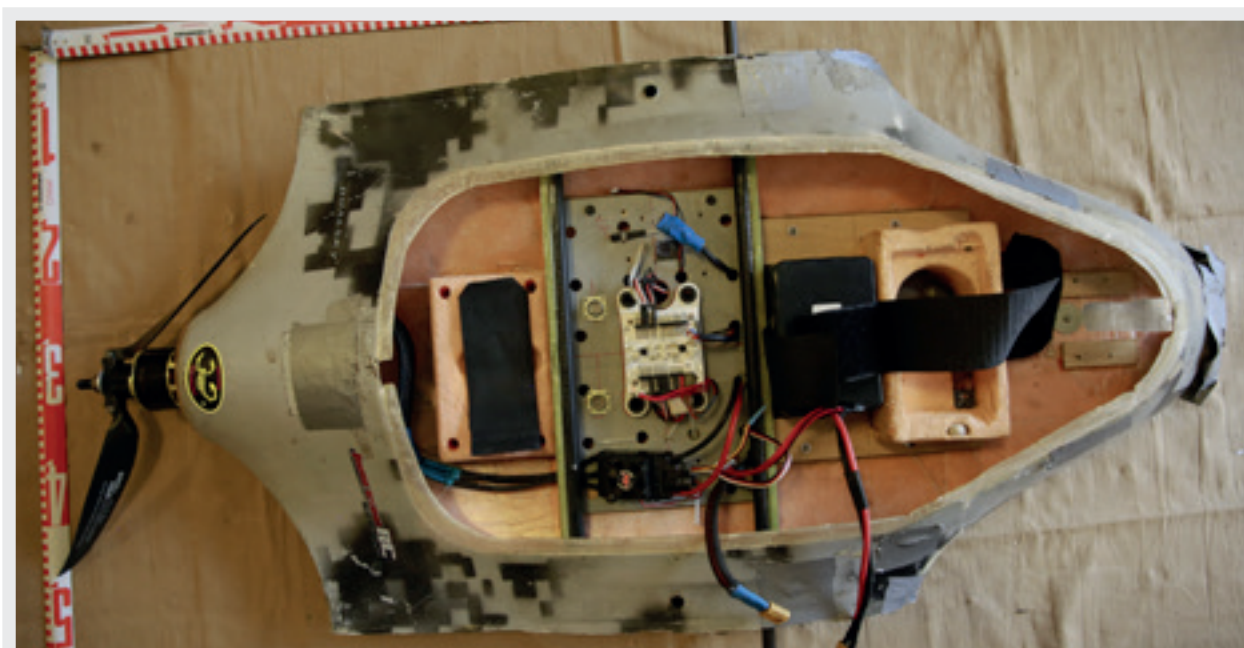
The UAV contains a SII-4020-420KV engine. In response to a trace request sent by CAR, the Chinese manufacturer Scorpion Power System said it had produced the engine in May 2016 and provided CAR with a list of 11 customers who purchased this model in the relevant period.²⁰¹ Some of the customers responded to trace requests, but CAR has not yet been able to pinpoint the exact chain of supply of the engine.²⁰²

The Russian company Zapas manufactured the battery of the UAV in June 2017 and has yet to respond to a CAR trace request.²⁰³

Figure 181

A non-military UAV

Documented by CAR in Mariupol on 9 May 2019



MAIN BATTLE TANKS

T-64

On 17 December 2018, CAR documented a T-64 main battle tank (see Figure 182). Former Kharkiv Manufacture Plant (KhPZ) (based in what is today Ukraine) manufactured the

vehicle on an unknown date. Unknown parties overpainted marks on the back of the hull (see Figure 183).

Figure 182

A T-64 main battle tank

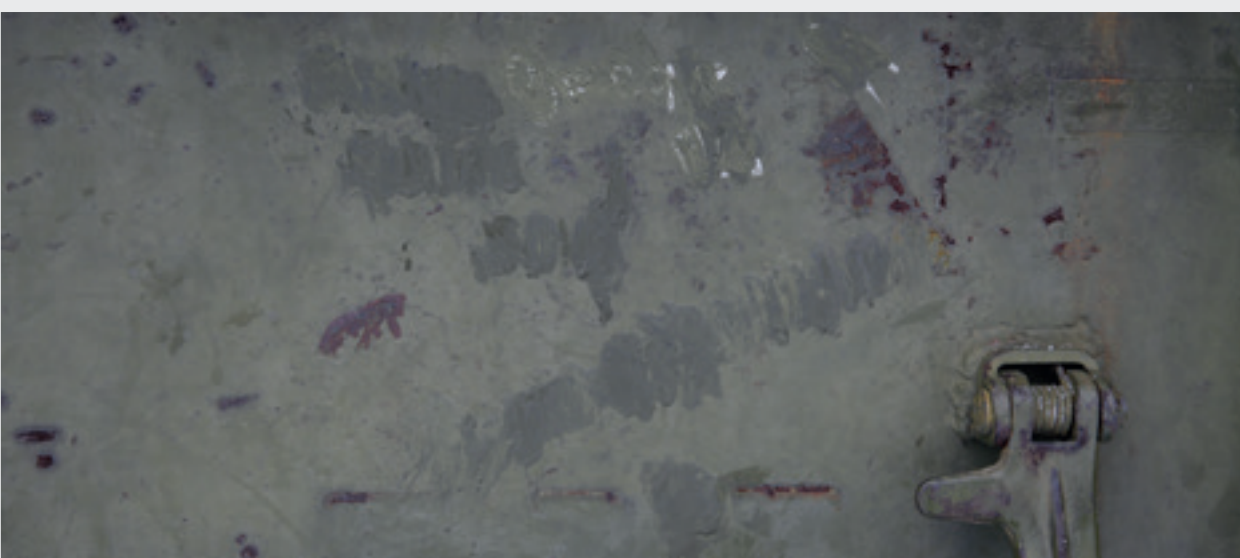
Documented by CAR in Kyiv on 17 December 2018



Figure 183

The back of the hull of a T-64 main battle tank

Documented by CAR in Kyiv on 17 December 2018



T-62BV

On 7 May and 19 September 2019, CAR documented two T-64BV main battle tanks (see Figures 184–85). The latter tank features oversized index marks on both sides, indicating

that it was transported by Russian railways (see Figures 185–86). KhPZ manufactured the vehicles on unknown dates.

Figure 184**A T-64BV main battle tank**

Documented by CAR in Kharkiv on 7 May 2019

**Figure 185****A T-64BV main battle tank**

Documented by CAR in Kryvyi Rih on 19 September 2019



Figure 186

Oversize index marks on a T-64BV main battle tank

Documented by CAR in Kryvyi Rih on 19 September 2019



MULTIPLE-ROCKET LAUNCHER SYSTEMS

BM-21

On 17 December 2018, CAR documented a BM-21 multiple rocket launcher whose identification plaque is missing (see Figures 187–88).

NPO Splav manufactured the vehicle on an unknown date.

Figure 187

A BM-21 multiple rocket launcher

Documented by CAR in Kyiv on 17 December 2018



Figure 188

The location where an identification plaque was unscrewed from the BM-21 multiple rocket launcher
Documented by CAR in Kyiv on 17 December 2018



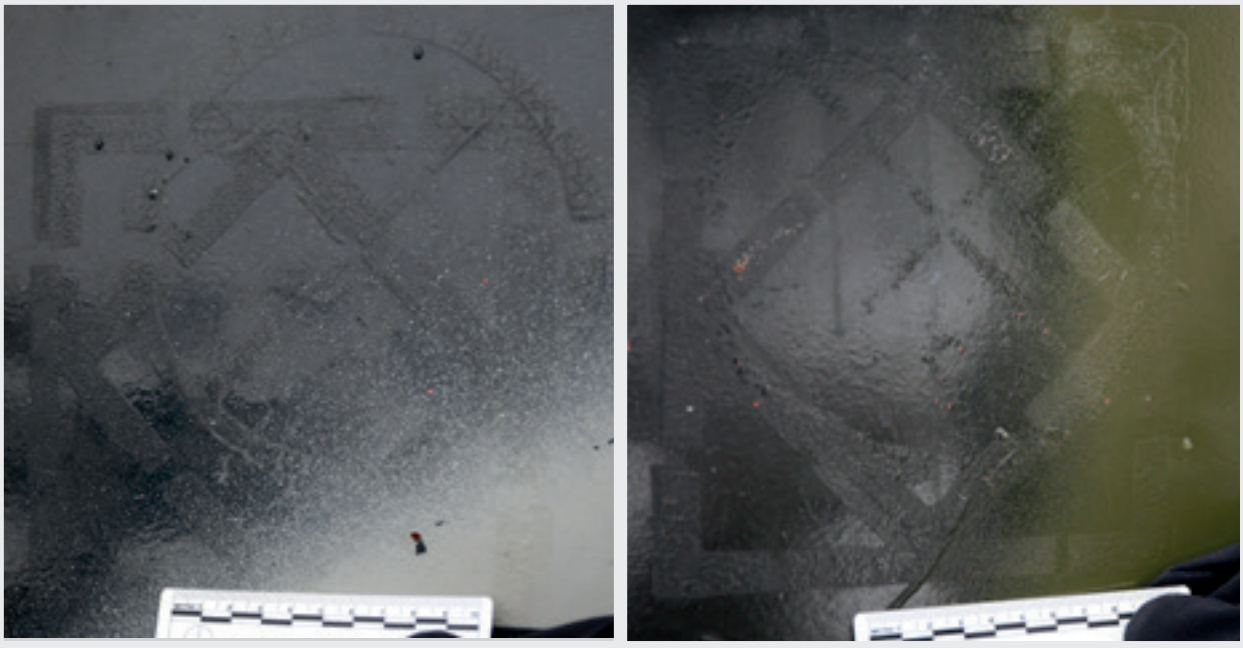
On each of the truck cabin doors, CAR observed two transfers of unit tactical marks that had previously been applied over each other (see Figure 189). The most recently removed mark is a broken diamond within a broken square.

The transfers appear to have been removed with the assistance of a heat source, which damaged the underlying paint. There is no evidence of overpainting to repair damage to the vehicle paint.

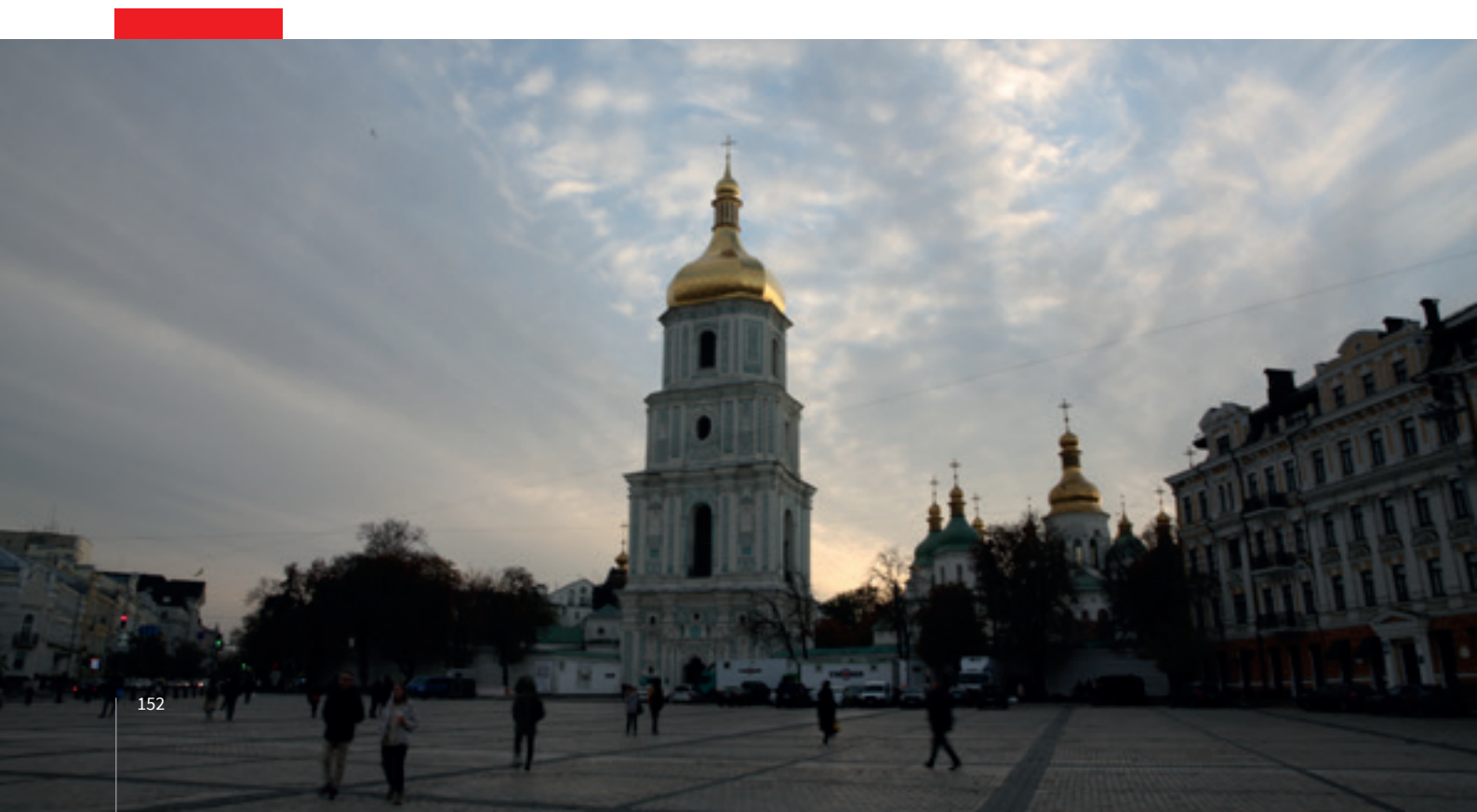
Figure 189

Transfers of unit tactical marks visible on the truck cabin doors

Documented by CAR in Kyiv on 17 December 2018



▼ St. Sophia's
Cathedral, Kyiv.



ARMoured PERSONNEL CARRIERS

BMD-2 airborne combat vehicle

On 17 December 2018, CAR documented a BMD-2 airborne combat vehicle (see Figure 190). Volgograd Tractor Plant produced the vehicle on an unknown date.

On each side of the hull, a number (probably 284) has been partially scraped off with a broad-bladed metal tool. Next to this number is an upside-down triangle, which is probably the tactical mark of a higher formation (see Figure 191).

Figure 190

A BMD-2 airborne combat vehicle

Documented by CAR in Kyiv on 17 December 2018



Figure 191

Obliterated numbers on the sides of a BMD-2 airborne combat vehicle

Documented by CAR in Kyiv on 17 December 2018



BTR-80 armoured personnel carrier

On 17 December 2018, CAR documented a BTR-80 armoured personal carrier (see Figure 192). Arzamas Machine-Building Plant manufactured the vehicle on an unknown date.

CAR observed evidence of overpainting on what was probably the tactical mark of a higher formation, which was replaced by '110' (see Figure 193).

Figure 192

A BTR-80 armoured personnel carrier

Documented by CAR in Kyiv on 17 December 2018



Figure 193

Overpaint on a BTR-80 armoured personnel carrier

Documented by CAR on 17 December 2018



On 9 May 2019, CAR documented a second BTR-80 armoured personnel carrier (see Figure 194). Arzamas Machine-Building Plant manufactured the vehicle on an unknown date. The engine tag, documented separately, refers to a KamAZ

model 7403, manufactured in 1990 (see Figure 195). KamAZ has yet to reply to CAR's trace request, which sought more information on this item.²⁰⁴

Figure 194

A BTR-80 armoured personnel carrier

Documented by CAR in Sartana on 9 May 2019



Figure 195

Tag for a KamAZ 7403 diesel engine, manufactured in 1990 and associated with a BTR-80 armoured personnel carrier

Documented by CAR in Sartana on 9 May 2019



OLDER ARMoured VEHICLES MAY LACK ACTIVE DEFENSIVE MEASURES, SUCH AS REACTIVE ARMOUR SYSTEMS – MODIFICATIONS TO THE ARMOUR ARE LIKELY TO BE COST-EFFECTIVE, LIGHTWEIGHT SOLUTIONS TO IMPROVE A VEHICLE'S SURVIVABILITY.

On 19 September 2019, CAR documented a third BTR-80 armoured personnel carrier (see Figure 196). Arzamas Machine-Building Plant manufactured the vehicle on an unknown date.

This BTR-80's armour shows signs of post-production modification. Shaped, 4-mm-thick steel plates are affixed to struts, mounted to the main body of the armoured vehicle (see

Figure 197). In addition, bar armour is attached to the turret to mitigate the threat of commonly encountered high-explosive anti-tank rounds circulating in certain areas of the Donetsk and Luhansk regions of Ukraine, such as varieties of PG-7 rocket.²⁰⁵ These types of 'stand-off' armour are mechanical countermeasures designed to disrupt the formation of the explosive jet, as well as to increase the stand-off between the vehicle body and the warhead.

Figure 196

A BTR-80 armoured personnel carrier

Documented by CAR in Zaporizhzhya on 19 September 2019



Figure 197

Overpainted marks on the hull of the BTR-80 armoured personnel carrier

Documented by CAR in Zaporizhzhya on 19 September 2019



Older armoured vehicles may lack active defensive measures, such as reactive armour systems. While their original sloping armour aids deflection and dissipation of the anti-tank round's power, modifications to the armour are likely to be cost-effective, lightweight solutions to improve a vehicle's survivability.

Both sides of the vehicle's hull display the number 222 as well as unit tactical marks—a dash in a circle, in a square, and a triangle in a circle—under the stand-off armour (see Figures 198–99).

Figure 198

The number 222 and a unit tactical mark on one side of the hull of the BTR-80 armoured personnel carrier

Documented by CAR in Zaporizhzhya on 19 September 2019



Figure 199

A unit tactical mark on the hull of a BTR-80

Documented by CAR in Zaporizhzhya on 19 September 2019



TRUCKS

KamAZ-5350 truck

Between 2018 and 2019, CAR documented five KamAZ-5350 trucks, produced by JSC KamAZ (see Figures 200–04). The model and serial number plates on the trucks' KamAZ transmission boxes indicate manufacture in 2000, 2008, 2009, and 2010.

→ In response to CAR's trace requests, Ukrainian authorities reported that the trucks had not been in service with the Armed Forces of Ukraine prior to their seizure.²⁰⁶ Russian authorities have yet to reply to a CAR trace request, which sought more information on these vehicles.²⁰⁷

Figure 200

A KamAZ-5350 truck with a transmission box indicating manufacture in 2010

Documented by CAR in Hvardiis'ke on 20 September 2019



Figure 201

A KamAZ-5350 truck with transmission box indicating manufacture in 2000

Documented by CAR in Hvardiis'ke on 20 September 2019



Figure 202

A KamAZ-5350 truck with a transmission box indicating manufacture in 2009

Documented by CAR in Okhtyrka on 10 December 2019



Figure 203

A KamAZ-5350 truck with a transmission box indicating manufacture in 2010

Documented by CAR in Kramators'k on 12 December 2019



Figure 204

A KamAZ-5350 truck with a transmission box indicating manufacture in 2008

Documented by CAR in Paraskoviivka on 13 December 2019



FURTHER INVESTIGATIONS

EVIDENCE OF POST-2014 TRADING BY DONETSK AND LUHANSK MILITARY AND DUAL-USE MANUFACTURERS

As shown in Box 1 on page 64, CAR has provided evidence of efforts to restart military production at the ammunition factory PJSC Luhansk Cartridge Works. Undertaken for the benefit of the self-declared LPR and its forces, these efforts involved private Russian entities.

Using Russian trade records, CAR identified five other defence and dual-use manufacturers in certain areas of the Donetsk and Luhansk

regions of Ukraine that have made post-2014 exports to the Russian Federation (see Table 10 for a detailed breakdown of these transfers). Two are part of the Ukrainian state-owned enterprise Ukroboronprom, and three are under Ukrainian sanctions imposed in August 2014 on companies the Ukrainian government regards as having been illegally expropriated. None of the exporting or importing entities are currently under specific EU sanctions.

Table 10

Transfers to the Russian Federation from entities in Donetsk and Luhansk

Factory	Part of Ukroboron-prom?	Under Ukrainian sanctions since August 2014?	Goods exported	Consignee in the Russian Federation
'Aviatech-Plus' LLC ²⁰⁸	No	No	Turbine engine parts	'Aviatech' LLC
Donetsk Branch of 'Aviatech' LLC ²⁰⁹	No	No	Engine maintenance tools; parts for aero-engines, including TV3-117VM (for Mil and Kamov helicopters), AI-series (Ivchenko/Motor Sich) turbofan engines, and DI-18T engines (for An-124 and An-225 cargo aircraft)	'Aviatech' LLC
'Pervomayskiy Mechanical Plant' PJSC	Yes	Yes	Wide range of aircraft components, particularly for IL-76 cargo aircraft	JSC 'Avia-Fed-Service' ²¹⁰ (aviation components distributor)
State Enterprise 'Luhansk Aircraft Repair Plant' ²¹¹	Yes	Yes	Pressure instruments, pipes, and tanks originally produced by military-civilian aircraft engine producer Motor Sich (Ukraine)	'ASZ' LLC ²¹²
State Enterprise 'Yunost' ²¹³	No	Yes	Voltage relays; AC/DC converters	Four large electronic component distributors: <ul style="list-style-type: none"> JSC NPP 'Promelectron'²¹⁴ JSC 'TsMK-Aero'²¹⁵ JSC 'Hermes'²¹⁶ JSC 'NOMINAL'²¹⁷

Source: bill-of-lading-level trade data obtained and provided by Import Genius LLC

There is no evidence that sanctioned Russian defence industry entities were involved in these transfers, nor does any clear evidence point to military purchasers or end users of these goods. Nonetheless, the aircraft engine components transferred by Aviatech and Luhansk Aircraft Repair Plant are clearly dual-use, with potential applications in engines of military aircraft.²¹⁸

Shipment records do, however, indicate a clear disjuncture between pre- and post-2014 exports. Russian import records show that three of the five entities made no exports to the Russian Federation prior to 2016. The records indicate that a fourth, the Luhansk Aircraft

Repair Plant, made one such shipment (in 2012). The fifth, the Pervomayskiy Mechanical Plant, regularly shipped products to the Russian Federation prior to 2014 but had a large gap in its exports from August 2014 until July 2016.²¹⁹ Thereafter, its Russian exports went exclusively to a single Russian aircraft component dealer, which had been an occasional customer prior to 2014, among numerous other Russian clients.²²⁰

While not conclusive, this pattern merits further investigation to determine whether Ukrainian state enterprises in certain areas of the Donetsk and Luhansk regions of Ukraine are being asset-stripped.



SHIPMENT RECORDS INDICATE A CLEAR DISJUNCTURE BETWEEN PRE- AND POST-2014 EXPORTS. WHILE NOT CONCLUSIVE, THIS PATTERN MERITS FURTHER INVESTIGATION TO DETERMINE WHETHER UKRAINIAN STATE ENTERPRISES IN CERTAIN AREAS OF THE DONETSK AND LUHANSK REGIONS OF UKRAINE ARE BEING ASSET-STRIPPED.

◀ A CAR field investigation team documenting a weapon in Ukraine.

CONCLUSION

Since 2014, the news media and other observers have provided accounts of weapon sourcing to armed formations operating in certain areas of the Donetsk and Luhansk regions of Ukraine. To date, efforts to verify these claims have relied largely on examinations of open-source photos and videos of weapons and ammunition, rather than systematic field-based investigations.

To fill this evidentiary gap, CAR undertook a three-year field investigation of materiel recovered from the self-declared DPR and LPR. This report presents the findings to help shed light on the extent to which these armed formations depend on external supplies.

The evidence confirms that factories based in what is today the Russian Federation produced most of the militias' ammunition and nearly all their weapons, from assault rifles and precision rifles, grenade launchers, precision-guided munitions, and landmines to anti-tank guided weapons. The findings also indicate that these armed formations field weapons previously captured by Russian forces, such as Polish anti-aircraft missiles seized in Georgia in 2008.

In addition, the militias deploy a fleet of Russian-made drones in Ukraine. Russian forces have used similar drones within the territory of EU member states, such as Lithuania and Poland. Russian entities acquired British, Czech, French, German, Spanish, and US-made components for use in the manufacture of these drones. CAR's analysis and tracing efforts reveal that independent Russian electronics and component distributors acquired such foreign technology on behalf of sanctioned Russian defence and security entities.

Despite the 2014 EU arms embargo on the Russian Federation, key EU-made technology has thus made its way into Russian military drones. CAR's investigation indicates that a general lack of clarity regarding the end use or end user of components, as well as opaque licensing requirements for dual-use components, may facilitate the export of

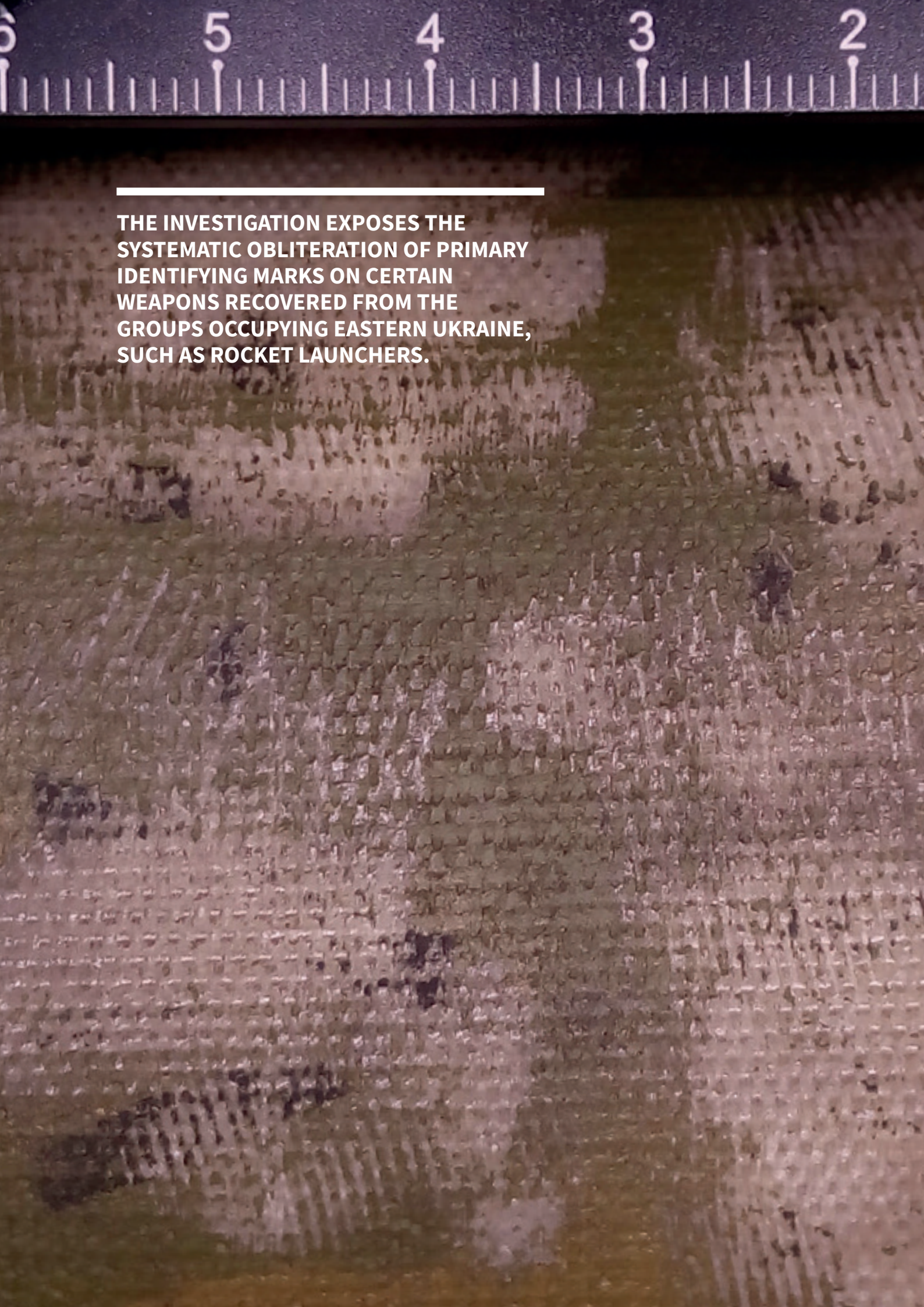
EU-made components for the manufacture of Russian military UAVs.

The investigation also exposes the systematic obliteration of primary identifying marks on certain weapons recovered from the armed formations operating in certain areas of the Donetsk and Luhansk regions of Ukraine, such as rocket launchers. This practice hinders traceability by concealing evidence of the precise point of diversion or the country of manufacture. The intentional retention of secondary marks, however, enables users to maintain record-keeping and inventories, in keeping with established military doctrine. The overall approach indicates that the militias operate within a centralised logistics structure.

Most of the components that CAR documented are original and were not taken from other weapons, which may suggest a short chain of custody between the point at which the weapons left a production facility or military inventory and their use by the militias in eastern Ukraine. Since the war began in 2014, military supplies have also been exported from facilities in Luhansk and Donetsk to new Russian customers. This development calls for further investigation.

► Details of obliteration to model designation, lot-date and factory marks on an RPO-A launcher.

THE EVIDENCE CONFIRMS THAT FACTORIES BASED IN WHAT IS TODAY THE RUSSIAN FEDERATION PRODUCED MOST OF THE MILITIAS' AMMUNITION AND NEARLY ALL THEIR WEAPONS INCLUDING ASSAULT RIFLES, GRENADE LAUNCHERS AND ANTI-TANK GUIDED WEAPONS.



**THE INVESTIGATION EXPOSES THE
SYSTEMATIC OBLITERATION OF PRIMARY
IDENTIFYING MARKS ON CERTAIN
WEAPONS RECOVERED FROM THE
GROUPS OCCUPYING EASTERN UKRAINE,
SUCH AS ROCKET LAUNCHERS.**

ACKNOWLEDGEMENTS

CAR thanks Alexander Diehl and Jonathan Ferguson (Royal Armouries).

ANNEXES

Table 11

Small-calibre ammunition headstamps documented by CAR in Ukraine

Note: = Highlighted headstamps are unique to Ukraine in CAR's global database

Headstamp	Manufacturer	Year of manufacture	Calibre	Quantity	Presence in Ukrainian inventory ²²¹
 10_72	Arsenal JSCo	1972	7.62 × 54 mm R	1	Yes ²²²
 17_48	Barnaul Cartridge Plant CJSC	1948	7.62 × 54 mm R	107	Yes ²²³
 10_49		1949	7.62 × 54 mm R	7	Yes ²²⁴
 17_73		1973	7.62 × 54 mm R	240	Yes ²²⁵

Headstamp	Manufacturer	Year of manufacture	Calibre	Quantity	Presence in Ukrainian inventory ²²¹
 17_76	Barnaul Cartridge Plant CJSC (continued)	1976	7.62 × 54 mm R	21	Yes ²²⁶
 17_79		1979	7.62 × 54 mm R	54	Yes ²²⁷
 17_82		1982	5.45 × 39 mm	2	Yes ²²⁸
 17_86		1986	5.45 × 39 mm	9	No ²²⁹
 17_88		1988	7.62 × 54 mm R	9	Yes ²³⁰

Headstamp	Manufacturer	Year of manufacture	Calibre	Quantity	Presence in Ukrainian inventory ²²¹
 <p>17_89</p>	Barnaul Cartridge Plant CJSC (continued)	1989	7.62 × 54 mm R	3	Yes ²³¹
 <p>17_90</p>		1990	5.45 × 39 mm	2	Yes ²³²
 <p>17_93</p>		1993	5.45 × 39 mm	82	Yes ²³³
 <p>17_94</p>		1994	5.45 × 39 mm	38	No ²³⁴
 <p>17_94 [in original sealed packaging]²³⁵</p>		1994	5.45 × 39 mm	1,080	No ²³⁶






Headstamp	Manufacturer	Year of manufacture	Calibre	Quantity	Presence in Ukrainian inventory ²²¹
 17_96	Barnaul Cartridge Plant CJSC (continued)	1996	5.45 × 39 mm	1	No ²³⁷
 17_96 [in original sealed packaging] ²³⁸		1996	7.62 × 54 mm R	440	No ²³⁹
 188_62	LVE Novosibirsk Cartridge Plant (JSC NPZ)	1962	7.62 × 54 mm R	28	Yes ²⁴⁰
 188_68		1968	7.62 × 54 mm R	40	Yes ²⁴¹
 188_[star]_70_[star]		1970	12.7 × 108 mm	2	Yes ²⁴²

Headstamp	Manufacturer	Year of manufacture	Calibre	Quantity	Presence in Ukrainian inventory ²²¹
 188_74	LVE Novosibirsk Cartridge Plant (JSC NPZ) (continued)	1974	7.62 × 54 mm R	1	Yes ²⁴³
 188_75		1975	7.62 × 54 mm R	9	Yes ²⁴⁴
 188_76		1976	7.62 × 54 mm R	7	Yes ²⁴⁵
 188_80		1980	7.62 × 54 mm R	19	Yes ²⁴⁶
 188_[star]_82_[star]		1982	12.7 × 108 mm	5	Yes ²⁴⁷






Headstamp	Manufacturer	Year of manufacture	Calibre	Quantity	Presence in Ukrainian inventory ²²¹
 188_85	LVE Novosibirsk Cartridge Plant (JSC NPZ) (continued)	1985	7.62 × 54 mm R	19	Yes ²⁴⁸
 188_86		1986	7.62 × 54 mm R	9	Yes ²⁴⁹
 188_01		2001	7.62 × 54 mm R	9	Yes ²⁵⁰
 270_71	PJSC Luhansk Cartridge Works	1971	7.62 × 39 mm	1	Yes ²⁵¹
 270_81		1981	5.45 × 39 mm	3	Yes ²⁵²






Headstamp	Manufacturer	Year of manufacture	Calibre	Quantity	Presence in Ukrainian inventory ²²¹
 270_82	PJSC Luhansk Cartridge Works (continued)	1982	5.45 × 39 mm	3	Yes ²⁵³
 270_83		1983	5.45 × 39 mm	2	Yes ²⁵⁴
 270_84		1984	5.45 × 39 mm	9	Yes ²⁵⁵
 270_87		1987	5.45 × 39 mm	2	Yes ²⁵⁶
 270_88		1988	5.45 × 39 mm	1	Yes ²⁵⁷

Headstamp	Manufacturer	Year of manufacture	Calibre	Quantity	Presence in Ukrainian inventory ²²¹
 270_93	PJSC Luhansk Cartridge Works (continued)	1993	5.45 × 39 mm	79	Yes ²⁵⁸
 270_94		1994	5.45 × 39 mm	667	Yes ²⁵⁹
 270_95		1995	5.45 × 39 mm	1	Yes ²⁶⁰
 270_03		2003	5.45 × 39 mm	3	Yes ²⁶¹
 LCW_9x18		Unknown	9 × 18 mm	4	No ²⁶²

Headstamp	Manufacturer	Year of manufacture	Calibre	Quantity	Presence in Ukrainian inventory ²²¹
 3_*51_*	Ulyanovsk Mechanical Plant	1951	14.5 × 114 mm	4	Yes ²⁶³
 3_78		1978	5.45 × 39 mm	1	Yes ²⁶⁴
 3_*79_*		1979	14.5 × 114 mm	1	Yes ²⁶⁵
 3_82		1982	5.45 × 39 mm	1	Yes ²⁶⁶
 3_85		1985	5.45 × 39 mm	40	Yes ²⁶⁷

Headstamp	Manufacturer	Year of manufacture	Calibre	Quantity	Presence in Ukrainian inventory ²²¹
 3_88	Ulyanovsk Mechanical Plant (continued)	1988	5.45 × 39 mm	1	Yes ²⁶⁸
 3_94 [in original sealed packaging] ²⁶⁹		1994	5.45 × 39 mm	1080	No ²⁷⁰
 539_62	Tula Cartridge Works	1962	7.62 × 39 mm	186	Yes ²⁷¹
 539_82		1982	5.45 × 39 mm	1	Yes ²⁷²
 539_90		1990	5.45 × 39 mm	6	Yes ²⁷³

Headstamp	Manufacturer	Year of manufacture	Calibre	Quantity	Presence in Ukrainian inventory ²²¹
 60_71	JSC Bishkek Machine Engineering Plant	1971	7.62 × 54 mm R	3	No ²⁷⁴
 60_74		1974	7.62 × 54 mm R	10	No ²⁷⁵
 60_77		1977	7.62 × 54 mm R	73	Yes ²⁷⁶
 60_80		1980	5.45 × 39 mm	180	Yes ²⁷⁷
 60_80		1980	7.62 × 54 mm R	1	Yes ²⁷⁸

Headstamp	Manufacturer	Year of manufacture	Calibre	Quantity	Presence in Ukrainian inventory ²²¹
 60_83	JSC Bishkek Machine Engineering Plant (continued)	1983	5.45 × 39 mm	3	Yes ²⁷⁹
 60_84		1984	5.45 × 39 mm	14	No ²⁸⁰
 60_85		1985	5.45 × 39 mm	2	Yes ²⁸¹
 60_89		1989	5.45 × 39 mm	10	Yes ²⁸²
 60_90		1990	5.45 × 39 mm	32	Yes ²⁸³

Headstamp	Manufacturer	Year of manufacture	Calibre	Quantity	Presence in Ukrainian inventory ²²¹
 7_89	Vypel State Production Association	1989	5.45 × 39 mm	7	Yes ²⁸⁴
 7_91		1991	5.45 × 39 mm	1	Yes ²⁸⁵
 7_93		1993	5.45 × 39 mm	10	Yes ²⁸⁶
 7_98		1998	5.45 × 39 mm	3	No ²⁸⁷
 711_89		Klimovsk Specialized Ammunition Plant	1989	7.62 × 39 mm	1
 No headstamp	Unknown		9 × 39 mm	103	No ²⁸⁹

ENDNOTES

- 1 This report refers to countries of manufacture using present-day place names. For instance, ‘Russian Federation’ refers to the current territory of the Russian Federation both before and after the collapse of the Soviet Union.
- 2 CAR follows weapon and ammunition management classification, in which disposable rocket launchers are ammunition rather than weapons. In this report, disposable rocket launchers—such as the MRO-A, RPG-18, RPG-22, RPG-26, RPO-A, and RShG-1 models—are considered ammunition.
- 3 See note 2, above.
- 4 In addition, CAR documented one SPSH-2 signal flare pistol. As this item cannot be converted for live fire, it has not been included in this analysis.
- 5 In accordance with the provisions of the EU General Data Protection Regulation (GDPR), CAR is not displaying names or other personal identification in this report.
- 6 On 15 April 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 10 September 2020. This trace request sought information on the Makarov pistol bearing the serial number ‘YX 4762’. In response, the Government of Ukraine confirmed that this item was in service with the Military Unit A0281 (based in Zhytomyr) and that on 16 April 2014, the pistol was lost during an attack from illegal military formations on a command post near Oleksandro-Kalynove village (Donetsk region) and subsequently written off from registers.

As of April 2016, the Ministry of Interior of Ukraine had RGN hand grenades without fuses, Makarov pistols, 5.45 × 39 mm AK-74 rifles, 40 mm RPG-7V rocket launchers, 40 mm GP-25 under barrel grenade launchers, 5.45 × 39 mm ammunition cartridges, 7.62 × 25 mm ammunition cartridges, 5.56 × 45 mm ammunition cartridges, and 9 × 19 mm ammunition cartridges in its inventory. The Ministry of Interior of Ukraine does not record information on markings, serial numbers, lot numbers, or years of manufacture and therefore no further information is available.
- 7 On 18 March 2021, CAR submitted a trace request to the Permanent Mission of the Russian Federation to the United Nations regarding this item. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.
- 8 On 15 April 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 10 September 2020. This trace request sought information on the Type 54 pistol bearing the serial number ‘30032424’. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen or lost.
- 9 On 20 November 2020, CAR submitted a trace request to the Permanent Mission of the People’s Republic of China to the United Nations regarding this item. At the time of writing, CAR had not yet received a response. Given the absence of a trace response, CAR cannot pronounce on the legality of the transfer in question.
- 10 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 21 January 2019. This trace request sought information on the AKM assault rifle bearing serial number ‘TP0280’. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen, lost or written-off and has never been transferred to any other military units.
- 11 On 18 March 2021, CAR submitted a trace request to the Permanent Mission of the Russian Federation to the United Nations regarding this item. At the time of writing, CAR had not yet received a response. Given the absence of a trace response, CAR cannot pronounce on the legality of the transfer in question.
- 12 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 31 July 2019. This trace request sought information on the AK-74 assault rifle bearing serial number ‘701560’. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen or lost.

As of April 2016, the Ministry of Interior of Ukraine had RGN hand grenades without fuses, Makarov pistols, 5.45 × 39 mm AK-74 rifles, 40 mm RPG-7V rocket launchers, 40 mm GP-25 under barrel grenade launchers, 5.45 × 39 mm ammunition cartridges, 7.62 × 25 mm ammunition cartridges, 5.56 × 45 mm ammunition cartridges, and 9 × 19 mm ammunition cartridges in its inventory. The Ministry of Interior of Ukraine does not record information on markings, serial numbers, lot numbers, or years of manufacture and therefore no further information is available.

On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 22 January 2020. This trace request sought information on the AK-74 assault rifle bearing serial number '3754038'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen, lost or written-off and has never been transferred to any other military units.

As of April 2016, the Ministry of Interior of Ukraine had RGN hand grenades without fuses, Makarov pistols, 5.45 × 39 mm AK-74 rifles, 40 mm RPG-7V rocket launchers, 40 mm GP-25 under barrel grenade launchers, 5.45 × 39 mm ammunition cartridges, 7.62 × 25 mm ammunition cartridges, 5.56 × 45 mm ammunition cartridges, and 9 × 19 mm ammunition cartridges in its inventory. The Ministry of Interior of Ukraine does not record information on markings, serial numbers, lot numbers, or years of manufacture and therefore no further information is available.

On 15 April 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 10 September 2020. This trace request sought information on the AK-74 rifle bearing the serial number '4310184'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen or lost. Further, the Government of Ukraine confirmed that as of April 2016, the AK-74 model was in service with the Ministry of Interior of Ukraine but the rifles are not recorded by serial number or year of manufacture and therefore no further information is available.

On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 21 January 2019. This trace request sought information on the AK-74 assault rifle bearing serial number '4737492'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen, lost or written-off and has never been transferred to any other military units.

As of April 2016, the Ministry of Interior of Ukraine had RGN hand grenades without fuses, Makarov pistols, 5.45 × 39 mm AK-74 rifles, 40 mm RPG-7V rocket launchers, 40 mm GP-25 under barrel grenade launchers, 5.45 × 39 mm ammunition cartridges, 7.62 × 25 mm ammunition cartridges, 5.56 × 45 mm ammunition cartridges, and 9 × 19 mm ammunition cartridges in its inventory. The Ministry of Interior of Ukraine does not record information on markings, serial numbers, lot numbers, or years of manufacture and therefore no further information is available.

On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 21 January 2019. This trace request sought information on the AK-74 assault rifle bearing serial number '5177278'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen, lost or written-off and has never been transferred to any other military units.

As of April 2016, the Ministry of Interior of Ukraine had RGN hand grenades without fuses, Makarov pistols, 5.45 × 39 mm AK-74 rifles, 40 mm RPG-7V rocket launchers, 40 mm GP-25 under barrel grenade launchers, 5.45 × 39 mm ammunition cartridges, 7.62 × 25 mm ammunition cartridges, 5.56 × 45 mm ammunition cartridges, and 9 × 19 mm ammunition cartridges in its inventory. The Ministry of Interior of Ukraine does not record information on markings, serial numbers, lot numbers, or years of manufacture and therefore no further information is available.

On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 22 January 2020. This trace request sought information on the AK-74 assault rifle bearing serial number '5419478'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen, lost or written-off and has never been transferred to any other military units.

As of April 2016, the Ministry of Interior of Ukraine had RGN hand grenades without fuses, Makarov pistols, 5.45 × 39 mm AK-74 rifles, 40 mm RPG-7V rocket launchers, 40 mm GP-25 under barrel grenade launchers, 5.45 × 39 mm ammunition cartridges, 7.62 × 25 mm ammunition cartridges, 5.56 × 45 mm ammunition cartridges, and 9 × 19 mm ammunition cartridges in its inventory. The Ministry of Interior of Ukraine does not record information on markings, serial numbers, lot numbers, or years of manufacture and therefore no further information is available.

- 13 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 21 January 2019. This trace request sought information on the AK-74 assault rifle bearing serial number '4124725'. In response, the Government of Ukraine confirmed that this item was in service with the Military Unit A2506 (based in Novoozerne, the Autonomous Republic of Crimea) and that the rifle was left in the temporarily occupied territory of the Autonomous Republic of Crimea.
- 14 On 24 June 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 16 March 2021. This response confirms that: 1) the AK-74 assault rifle bearing the serial number '4293274', was in service with the Military Unit A4519 (based in Eupatoria, the Autonomous Republic of Crimea); and 2) the rifle was left in the temporarily occupied territory of the Autonomous Republic of Crimea.
- 15 On 18 March 2021, CAR submitted trace requests to the Permanent Mission of the Russian Federation to the United Nations regarding these items. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.
- 16 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 21 January 2019. This trace request sought information on the AKS-74 assault rifle bearing serial number '5252901'. In response, the Government of Ukraine confirmed that this item was in service with the Military Unit A4519 (based in Eupatoria, the Autonomous Republic of Crimea) and that the rifle was left in the temporarily occupied territory of the Autonomous Republic of Crimea.
- 17 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 31 July 2019. This trace request sought information on the AKS-74 assault rifle bearing serial number '1291269'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen, lost or written-off and has never been transferred to any other military units.
- On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 22 January 2020. This trace request sought information on the AKS-74 assault rifle bearing serial number '2706638'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen, lost or written-off and has never been transferred to any other military units.
- 18 On 18 March 2021, CAR submitted trace requests to the Permanent Mission of the Russian Federation to the United Nations regarding these items. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.
- 19 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 21 January 2019. This trace request sought information on the AK-74N assault rifle bearing serial number '7492536'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen, lost or written-off and has never been transferred to any other military units.
- On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 22 January 2020. This trace request sought information on the AK-74N assault rifle bearing serial number '4799855'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen, lost or written-off and has never been transferred to any other military units.
- 20 On 18 March 2021, CAR submitted trace requests to the Permanent Mission of the Russian Federation to the United Nations regarding these items. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.
- 21 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 31 July 2019. This trace request sought information on the AK-74M assault rifle bearing serial number '8364331'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen, lost or written-off and has never been transferred to any other military units.
- 22 On 18 March 2021, CAR submitted a trace request to the Permanent Mission of the Russian Federation to the United Nations regarding this item. At the time of writing, CAR had not yet received a response. Given the absence of a trace response, CAR cannot pronounce on the legality of the transfer in question.

- 23 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 22 January 2020. This trace request sought information on the Dragunov sniper rifle (SVD) bearing serial number '17368'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen, lost or written-off and has never been transferred to any other military units.
- On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 21 January 2019. This trace request sought information on the Dragunov sniper rifle (SVD) bearing serial number '90985'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen, lost or written-off and has never been transferred to any other military units.
- On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 21 January 2019. This trace request sought information on the Dragunov sniper rifle (SVD) bearing serial number '91438'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen, lost or written-off and has never been transferred to any other military units.
- On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 31 July 2019. This trace request sought information on the Dragunov sniper rifle (SVD) bearing serial number '43039'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen or lost.
- On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 31 July 2019. This trace request sought information on the Dragunov sniper rifle (SVD) bearing serial number '43646'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen or lost.
- On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 21 January 2019. This trace request sought information on the Dragunov sniper rifle (SVD) bearing serial number '44797'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen, lost or written-off and has never been transferred to any other military units.
- On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 22 January 2020. This trace request sought information on the Dragunov sniper rifle (SVD) bearing serial number '0060300'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen, lost or written-off and has never been transferred to any other military units.
- On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 21 January 2019. This trace request sought information on the Dragunov sniper rifle (SVD) bearing serial number '0061272'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen, lost or written-off and has never been transferred to any other military units.
- 24 On 18 March 2021, CAR submitted trace requests to the Permanent Mission of the Russian Federation to the United Nations regarding these items. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.
- 25 Zeroing is the process of adjusting weapon sighting systems so that the point of impact coincides with the aiming point at a specified distance.
- 26 CAR found anecdotal evidence that elements of the National Guard of Ukraine manning checkpoints may also have carried SVD rifles modified to accept sound moderators (Chekh, 2020).
- 27 The lug may be removed to reduce snagging of the barrel on foliage or other objects. By altering barrel harmonics, the removal could potentially offer some benefit in terms of accuracy, although test firing would be necessary to confirm this hypothesis. In this case, however, the lug is more likely to have been removed in line with a machinist's aesthetic preferences or due to historical legal requirements for military rifles to be modified prior to transfers to civilian markets (more research is needed in this area).
- 28 The modification process may have involved:
1. removing the front sight block by pressing or hammering the front sight block retaining pins and pulling it free from the barrel with a gear puller tool, or by striking its rear with a mallet to free it;

2. shortening the front sight block by removing the flash hider element with a metal saw, forward of the front sight post, then filing to finish;
 3. grinding away the bayonet lug on the underside of the front sight block, if present at the time of modification;
 4. using a tap and die, preferably in conjunction with a thread alignment tool, threading the barrel with a 14 × 1 left-hand metric thread, which is commonly used for a variety of military sound moderators and muzzle devices; and
 5. reattaching the front sight block, aligning it with the existing pin slots, and securing it in place with the original retaining pins. Alternatively, if insufficient material was left forward of the modified front sight block to accept a thread, it would be necessary to set it back and to secure it in place with newly machined pin slots.
- 29 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 11 October 2018. This trace request sought information on the VSS 9 × 39 mm automatic sniper rifle bearing the serial number 'BK-0680'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen, lost or written-off and has never been transferred to any other military units.
- 30 On 18 March 2021, CAR submitted a trace request to the Permanent Mission of the Russian Federation to the United Nations regarding this item. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.
- 31 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 11 October 2018. This trace request sought information on the ASVK 12.7 × 108 mm anti-materiel rifle bearing the serial number 'ЦМ13 363'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen, lost or written-off and has never been transferred to any other military units.
- 32 On 18 March 2021, CAR submitted a trace request to the Permanent Mission of the Russian Federation to the United Nations regarding this item. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.
- 33 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 22 January 2020. This trace request sought information on the RPK machine gun bearing serial number 'Б/Л-0942'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen, lost or written-off and has never been transferred to any other military units.
- 34 On 18 March 2021, CAR submitted a trace request to the Permanent Mission of the Russian Federation to the United Nations regarding this item. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.
- 35 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 31 July 2019. This trace request sought information on the RPK-74 machine gun bearing serial number 'КМ-4669'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen, lost or written-off and has never been transferred to any other military units.
- On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 21 January 2019. This trace request sought information on the RPK-74 machine gun bearing serial number 'OK9931'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen, lost or written-off and has never been transferred to any other military units.
- On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 22 January 2020. This trace request sought information on the RPK-74 machine gun bearing serial number 'СЛ 2083'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen, lost or written-off and has never been transferred to any other military units.
- 36 On 18 March 2021, CAR submitted trace requests to the Permanent Mission of the Russian Federation to the United Nations regarding these items. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.

- 37 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 21 January 2019. This trace request sought information on the PKM machine gun bearing the serial number 'AC383'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen, lost or written-off and has never been transferred to any other military units.

On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 21 January 2019. This trace request sought information on the PKM machine gun bearing serial number 'ЭP504'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen, lost or written-off and has never been transferred to any other military units.

- 38 On 18 March 2021, CAR submitted trace requests to the Permanent Mission of the Russian Federation to the United Nations regarding these items. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.
- 39 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 31 July 2019. This trace request sought information on the PKT machine gun bearing serial number 'И 2147'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen or lost.
- 40 On 18 March 2021, CAR submitted a trace request to the Permanent Mission of the Russian Federation to the United Nations regarding this item. At the time of writing, CAR had not yet received a response. Given the absence of a trace response, CAR cannot pronounce on the legality of the transfer in question.
- 41 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 31 July 2019. This trace request sought information on the KPVT machine gun bearing serial number 'ЖС-223'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen or lost.
- 42 On 18 March 2021, CAR submitted a trace request to the Permanent Mission of the Russian Federation to the United Nations regarding this item. At the time of writing, CAR had not yet received a response. Given the absence of a trace response, CAR cannot pronounce on the legality of the transfer in question.
- 43 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 31 July 2019. This trace request sought information on RPG-7V rocket launcher bearing serial number 'БГ-750'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen or lost.

As of April 2016, the Ministry of Interior of Ukraine had RGN hand grenades without fuses, Makarov pistols, 5.45 × 39 mm AK-74 rifles, 40 mm RPG-7V rocket launchers, 40 mm GP-25 under barrel grenade launchers, 5.45 × 39 mm ammunition cartridges, 7.62 × 25 mm ammunition cartridges, 5.56 × 45 mm ammunition cartridges, and 9 × 19 mm ammunition cartridges in its inventory. The Ministry of Interior of Ukraine does not record information on markings, serial numbers, lot numbers, or years of manufacture and therefore no further information is available.

- 44 On 18 March 2021, CAR submitted a trace request to the Permanent Mission of the Russian Federation to the United Nations regarding this item. At the time of writing, CAR had not yet received a response. Given the absence of a trace response, CAR cannot pronounce on the legality of the transfer in question.
- 45 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 31 July 2019. This trace request sought information on the AGS-17 grenade launcher bearing serial number 'ГK656'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen or lost.

On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 31 July 2019. This trace request sought information on the AGS-17 grenade launcher bearing serial number 'ГK949'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen or lost.

On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 22 January 2020. This trace request sought information on the AGS-17 grenade launcher bearing serial number 'ПГ104'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen, lost or written-off and has never been transferred to any other military units.

- 46 On 18 March 2021, CAR submitted trace requests to the Permanent Mission of the Russian Federation to the United Nations regarding these items. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.
- 47 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 22 January 2020. This trace request sought information on the GP-25 grenade launcher bearing serial number '15 4657'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen, lost or written-off and has never been transferred to any other military units.
- As of April 2016, the Ministry of Interior of Ukraine had RGN hand grenades without fuses, Makarov pistols, 5.45 × 39 mm AK-74 rifles, 40 mm RPG-7V rocket launchers, 40 mm GP-25 under barrel grenade launchers, 5.45 × 39 mm ammunition cartridges, 7.62 × 25 mm ammunition cartridges, 5.56 × 45 mm ammunition cartridges, and 9 × 19 mm ammunition cartridges in its inventory. The Ministry of Interior of Ukraine does not record information on markings, serial numbers, lot numbers, or years of manufacture and therefore no further information is available.
- On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 22 January 2020. This trace request sought information on the GP-25 grenade launcher bearing serial number '52 6734'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen, lost or written-off and has never been transferred to any other military units.
- As of April 2016, the Ministry of Interior of Ukraine had RGN hand grenades without fuses, Makarov pistols, 5.45 × 39 mm AK-74 rifles, 40 mm RPG-7V rocket launchers, 40 mm GP-25 under barrel grenade launchers, 5.45 × 39 mm ammunition cartridges, 7.62 × 25 mm ammunition cartridges, 5.56 × 45 mm ammunition cartridges, and 9 × 19 mm ammunition cartridges in its inventory. The Ministry of Interior of Ukraine does not record information on markings, serial numbers, lot numbers, or years of manufacture and therefore no further information is available.
- 48 On 18 March 2021, CAR submitted trace requests to the Permanent Mission of the Russian Federation to the United Nations regarding these items. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.
- 49 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 21 January 2019. This trace request sought information on the GP-34 grenade launcher bearing serial number '71101'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine.
- 50 On 18 March 2021, CAR submitted a trace request to the Permanent Mission of the Russian Federation to the United Nations regarding this item. At the time of writing, CAR had not yet received a response. Given the absence of a trace response, CAR cannot pronounce on the legality of the transfer in question.
- 51 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 31 July 2019. This trace request sought information on the M-37M mortar bearing the serial number 'B658'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen or lost.
- 52 See note 2, above.
- 53 By the time the CAR field investigation team gained access to the hand grenades and mines, their fuzes had already been removed.
- 54 Specifically, CAR's sample contains 64 distinct manufacturers, calibres, and years of manufacture markings.
- 55 The tins contain 1,080 5.45 × 39 mm cartridges with the headstamp 17_94; another 1,080 5.45 × 39 mm cartridges with the headstamp 3_94; and 440 7.62 × 54R mm cartridges with the headstamp 17_96. All three headstamps are unique to the Ukraine sample in CAR's global database and had never been documented by CAR before.
- 56 CAR was not able to document the headstamps of two additional calibres of Barnaul ammunition, as it was still in its sealed packaging.
- 57 On 15 April 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 10 September 2020. This trace request sought information on the 9 × 39 mm ammunition bearing no headstamp marks. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen or lost.

- 58 CAR interviews with three ammunition dealers, locations withheld, June–December 2019.
- 59 CAR interviews with three ammunition dealers, locations withheld, June–December 2019.
- 60 Web archive of <http://lcw.lg.ua/index.php/ru/>, archived at <http://web.archive.org>, various dates in 2014–20.
- 61 Bill-of-lading-level trade data for Russian exports and Ukrainian imports, acquired and provided by Import Genius LLC.
- 62 Муромский Приборостроительный Завод. Bill-of-lading-level trade data, acquired and provided by Import Genius LLC.
- 63 Bill-of-lading-level trade data, acquired and provided by Import Genius LLC.
- 64 The registration number of Tenal LLC on USRLE (n.d.) is 1177746936619.
- 65 Registration certificate number 11-0003620/2018 issued by the Unified State Register of Legal Entities of the Department of State Registration, Ministry of Justice, ‘People’s Republic of Luhansk’, on 24 June 2018, on file with CAR. The former and current ministers of justice of the ‘Luhansk People’s Republic’ are under EU sanction for allegedly having ‘in this capacity [...] actively supported actions and policies which undermine the territorial integrity, sovereignty and independence of Ukraine’ (European Council, 2015).
- 66 CAR was not able to find contact details for Redut or Tenal before this report was published.
- 67 Important notes regarding the data set:
- CAR received some incomplete information, such as just ‘5.45 mm’ in the calibre category. In such cases, CAR drew inferences based on headstamp information. Similarly, only partial manufacturer identification was provided, which led CAR to compare recorded marks with those in its global ammunition data set to determine distinct factory codes.
 - Documentation provided to CAR states that crate 31 (reference #6) contains 596,004 rounds of ‘5.45 mm’ ammunition, yet CAR calculates that 572,400 rounds were listed in that crate, 23,604 fewer than the stated quantity.
 - Ukrainian authorities generally recorded the quantities marked on packaging of the small-calibre ammunition they had recovered and inspected (such as tins of 2,160 cartridges). In these cases, they appear to have used the format ‘factory code–lot number–year of manufacture’. CAR deduced the format by comparing the Ukrainian entries with those of items in its global database. For example, the Ukrainian inspection sheet includes ammunition listed as 188_H17_83, which most probably refers to:

factory code: 188 (LVE Novosibirsk);
lot number: H17; and
year of manufacture: 83 (1983).

This format differs from that observed on Soviet/Warsaw Pact-era ammunition tins documented in Ukraine. One example is ammunition recorded as ‘A24_94_17’, which appears to list the factory code last rather than first:

lot number: A24;
year of manufacture: 94 (1994); and
factory code: 17 (Barnaul Cartridge Plant CJSC).

This assumption is based on analysis of Ukrainian authorities’ records of small quantities of recovered ammunition, which show only marks that would ordinarily be observed on individual cartridge headstamps. CAR has extrapolated plausible headstamps from these records.
- 68 At the time of writing, CAR did not have sufficient information to clarify the production dates of two lot numbers referenced in the documentation.
- 69 This calibre could refer to either 7.62 × 25 mm, 7.62 × 39 mm, or 7.62 × 54R mm. It was not always possible to identify the calibre by comparing markings against matches in CAR’s global ammunition data set.
- 70 On 15 October 2020, the Government of Ukraine responded to a formal trace requests issued by CAR on 11 October 2018 and 21 January 2019. These trace requests sought information on MRO-A rocket launchers. In response, the Government of Ukraine confirmed that MRO-A rocket launchers are not in service with the Armed Forces of Ukraine.
- 71 On 18 March 2021, CAR submitted trace requests to the Permanent Mission of the Russian Federation to the United Nations regarding these items. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.

72 On 15 April 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 10 September 2020. This trace request sought information on the RPG-18 rocket launcher bearing the lot number '254-8-80'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen or lost.

73 On 18 March 2021, CAR submitted trace requests to the Permanent Mission of the Russian Federation to the United Nations regarding this item. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.

74 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 22 January 2020. This trace request sought information on the RPG-22 rocket launcher bearing lot number '[11 in double circle]-6-88'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen, lost or written-off and has never been transferred to any other military units.

On 15 April 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 10 September 2020. This trace request sought information on the RPG-22 rocket launcher bearing the lot number '[11 in double circle]-6-85'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen or lost.

On 15 April 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 10 September 2020. This trace request sought information on the RPG-22 rocket launchers bearing the lot number '[11 in double circle]-12-90'. In response, the Government of Ukraine confirmed that these items are not in service with the Armed Forces of Ukraine, nor have they been recorded as stolen or lost.

75 On 7 January 2020, the Government of Bulgaria responded to a formal trace request issued by CAR on 7 November 2019. This response confirms that: 1) Vazovski Mashinostroitelni Zavodi (VMZ) EAD manufactured the RPG-22 rocket launcher with lot number [11 in double circle]-6-88, subject to CAR's trace request, in 1988; 2) taking into consideration that the item was manufactured more than 10 years ago, according to Article 65 of the Bulgarian Defense-Related Products and Dual-Use Items and Technologies Export Control Act, the manufacturer could not provide details regarding the export of the item.

76 On 14 February 2020, CAR submitted trace requests to the Government of the Republic of Bulgaria. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.

77 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 22 January 2020. This trace request sought information on the RPG-26 rocket launcher bearing lot number '254-15-88'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen, lost or written-off and has never been transferred to any other military units.

78 On 15 April 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 10 September 2020. This trace request sought information on the RPG-26 rocket launcher bearing the lot number '254-6-90'. In response, the Government of Ukraine confirmed that Unit A1352 field artillery storage has RPG-26 rocket launchers with the same lot number in its inventory and none of the launchers have been recorded as stolen or lost.

On 15 April 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 10 September 2020. This trace request sought information on the RPG-26 rocket launcher bearing the lot number '254-3-91'. In response, the Government of Ukraine confirmed that Unit A1352 field artillery storage has RPG-26 rocket launchers with the same lot number in its inventory and none of the launchers have been recorded as stolen or lost.

On 15 April 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 10 September 2020. This trace request sought information on the RPG-26 rocket launcher bearing the lot number '254-9-91'. In response, the Government of Ukraine confirmed that Unit A1352 field artillery storage has RPG-26 rocket launchers with the same lot number in its inventory and none of the launchers have been recorded as stolen or lost.

79 On 18 March 2021, CAR submitted trace requests to the Permanent Mission of the Russian Federation to the United Nations regarding these items. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.

- 80 On 15 October 2020, the Government of Ukraine responded to formal trace requests issued by CAR on 11 October 2018, 21 January 2019, and 22 January 2020. These trace requests sought information on RPO-A rocket launchers, manufactured before 2001. In response, the Government of Ukraine confirmed that it has RPO-A rocket launchers manufactured prior to 2001 in service with the Armed Forces of Ukraine.
- 81 On 15 April 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 10 September 2020. This trace request sought information on the RPO-A rocket launcher bearing the lot number '1247'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen or lost.
- On 15 April 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 10 September 2020. This trace request sought information on the RPO-A rocket launcher bearing the lot number '1248'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen or lost.
- On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 11 October 2018. This trace request sought information on RPO-A rocket launchers, manufactured after 2001. In response, the Government of Ukraine confirmed that these items are not in service with the Armed Forces of Ukraine.
- 82 On 18 March 2021, CAR submitted trace requests to the Permanent Mission of the Russian Federation to the United Nations regarding these items. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.
- 83 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 22 January 2020. This trace request sought information on the RShG-1 rocket launcher bearing serial number '56-1-04'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen, lost or written-off and has never been transferred to any other military units.
- On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 22 January 2020. This trace request sought information on the RShG-1 rocket launcher bearing serial number '56-1-05'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen, lost or written-off and has never been transferred to any other military units.
- On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 21 January 2019. This trace request sought information on the RShG-1 rocket launcher bearing the serial number '56-1-13'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine.
- 84 On 18 March 2021, CAR submitted trace requests to the Permanent Mission of the Russian Federation to the United Nations regarding these items. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.
- 85 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 31 July 2019. This trace request sought information on the MVCh-62 fuze bearing lot number '[intertwined circles]-16-76'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen or lost.
- On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 31 July 2019. This trace request sought information on the MVCh-62 fuzes bearing lot number '[intertwined circles]-35-77'. In response, the Government of Ukraine confirmed that these items are not in service with the Armed Forces of Ukraine, nor have they been recorded as stolen or lost.
- 86 On 18 March 2021, CAR submitted trace requests to the Permanent Mission of the Russian Federation to the United Nations regarding these items. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.
- 87 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 21 January 2019. This trace request sought information on the NVU-P fuze bearing lot number '5-89'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen or lost.

- 88 On 18 March 2021, CAR submitted a trace request to the Permanent Mission of the Russian Federation to the United Nations regarding this item. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.
- 89 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 31 July 2019. This trace request sought information on the ML-8 landmine fuze bearing lot number '583-3-02'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen or lost.
- 90 On 18 March 2021, CAR submitted trace requests to the Permanent Mission of the Russian Federation to the United Nations regarding this item. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.
- 91 On 15 April 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 10 September 2020. This trace request sought information on the RG 42 hand grenade bearing the lot number '11-49'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen or lost.
- 92 On 18 March 2021, CAR submitted trace requests to the Permanent Mission of the Russian Federation to the United Nations regarding this item. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.
- 93 On 15 April 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 10 September 2020. This trace request sought information on the RGN hand grenade bearing the lot number '254-32-88' and UDZ fuze with lot number '334-4-88.' In response, the Government of Ukraine confirmed that:
- a) Unit A1588 have records of the RGN hand grenades with the same lot number. These have not been recorded as stolen or lost.
 - b) As of 2016, the Ministry of Interior of Ukraine had RGN hand grenades in its national arsenal. The RGN hand grenades are not recorded by lot number or year of manufacture and therefore no further information is available.
 - c) Units A1451 and A1588 have records of the UDZ fuzes with lot number '334-4-88.' These have not been recorded as stolen or lost.
- On 15 April 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 10 September 2020. This trace request sought information on the RGN hand grenade bearing the lot number '254-126-88' and UDZ fuze with lot number 'ЫШ-25-88'. In response, the Government of Ukraine confirmed that:
- a) Unit A0989 have records of the RGN hand grenades with the same lot number. These have not been recorded as stolen or lost.
 - b) As of 2016, the Ministry of Interior of Ukraine had RGN hand grenades in its national arsenal. The RGN hand grenades are not recorded by lot number or year of manufacture and therefore no further information is available.
- 94 On 18 March 2021, CAR submitted trace requests to the Permanent Mission of the Russian Federation to the United Nations regarding these items. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.
- 95 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 31 July 2019. This trace request sought information on the ZMG-1 grenade. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen or lost.
- 96 On 18 March 2021, CAR submitted trace requests to the Permanent Mission of the Russian Federation to the United Nations regarding this item. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.
- 97 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 22 January 2020. This trace request sought information on the 3D6 vehicle-launched grenades bearing lot number '254-19-82'. In response, the Government of Ukraine confirmed that these items are not in service with the Armed Forces of Ukraine, nor have they been recorded as stolen or lost.
- 98 On 18 March 2021, CAR submitted trace requests to the Permanent Mission of the Russian Federation to the United Nations regarding these items. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.

- 99 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 11 October 2018. This trace request sought information on the 9M133F-1 Kornet missile bearing the lot number '01-12'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine.
- 100 On 18 March 2021, CAR submitted trace requests to the Permanent Mission of the Russian Federation to the United Nations regarding this item. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.
- 101 On 31 October 2018, the Government of the Republic of Poland responded promptly to a formal trace request issued by CAR on 4 October 2018. This response confirms that: 1) the Polish Ministry of Economy authorised the export of the GROM gripstock with serial number 182, subject to CAR's trace request, to the Government of Georgia as part of an agreement between the two governments brokered in November and December 2007; 2) the Polish Ministry of Economy issued an export licence dated 22 October 2007 for export to the end-user, the Georgian Ministry of Defence; 3) in 2006 and 2007, prior to issuance of the export licence, representatives of the Polish Ministry of Defence, Ministry of Foreign Affairs and Ministry of Economy visited Georgia. These meetings were arranged to provide support to the Georgian army in fulfilling the additional requirements of the Wassenaar Arrangement and in particular, preparing the physical protection for the MANPADS storage and stockpile management; 4) the gripstock was part of a delivery of 100 GROM MANPADS launch tubes and missiles (serial numbers 996, 1012-1016, 1023-1032, 1034, 1036-1069, 1072, 1073, 1075-1081, 1083-1091, 1093-1096, 1098, 1099, 1101-1124, 1134) and 16 gripstocks (serial numbers 169-174, 176-185); 5) the Georgian Ministry of Defence stored the equipment in a military base in Senaki (Western Georgia); 6) the Polish authorities conducted a post-delivery verification assessment and confirmed that all requirements for secure storage and stockpile management were fulfilled at that time; and 7) during the Russo-Georgian war of August 2008 many of the missiles, shipped with the launchers, were used in battle and at least 26 missiles remained in the possession of the Georgian army. However, some were abandoned on the battlefield and taken over by Russian forces.

On 31 October 2018, the Government of the Republic of Poland responded promptly to a formal trace request issued by CAR on 4 October 2018. This response confirms that: 1) the Polish Ministry of Economy authorised the export of the GROM E2 MANPADS launch tube with lot number E2-07-21 and serial number 1134, subject to CAR's trace request, to the Government of Georgia as part of an agreement between the two governments brokered in November and December 2007; 2) the Polish Ministry of Economy issued an export licence dated 22 October 2007 for export to the end-user, the Georgian Ministry of Defence; 3) in 2006 and 2007, prior to issuance of the export licence, representatives of the Polish Ministry of Defence, Ministry of Foreign Affairs and Ministry of Economy visited Georgia. These meetings were arranged to provide support to the Georgian army in fulfilling the additional requirements of the Wassenaar Arrangement and in particular, preparing the physical protection for the MANPADS storage and stockpile management; 4) the MANPADS launch tube was part of a delivery of 100 GROM MANPADS launch tubes and missiles (serial numbers 996, 1012-1016, 1023-1032, 1034, 1036-1069, 1072, 1073, 1075-1081, 1083-1091, 1093-1096, 1098, 1099, 1101-1124, 1134) and 16 gripstocks (serial numbers 169-174, 176-185); 5) the Georgian Ministry of Defence stored the equipment in a military base in Senaki (Western Georgia); 6) the Polish authorities conducted a post-delivery verification assessment and confirmed that all requirements for secure storage and stockpile management were fulfilled at that time; and 7) during the Russo-Georgian war of August 2008 many of the missiles were used in battle and at least 26 remained in the possession of the Georgian army. However, some were abandoned on the battlefield and taken over by Russian forces.

In addition, the Government of the Republic of Poland confirmed that GROM MANPADS are equipped with individual starting codes to prevent their use by unauthorized users.

On 31 October 2018, the Government of the Republic of Poland responded promptly to a formal trace request issued by CAR on 4 October 2018. This response confirms that: 1) the Polish Ministry of Economy authorised the export of the GROM E2 MANPADS launch tube with lot number E2-07-21 and serial number 1016, subject to CAR's trace request, to the Government of Georgia as part of an agreement between the two governments brokered in November and December 2007; 2) the Polish Ministry of Economy issued an export licence dated 22 October 2007 for export to the end-user, the Georgian Ministry of Defence; 3) in 2006 and 2007, prior to issuance of the export licence, representatives of the Polish Ministry of Defence, Ministry of Foreign Affairs and Ministry of Economy visited Georgia. These meetings were arranged to provide support to the Georgian army in fulfilling the additional requirements of the Wassenaar Arrangement and in particular, preparing the physical protection for the MANPADS storage and stockpile management; 4) the MANPADS launch tube was part of a delivery of 100 GROM MANPADS launch tubes and missiles (serial numbers 996, 1012-1016, 1023-1032, 1034, 1036-1069, 1072, 1073, 1075-1081, 1083-1091, 1093-1096, 1098, 1099, 1101-1124, 1134) and 16 gripstocks (serial numbers 169-174, 176-185); 6) the Polish authorities conducted a post-delivery verification assessment and confirmed that all

requirements for secure storage and stockpile management were fulfilled at that time; and 7) during the Russo-Georgian war of August 2008 many of the missiles were used in battle and at least 26 remained in the possession of the Georgian army. However, some were abandoned on the battlefield and taken over by Russian forces.

In addition, the Government of the Republic of Poland confirmed that GROM MANPADS are equipped with individual starting codes to prevent their use by unauthorized users.

102 On 21 December 2018, the Government of Georgia responded promptly to a formal trace request issued by CAR on 1 November 2018. This response confirms that the Ministry of Defence of Georgia, in its capacity as the licensing agency for military materiel, has not granted a permit for the export of the GROM gripstock with serial number 182, the object of CAR's trace request.

On 21 December 2018, the Government of Georgia responded promptly to a formal trace request issued by CAR on 1 November 2018. This response confirms that the Ministry of Defence of Georgia, in its capacity as the licensing agency for military materiel, has not granted a permit for the export of the GROM E2 MANPADS launch tube with lot number E2-07-21 and serial number 1134, the object of CAR's trace request.

On 21 December 2018, the Government of Georgia responded promptly to a formal trace request issued by CAR on 1 November 2018. This response confirms that the Ministry of Defence of Georgia, in its capacity as the licensing agency for military materiel, has not granted a permit for the export of the GROM E2 MANPADS launch tube with lot number E2-07-21 and serial number 1016, the object of CAR's trace request.

- 103 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 11 October 2018. This trace request sought information on the GROM gripstock bearing lot number '01-05-21'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine.

On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 11 October 2018. This trace request sought information on two GROM MANPADS bearing lot number 'E2-07-21'. In response, the Government of Ukraine confirmed that these items are not in service with the Armed Forces of Ukraine.

- 104 On 18 March 2021, CAR submitted trace requests to the Permanent Mission of the Russian Federation to the United Nations regarding these items. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.

- 105 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 21 January 2019. This trace request sought information on the MON-50 mine bearing lot number '15-1-00'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen or lost.

On 15 April 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 10 September 2020. This trace request sought information on the MON-50 mine bearing the lot number '15-[illegible]-00'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen or lost.

On 15 April 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 10 September 2020. This trace request sought information on the MON-50 mine bearing the lot number '15-17-05'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen or lost.

- 106 On 18 March 2021, CAR submitted trace requests to the Permanent Mission of the Russian Federation to the United Nations regarding these items. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.

- 107 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 21 January 2019. This trace request sought information on OZM-72 mines. In response, the Government of Ukraine confirmed that these items are not in service with the Armed Forces of Ukraine, nor have they been recorded as stolen, lost or written-off and have never been transferred to any other military units.

On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 21 January 2019. This trace request sought information on the OZM-72 mine bearing lot number 'K11-46-80'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen or lost.

On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 21 January 2019. This trace request sought information on the OZM-72 mines bearing lot number 'Б-041-88'. In response, the Government of Ukraine confirmed that these items are not in service with the Armed Forces of Ukraine, nor have they been recorded as stolen or lost.

On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 21 January 2019. This trace request sought information on the OZM-72 mine bearing lot number 'Б-046-88'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen or lost.

108 On 18 March 2021, CAR submitted trace requests to the Permanent Mission of the Russian Federation to the United Nations regarding these items with legible markings. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.

109 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 22 January 2020. This trace request sought information on the PMN-2 mines bearing lot number '583-28-85'. In response, the Government of Ukraine confirmed that these items are not in service with the Armed Forces of Ukraine, nor have they been recorded as stolen or lost.

On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 21 January 2019. This trace request sought information on the PMN-2 mines bearing lot number '533-18-88'. In response, the Government of Ukraine confirmed that these items are not in service with the Armed Forces of Ukraine, nor have they been recorded as stolen or lost.

On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 22 January 2020. This trace request sought information on the PMN-2 mines bearing lot number '533-21-88'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen or lost.

110 On 18 March 2021, CAR submitted trace requests to the Permanent Mission of the Russian Federation to the United Nations regarding these items with legible markings. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.

111 On 24 June 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 16 March 2021. This trace request sought information on the POM-2 landmines bearing lot number 80-5-93. In response, the Government of Ukraine confirmed that these items have neither been registered in the inventory of the Armed Forces of Ukraine nor reported stolen or lost.

On 24 June 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 16 March 2021. This trace request sought information on the POM-2 landmine bearing lot number 80-34-90. In response, the Government of Ukraine confirmed that this item has neither been registered in the inventory of the Armed Forces of Ukraine nor reported stolen or lost.

On 24 June 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 16 March 2021. This trace request sought information on the KPOM-2 cluster units bearing lot number 80-36-90. In response, the Government of Ukraine confirmed that these items have neither been registered in the inventory of the Armed Forces of Ukraine nor reported stolen or lost.

112 On 18 March 2021, CAR submitted trace requests to the Permanent Mission of the Russian Federation to the United Nations regarding these items. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.

113 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 31 July 2019. This trace request sought information on the TM-62M mines bearing lot number 'B-2516-136-74'. In response, the Government of Ukraine confirmed that these items are not in service with the Armed Forces of Ukraine, nor have they been recorded as stolen or lost.

On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 31 July 2019. This trace request sought information on the TM-62M mine bearing lot number '55-82-76'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen or lost.

On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 31 July 2019. This trace request sought information on the TM-62M mine bearing lot number '55-492-79'. In response,

the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen or lost.

- 114 On 18 March 2021, CAR submitted trace requests to the Permanent Mission of the Russian Federation to the United Nations regarding these items. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.
- 115 On 15 April 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 10 September 2020. This trace request sought information on the 23 × 152B mm ammunition bearing the headstamp marks '184_83_M. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen or lost.
- On 15 April 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 10 September 2020. This trace request sought information on the 23 × 152B mm ammunition bearing the headstamp marks '[arrow]_84'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen or lost.
- 116 On 18 March 2021, CAR submitted trace requests to the Permanent Mission of the Russian Federation to the United Nations regarding these items. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.
- 117 On 24 June 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 16 March 2021. This trace request sought information on 3OF39 guided projectiles. In response, the Government of Ukraine confirmed that these items have neither been registered with the Armed Forces of Ukraine, nor reported stolen or lost.
- 118 CAR interview with General Prosecutor's Office representatives, Mariupol, 9 May 2019. Notes on file.
- 119 On 18 March 2021, CAR submitted trace requests to the Permanent Mission of the Russian Federation to the United Nations regarding these items. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.
- 120 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 11 October 2018. This trace request sought information on OG-7 40 mm projectiles bearing the lot number 56-2-05. In response, the Government of Ukraine confirmed that these items are not in service with the Armed Forces of Ukraine.
- 121 On 18 March 2021, CAR submitted trace requests to the Permanent Mission of the Russian Federation to the United Nations regarding these items. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.
- 122 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 11 October 2018. This trace request sought information on PG-7PM primary propelling charges bearing the lot number 85-80-254. In response, the Government of Ukraine confirmed that these items are not in service with the Armed Forces of Ukraine.
- 123 On 18 March 2021, CAR submitted trace requests to the Permanent Mission of the Russian Federation to the United Nations regarding these items. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.
- 124 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 22 January 2020. This trace request sought information on the PG-9S rockets bearing lot number '56-32-75'. In response, the Government of Ukraine confirmed that these items are not in service with the Armed Forces of Ukraine, nor have they been recorded as stolen or lost.
- On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 22 January 2020. This trace request sought information on the PG-9S rocket bearing lot number '56-73-80'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen or lost.
- 125 On 18 March 2021, CAR submitted trace requests to the Permanent Mission of the Russian Federation to the United Nations regarding these items. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.
- 126 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 22 January 2020. This trace request sought information on the PG-15P propelling charge bearing lot number '56-

74-Б'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen or lost.

On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 22 January 2020. This trace request sought information on the PG-15P propelling charges bearing lot number '9-84-676'. In response, the Government of Ukraine confirmed that these items are not in service with the Armed Forces of Ukraine, nor have they been recorded as stolen or lost.

On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 22 January 2020. This trace request sought information on the PG-15P propelling charges bearing lot number '16-8-Б'. In response, the Government of Ukraine confirmed that these items are not in service with the Armed Forces of Ukraine, nor have they been recorded as stolen or lost.

- 127 On 18 March 2021, CAR submitted trace requests to the Permanent Mission of the Russian Federation to the United Nations regarding these items. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.
- 128 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 22 January 2020. This trace request sought information on the PSO-1 optical sight bearing serial number 'A3309'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen or lost.
- On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 22 January 2020. This trace request sought information on the POSP 6 × 24 optical sight bearing serial number '1205470'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen or lost.
- On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 22 January 2020. This trace request sought information on the POSP 8 × 42V optical sight bearing serial number '1105111'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen or lost.
- On 24 June 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 16 March 2021. This trace request sought information on the PSO-1 optical sight bearing serial number '74427'. In response, the Government of Ukraine confirmed that this item is not registered in the inventory of the Armed Forces of Ukraine, or reported stolen or lost, or transferred to other military units or organisations.
- On 24 June 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 16 March 2021. This trace request sought information on the PSO-1 optical sight bearing serial number '75052'. In response, the Government of Ukraine confirmed that this item is not registered in the inventory of the Armed Forces of Ukraine, or reported stolen or lost, or transferred to other military units or organisations.
- 129 On 7 November 2019 and 18 March 2021, CAR submitted trace requests to the Permanent Mission of the Republic of Belarus and the Permanent Mission of the Russian Federation to the United Nations regarding these items. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.
- 130 CAR interview with General Prosecutor's Office representatives, 20 December 2018, Mariupol. Notes on file.
- 131 On 1 May 2019, Becton, Dickinson and Company responded promptly to a formal trace request issued by CAR on 24 January 2019. This response confirms that: 1) BD International manufactured the five BD Discardit™ II 5ml 22G x 1 1/2" syringes with lot number 1606239, subject to CAR's trace request, in June 2016 in Fraga, Spain; 2) Becton, Dickinson and Company sold and delivered syringes with this lot number in three shipments;
- a) the freight company Soncotra delivered 360,000 units under order number B03607667 from the BD Fraga manufacturing plant (Spain), to Protek (Bolshaya Tarasovska, Moscow, Russia, 115201) via truck. This order was shipped on 15 November 2016 and arrived on 21 November 2016.
 - b) 396,000 units were delivered under order number B03810944 from the BD Fraga manufacturing plant (Spain), to SF Medical Products GmbH (Forckenbeckstrasse 9-13, Berlin, Germany, 14199) via truck. This order was shipped on 13 February 2017 with an estimated arrival of 18 February 2017 through an ex works contract.
 - c) the freight company Soncotra delivered 32,400 units under order number B04732585 from the BD Fraga manufacturing plant (Spain), to Protek (Bolshaya Tarasovska, Moscow, Russia, 115201) via truck. This order was shipped on 22 January 2018 and arrived on 29 January 2018.

Becton, Dickinson and Company included copies of the relevant distribution information in its response to CAR.

On 1 May 2019, Becton, Dickinson and Company responded promptly to a formal trace request issued by CAR on 24 January 2019. This response confirms that: 1) BD International manufactured the ten BD Discardit™ II 5ml 22G x 1 1/2" syringes with lot number 1607151, subject to CAR's trace request, in July 2016 in Fraga, Spain; 2) Becton, Dickinson and Company sold and delivered syringes with this lot number in six shipments;

- a) 480,000 units were delivered under order number B03562950 from the BD Fraga manufacturing plant (Spain), to FESCO North West Europe B.V. (3089 JH, Rotterdam, the Netherlands) via container, under an invoice for Vogt Medical (Rüppurrer Strasse, 1a Haus B, Karlsruhe, Germany, 76137). This order was shipped on 1 September 2016 through an ex works contract.
- b) the freight company Soncotra delivered 90,000 units under order number B03592511 from the BD Fraga manufacturing plant (Spain), to Protek (Bolshaya Tarasovska, Moscow, Russia, 115201) via truck. This order was shipped on 18 October 2016 and arrived on 25 October 2016.
- c) 300,000 units were delivered under order number B03811111 from the BD Fraga manufacturing plant (Spain), to SF Medical Products GmbH (Forckenbeckstrasse 9-13, Berlin, Germany, 14199) via truck. This order was shipped on 13 February 2017 with an estimated arrival of 21 February 2017 through an ex works contract.
- d) 360,000 units were delivered under order number B04045657 from the BD Fraga manufacturing plant (Spain), to SF Medical Products GmbH (Forckenbeckstrasse 9-13, Berlin, Germany, 14199) via truck. This order was shipped on 28 March 2017 with an estimated arrival of 31 March 2017 through an ex works contract.
- e) 69,000 units were delivered under order number B04604971 from the BD Fraga manufacturing plant (Spain), to SF Medical Products GmbH (Forckenbeckstrasse 9-13, Berlin, Germany, 14199) via truck. This order was shipped on 18 July 2017 with an estimated arrival of 25 July 2017 through an ex works contract.
- f) 21,000 units were delivered under order number B04681828 from the BD Fraga manufacturing plant (Spain), to Jsc Spc Katren (4 Timakova Street, Novosibirsk Russia, 630117) via truck. This order was shipped on 21 December 2017 with an estimated arrival of 28 December 2017 through an ex works contract.

Becton, Dickinson and Company included copies of the relevant distribution information in its response to CAR.

On 1 May 2019, Becton, Dickinson and Company responded promptly to a formal trace request issued by CAR on 24 January 2019. This response confirms that: 1) BD International manufactured the three BD Discardit™ II 5ml 22G x 1 1/2" syringes with lot number 1606181, subject to CAR's trace request, in June 2016 in Fraga, Spain; 2) Becton, Dickinson and Company sold and delivered syringes with this lot number in six shipments;

- a) 432,000 units were delivered under order number B03562033 from the BD Fraga manufacturing plant (Spain) to FESCO North West Europe B.V. (3089 JH, Rotterdam, the Netherlands) via container, under an invoice for Vogt Medical (Rüppurrer Strasse, 1a Haus B, Karlsruhe, Germany, 76137). This order was shipped on 2 September 2016 through an ex works contract.
- b) 36,000 units were delivered under order number B03532271 from the BD Fraga manufacturing plant (Spain) to FESCO North West Europe B.V. (3089 JH, Rotterdam, the Netherlands) via container, under an invoice for Vogt Medical (Rüppurrer Strasse, 1a Haus B, Karlsruhe, Germany, 76137). This order was shipped on 9 September 2016 through an ex works contract.
- c) the freight company Soncotra delivered 288,000 units under order number B03566823 from the BD Fraga manufacturing plant (Spain), to TSW Ltd. (142000, Domodedovo, Russia) via truck, under an invoice for Pharmcomplect (Prospekt Gagarina, 37d, Room P23, Nizhny Novgorod, Russia, 60300). This order was shipped on 13 September 2016 and arrived on 18 September 2016.
- d) 10,800 units delivered under order number B03627595 from the BD Fraga manufacturing plant (Spain), to Gerda Group (Nastavnicheskij Per. 6, Gate, Moscow, Russia, 105120) via truck. This order was shipped on 21 December 2016 with an estimated arrival of 24 December 2016 through an ex works contract.
- e) the freight company Soncotra delivered 12,600 units under order number B04732585 from the BD Fraga manufacturing plant (Spain), to Protek (Bolshaya Tarasovska, Moscow, Russia, 115201) via truck. This order was shipped on 22 January 2018 and arrived on 29 January 2018.
- f) the freight company Soncotra delivered 12,600 units under order number B05166265 from the BD Fraga manufacturing plant (Spain), to Protek (Bolshaya Tarasovska, Moscow, Russia, 115201) via truck. This order was shipped on 29 August 2018 and arrived on 3 September 2018.

- Becton, Dickinson and Company included copies of the relevant distribution information in its response to CAR.
- 132 On 26 March 2021, CAR submitted a trace request to Predpriyatiye “Vladeks”, Ooo (Предприятие “Владекс”, Ooo) regarding this item. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.
- 133 On 25 May 2021, Sandoz Limited responded to a formal trace request issued by CAR on 28 January 2019. This response confirms that: 1) in July 2013, Sandoz International GmbH manufactured the Ketonal® analgesic bearing batch number EA3422 the subject of CAR’s trace request, in Germany; 2) Sandoz International GmbH delivered the batch number EA3422 to Sandoz, Moscow, Russia; 3) Sandoz Russia delivered units of batch number EA3422 to 14 of its licensed distributors in Russia between 28 February 2014 and 13 March 2014 (Sandoz Limited provided the details of these transactions with CAR); and 4) Sandoz Limited have no further information regarding the re-transfer of these items.
- 134 On 26 March 2021, CAR submitted a trace request to Terapia S.A. regarding these items. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.
- 135 On 26 March 2021, CAR submitted trace requests to OOO “Kanskaya Gigrovata” (ООО “КАНСКАЯ ГИГРОВАТА”) regarding these items. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.
- 136 On 26 March 2021, CAR submitted a trace request to Южфарм ООО (Yuzhpharm OOO) regarding this item. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.
- 137 Table 8 lists purchasers as opposed to the recipients (ship-to addresses), which sometimes differed.
- 138 Becton, Dickinson and Company made an additional shipment of 69,000 units to SF Medical on 18 July 2017. Table 8 excludes this shipment because the estimated arrival was 25 July 2017, five days after the clashes in Krasnohorivka.
- 139 On 2 June 2021, CAR submitted trace requests to Protek and Pharmakomplect, on 11 June 2021, CAR submitted trace requests to Lantset AO, ProfitMed ZAO, Severo-Zapad MFK NAO, ZAO “Firma EVROSERVIS”, ZAO “ROSTA” and on 15 June 2021, CAR submitted trace requests to Farm-Trade OOO, Magistra OOO, OOO ‘BSS’, OOO “Pharmperspectiva” and ZAO “SIA INTERNEJSHNL LTD regarding these items. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question. CAR did not issue trace requests to the companies which no longer exist.
- 140 Employee and financial data from local registry filings gathered by Credinform, accessed via Orbis BvD.
- 141 On 3 June 2019, SF Medical Products GmbH responded to a formal trace request issued by CAR on 3 June 2019. This response confirms that: 1) SF Medical Products GmbH received the BD Discardit™ II 5ml 22G x 1 1/2” syringe bearing the lot number ‘1607 151’, the subject of CAR’s trace request; 2) SF Medical Products GmbH is an official distributor for Beckton Dickinson products in the Russian Federation and only supplies products to verified partners and customers; 3) SF Medical Products GmbH supplied products to the Russian Federation in 2017; and 4) SF Medical Products GmbH is unable to confirm if the item was retransferred or stolen by third parties.
- On 3 June 2019, SF Medical Products GmbH responded to a formal trace request issued by CAR on 3 June 2019. This response confirms that: 1) SF Medical Products GmbH received the BD Discardit™ II 5ml 22G x 1 1/2” syringe bearing the lot number ‘1606 239’, the subject of CAR’s trace request; 2) SF Medical Products GmbH is an official distributor for Beckton Dickinson products in the territory of the Russian Federation and only supplies products to verified partners and customers; 3) SF Medical Products GmbH supplied products to the Russian Federation in 2017; and 4) SF Medical Products GmbH is unable to guarantee that the item was not re-transferred to third parties.
- 142 On 18 March 2021, CAR submitted a trace request to LLC Splav regarding this item. At the time of writing, CAR had not yet received a response. Given the absence of a trace response, CAR cannot pronounce on the legality of the transfer in question.
- 143 CAR did not trace this item with its manufacturer because it did not feature traceable markings.
- 144 On 18 March 2021, CAR submitted trace requests to OMNITEK-H, LTD. regarding these items. On 17 August 2021, CAR issued an advance notification to OMNITEK-H, LTD. regarding these items. On 17 August 2021, Omnitek-N informed CAR that their company is a supplier of the Ministry of Interior of Russia and it has never sold or delivered items to Ukraine.

- 145 On 18 March 2021, CAR submitted a trace request to LLC Splav regarding this item. At the time of writing, CAR had not yet received a response. Given the absence of a trace response, CAR cannot pronounce on the legality of the transfer in question.
- 146 On 18 March 2021, CAR submitted a trace request to JSC “Research Institute of Steel” regarding this item. At the time of writing, CAR had not yet received a response. Given the absence of a trace response, CAR cannot pronounce on the legality of the transfer in question.
- 147 On 18 March 2021, CAR submitted a trace request to Armocom and KLIASS regarding these items. At the time of writing, CAR had not yet received any responses. Given the absence of a trace response, CAR cannot pronounce on the legality of the transfer/s in question.
- 148 On 18 March 2021, CAR submitted trace requests to the Permanent Mission of the Russian Federation to the United Nations regarding these items. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.
- 149 On 23 November 2018, u-blox Berlin GmbH responded promptly to a formal trace request issued by CAR on 5 October 2018. This response confirms that: 1) u-blox manufactured the LEA-6N u-blox 6 GNSS module Flash, TCXO GPS module, subject to CAR’s trace request; and 2) on 31 May 2012, u-blox sold this item (as part of a larger consignment of 250 LEA modules) to Microdis Electronics GmbH (Rheinauer Straße 1 Hockenheim, 68766, Germany).
- On 7 January 2019, Microdis Electronics GmbH responded promptly to a formal trace request issued by CAR on 18 December 2018. This response confirms that: 1) Microdis Electronics GmbH received the LEA-6N u-blox 6 GNSS module Flash, TCXO GPS module, subject to CAR’s trace request, from u-blox; 2) Microdis Electronics GmbH exported 7000 units of lot LEA-6N-0-000 to the Russian Joint Stock Company, MicroEM (4 Savelkinsky Proyezd – Street, 124482, Zelenograd/Moscow); 3) the forwarder, Spedition Dachser delivered the order in two consignments:
- a) 5000 pieces delivered under invoice number UEM441 dated 1 June 2012, shipping document number RN12DE590457901612E8. The goods arrived in Moscow around 4 June 2012;
 - b) 2000 pieces delivered under invoice number UEM443 dated 8 June 2012, shipping document number MRN12DE590458265166E5. The goods arrived in Moscow around 11 June 2012;
- 4) Microdis Electronics GmbH informed CAR that MicroEM’s original customer, Scout, cancelled the order as the modules did not fulfil their promised features; 5) MicroEM used the main quantity of the materiel for the Iskra company and sold the remaining items to unnamed third parties, with a discount and 6); Microdis Electronics GmbH included copies of the shipping documents in its response to CAR.
- On 21 January 2019, Microdis Electronics GmbH responded promptly to a subsequent communication issued by CAR on 14 January 2019. This response confirmed that: 1) between 2012 and 2014, MicroEM have no sales records; 2) between 2015 and 2017, Microdis Electronics GmbH shipped an additional 1311 LEA-6N modules to MicroEM in six deliveries;
- a) 310 UBL LEA-6N units delivered on 13 April 2017;
 - b) 300 UBL LEA-6N units delivered on 10 February 2017;
 - c) 100 UBL LEA-6N units delivered on 9 September 2016;
 - d) 250 UBL LEA-6N units delivered on 27 November 2015;
 - e) 286 UBL LEA-6N units delivered on 28 August 2015;
 - f) 65 EMD (from Microdis stock) LEA-6N units delivered on 28 August 2015;
- 3) MicroEM resold the 1311 parts delivered by Microdis to the following trader companies between 2015 and 2017:
- i) 504 pieces delivered to Iskra
 - ii) 257 pieces delivered to ООО “ЭЛКОМ-Маркет
 - iii) 250 pieces delivered to ООО “ПАРУС А” 6686055386
 - iv) 300 pieces delivered to ООО “ОРИОН” 6670353436.
- 150 On 7 April 2021, CAR submitted a trace request to AO SKB BT ISKRA regarding this item. At the time of writing, CAR had not yet received a response.
- 151 Analysis of bill-of-lading-level trade data, obtained and provided by Import Genius LLC.

- 152 On 10 October 2018, Antcom Corporation responded promptly to a formal trace request issued by CAR on 10 October 2018. This response confirmed that: 1) Antcom Corporation manufactured the Active L1/L2 GPS Antenna with serial number 353415, subject to CAR's trace request, on 5 March 2013; and 2) sold the part to NovAtel.
- On 10 October 2018, NovAtel Inc. responded promptly to a formal trace request issued by CAR on 10 October 2018. This response confirmed that: 1) NovAtel received the commercial off the shelf Active L1/L2 GPS Antenna with serial number 353415, subject to CAR's trace request, from Antcom Corporation; 2) NovAtel sold the antenna to Israel Aerospace Industries Ltd (IAI) (Malat Division – Military Aircraft Group Dpt 2713, Ben Gurion Int'l Airport, Tel Aviv, Israel 70100) under an order dated 3 July 2012; 3) DHL Global Forwarding (Canada) Air (620 Edwards Blvd, Mississauga, Ontario) organised shipment of the order by British Airways to IAI on 24 May 2013, under waybill 125-56202145; 4) IAI confirmed receipt of the product; and 5) the item in question was part of a larger consignment of 10 antennas (serial numbers 353415 – 353419 and 366411 – 366421). NovAtel informed CAR that this US-origin item, controlled under the US Department of Commerce Export Administrative Regulations (ECCN 7A994) is authorized for re-export under no license required (NLR) to any non-sanctioned destination worldwide, and was sold to a trusted customer and end-user, therefore no end-user certificate was obtained for the items delivered.
- 153 On 11 October 2018, CAR submitted a trace request to IAI. At the time of writing, CAR had not yet received a response.
- 154 On 18 March 2021, CAR submitted trace requests to the Permanent Mission of the Russian Federation to the United Nations regarding this item. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.
- 155 On 10 October 2018, CAR submitted trace requests to Controp Precision Technologies Ltd, Nir-O, Tadiran Spectralink, and Thales Group. At the time of writing, CAR had not yet received any responses. Given the absence of trace responses, CAR cannot pronounce on the legality of the transfers in question.
- On 31 January 2020, RYCO Filters responded promptly to a formal trace request issued by CAR on 30 January 2020. This response confirms that: 1) RYCO Filters manufactured the oil filter model Z386 with date code 120824, the object of CAR's trace request, on 24 August 2012; 2) in Australia and New Zealand this type of oil filter is used with various automotive vehicles; 3) annual sales of oil filter model Z386 from 2012 to 2018 ranged from 220,000 units to 250,000 units of this product through major automotive distributors in Australia and New Zealand and other online distributors; 4) RYCO Filters has no knowledge of exports outside of Australia and New Zealand prior to 2018; and 5) the product does not include a unique identifying code.
- On 23 March 2021, Intel Corporation responded to a formal trace request issued by CAR on 16 November 2018. This response confirms that: 1) the ACEX component is an older model that has been in production for approximately 20 years; 2) Intel Corporation and Altera have probably sold several million ACEX components to distributors during the production cycle of this model; 3) Intel Corporation is unable to trace the chain of supply of the ACEX component bearing the serial number '9CH11070022', the subject of CAR's trace request; 4) Intel Corporation did not produce or assemble the circuit board that the ACEX component was attached to at the time of documentation; and 5) the owl pictured on the circuit board is not an Intel Corporation logo.
- 156 Similar UAV models were used in Libya and Syria. In 2015, Turkey shot down a UAV closely resembling the one documented by CAR in Ukraine as it was violating its airspace by flying in from Syria (Peker, 2015). In 2019, the United Nations Panel of Experts on Libya published a report that features social media pictures of a UAV in Libya. It resembles the one documented by CAR in Ukraine. Through photo analysis, the Panel found that the UAV reportedly photographed in Libya had 'characteristics virtually identical to those of the Orlan-10 UAV variants' (UNSC, 2019, p. 315). In contrast, CAR documented both models and found that they were fundamentally different.
- 157 On 18 March 2021, CAR submitted trace requests to the Permanent Mission of the Russian Federation to the United Nations regarding this item. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.
- 158 On 12 July 2019, Tillotson responded promptly to a formal trace request issued by CAR on 14 June 2019. This response confirms that; 1) the fuel-pump cover, HE Series carburettor, subject to CAR's trace request, is not a genuine Tillotson part; 2) a review of the sales records from the past seven years indicates that Tillotson has not sold this type of cover at any point during that period, either individually or as part of a carburettor; 3) Tillotson's current single screw HE cover has been in use since 2012 and has many different features to the item subject to CAR's trace request, including a different font, letter placement and indentation structure; 4) Tillotson's master sample cover, in use from approximately 2001 to 2011 has further differences to the item

documented by CAR, such as a different orientation on the back cover of the B2117 pin and a lack of a casing feature (present on the item CAR documented); 5) both the current and the former genuine covers have two location pins on the underside of the cover, which are essential for the proper fitting of the cover to the carburettor; 6) Tillotson was only able to locate one sample of the 2001 cover and cannot therefore determine whether the differences noted above are the result of a tool modification or maintenance; and 7) Tillotson could not have produced the item without the location pins. In their response, Tillotson provided CAR with photographic comparisons to support their observations.

- 159 On 24 June 2021, Xilinx responded to a formal trace request issued by CAR on 27 May 2021. This response claims that: 1) the Xilinx-labelled Spartan XC3S250E field-programmable gate array integrated circuit, the subject of CAR's trace request, is counterfeit; and 2) Xilinx is unaware of the origin of the counterfeit item.
- 160 On 9 April 2021, Pulse Electronics GmbH responded to a formal trace request issued by CAR on 17 June 2019. This response confirms that: 1) the Pulse-labelled H2019NL signal transformer, the subject of CAR's trace request, is counterfeit; 2) the item bears the mark '1323-C', which, if genuine, would indicate that Pulse Electronics GmbH manufactured the item in week 23 of 2013, in China; and 3) in 2009, Pulse Electronics ceased manufacture of the H2019NL signal transformer product at its plant in China, which uses the '-C' manufacturing code, transferring production of this product to a different location, identified by the manufacturing code 'M'.
- 161 On 25 June 2019, 3W-Modellmotoren Weinhold GmbH responded promptly to a formal trace request issued by CAR on 14 June 2019. This response confirms that 3W-Modellmotoren Weinhold GmbH sent the 3W-55i tractor rugged single-cylinder engine with IIS ignition, subject to CAR's trace request, to World Logistics Group (Dr. Behera 24, 36001 Karlovy Vary, Czech Republic) on 11 October 2013.
- 162 CAR found that both the servomotors of the Orlan-10 and the battery of the unidentified UAV were sourced through a hobbyist company based in Hong Kong.
- 163 On 19 July 2019, Silicon Sensing Systems Ltd responded promptly to a formal trace request issued by CAR on 14 June 2019. This response confirms that: 1) Silicon Sensing Systems Ltd manufactured the DMU02 Dynamic measurement unit, with serial number 3312ULT 465, subject to CAR's trace request; 2) Silicon Sensing Systems Ltd sold the item to its Russian distributor, Radiant-Elcom CJSC, now known as Radiant Group LLC (65, bld. 1, Profsoyuznaya st. Moscow, 117246, Russia); 3) email records from Radiant-Elcom CJSC stated the end use was for a stabilisation system to be used in a UAV; 4) on 21 August 2012, UPS transferred the item to Radiant-Elcom CJSC as part of a consignment of 52 units; 5) Radiant-Elcom confirmed that it re-sold this item to ANO "PO KSI" (Moscow) and that ANO "PO KSI" purchases this type of item for various educational institutions in Russia; and 6) Silicon Sensing Systems Ltd clarified that the delivery was completed prior to the EU's imposition of an arms embargo on Russia on 1 August 2014, and that the DMU02 Dynamic measurement unit is a commercial part that does not exceed the performance parameters defined by the UK Strategic Export Control List.

On 24 May 2021, Silicon Sensing Systems Ltd responded to a request for information issued by CAR on 13 May 2021. This response confirms that: 1) the "DMU02" was Silicon Sensing Systems Ltd's first generation commercial dynamic measurement unit, which was first released in 2009; 2) the "DMU10" was Silicon Sensing Systems Ltd's second generation commercial dynamic measurement unit, which was first introduced as a prototype between July and September 2014; 3) the DMU02 and DMU10 models contain different commercial gyro and accelerometer components; 4) neither the DMU02 nor DMU10 models are on the UK Strategic Export Control List; and 5) both the DMU02 and DMU10 models have been discontinued and replaced by alternative products.

On 24 May 2021, Silicon Sensing Systems Ltd responded to a request for information issued by CAR on 13 May 2021. This response confirms that: 1) Silicon Sensing Systems Ltd retains no records of the end users of the various products that it sold to Radiant Group/Radiant-Elcom between 2014 and 2017, and in 2019; 2) Silicon Sensing Systems Ltd maintains records of the product type, quantity delivered, and the declared end users of the material it shipped to Radiant Group/Radiant-Elcom in 2020 and 2021; 3) Silicon Sensing Systems Ltd shipped the following products to Radiant Group/Radiant-Elcom for the following declared end users:

- a) Ten (10) CAS213 units and ten (10) CAS214 units to Scientific Research Institute of Technical Systems 'PILOT' in May 2020;
- b) 24 CRM100 units and 32 CRM200 units to Gyronav LLC in July 2020;
- c) Six (6) CRS39-03 units to an unknown end user in February 2021;
- d) Ten (10) CRM100 units and 20 CRM200 units to Nauchno Issledovatel'skiy Institut Sovremennykh Telecommunicationny Technologiy – Joint Stock Company in September 2020;
- e) Two (2) CRS09A-12 units to Gyronav LLC in September 2020;

- f) Ten (10) CMS300 units and ten (10) CMS390 units to KT-UAV Systems (JSC) in November 2020;
- g) Six (6) CRS39-03 units to Geo-Pribor LLC in February 2021;
- h) Ten (10) CAS213 units, 600 CRM100 units, 1200 CRM200 units, two (2) CRS03-2T units, two (2) CRS09A-2 units, and two (2) CRS09A-12 units to LMD Ltd in November 2020;
- i) 150 CMS300 units and 300 CMS390 units to Peleng JSC – Belarus in November 2020;
- j) One (1) CMS300 unit and one (1) CMS390 units to Radiant in June 2021;
- k) Two (2) CRS43-01 units to Satis-TL-94 JSC in December 2020;
- l) 11 CRS39-03M units and ten (10) CRS39-03V units to Progress Izhevsk LLC in April 2021;
- m) Ten (10) CRS39-03L units to Geo-Pribor LLC in March 2021;
- n) Ten (10) CRS03-2T units to LMD Ltd in March 2021;
- o) One (1) 4600-0100EVB unit to VTM JSC in April 2021;
- p) Ten (10) CRS39A-01L units to Geo-Pribor LLC in June 2021;
- q) Ten (10) CRS09A units to RMZ LLC, in May 2021;

and 4) Radiant Group/Radiant-Elcom has ordered ten (10) CRM100 units and 20 CRM200 units for Nauchno Issledovatel'skiy Institute Sovremennykh Telecommunicationnykh Technology – Joint Stock Company. Silicon Sensing Systems Ltd included a copy of the DMU02 and DMU10 commercial dynamic measurement unit product brochures in its response to CAR.

- 164 Bill-of-lading-level trade data for Russian imports, obtained and provided by Import Genius LLC.
- 165 On 8 August 2019, DIGI responded to a formal trace request issued by CAR on 19 June 2019. This response confirms that: 1) DIGI manufactured the 9XTend 900 MHz RF Module with serial number T10AJ - OK – 2067 BC115ADO, subject to CAR's trace request; 2) DIGI sold and directly shipped the item to a US based distributor in March 2012; and 3) the distributor is unable to identify the recipient of the item subject to CAR's trace request, due to a large number of recipients for this item.
- 166 On 18 June 2019, NGK Spark Plugs (UK) Ltd. Responded promptly to a formal trace request issued by CAR on 17 June 2019. Due to insufficient information provided by CAR, NGK are unable to determine the origins and supply route of the spark plug, subject to CAR's trace request. NGK additionally informed CAR that NGK spark plugs should not be used in aircraft and the company includes a pictogram on product packaging to explain this. NGK included a copy of the packaging label in its response to CAR.
- On 19 June 2019, Traco Electronic International responded promptly to a formal trace request issued by CAR on 17 June 2019. Due to insufficient information provided by CAR, Traco Electronic International are unable to establish the origins and supply route of the THN 20-2411WI DC/DC Converter, subject to CAR's trace request.
- 167 On 21 December 2020, Maxim Integrated responded to a formal trace request issued by CAR on 14 June 2019. This response confirms that: 1) Maxim manufactured the MAX2769E Universal GPS Receiver, the subject of CAR's trace request, in 2013; 2) Maxim shipped the item to its distributors in January 2014; 3) the MAX2769E Universal GPS Receiver model is not designed for use in unmanned aerial vehicles and is not on the EU Control List of Dual-Use Items; and 4) Maxim did not sell the item to separatist elements in Donetsk, Ukraine, or have any knowledge of such a sale.
- 168 On 18 July 2019, STMicroelectronics responded to a formal trace request issued by CAR on 20 June 2019. This response confirms that: 1) the ST EEPROM M95512-RDW6TP component, subject to CAR's trace request, is a genuine STM product as marking on the product is in line with original product marking; 2) the EEPROM component is an integrated circuit, largely used in common applications that store data in electrical devices (such as keyless remote car door opening); 3) STM shipped components like the item CAR documented to five distributors between the end of July and beginning of August 2014; 4) STMicroelectronics confirmed that it cannot determine the precise chain of custody of the item CAR documented as the company does not retain that information.
- 169 On 18 June 2019, NVS Technologies AG responded promptly to a formal trace request issued by CAR on 14 June 2019. This response confirms that: 1) NVS Technologies AG manufactured the NV08C-CSM GNSS receiver with code 1339, subject to CAR's trace request, between 2013 and 2015; 2) the company has manufactured this type of product for the last 10 years and has sold thousands of units globally; 3) the NV08C-CSM receiver is intended purely for civil application and therefore no export license or control is required for this item; 4) the receiver does not include military specifications but as with other types of electronic or mechanic devices, can be used for purposes other than the specified application; 5) the NV08C-CSM receiver can be purchased either directly from NVS Technologies AG or from one of its distributors; and 6) it is impossible to track the supply of the particular item that CAR documented.

- 170 On 21 December 2020, WIZnet Technology responded to a formal trace request issued by CAR on 14 June 2019. This response confirms: 1) WIZnet Technology manufactured the iEthernet W5300 ethernet controller, with date code 1406, the subject of CAR's trace request, in June 2014; 2) WIZnet Technology sold the ethernet controller between 2014 and 2016; and 3) WIZnet Technology is unable to identify the recipient of the ethernet controller as the company sells this model to over 50 distributors worldwide, including one Russian distributor, EFO.
- 171 Russian passport renewal database, accessed via C4ADS Seamless Horizons database. The founding documents of the company do not specify whether the owners are Russian citizens rather than simply Russian residents, but the individuals also appear in Russian passport records (matched by name and date of birth). These records provide their full names (including patronymics), allowing them to be linked to other Russian companies, addresses, and telephone numbers in Russian public records.
- 172 CAR also conducted company searches for these individuals in the Russian company register; on social media sites, such as vk.com and Facebook.com; and in the Russian telephone directory and passport databases accessed via C4ADS Seamless Horizons database, crosschecked with registered addresses.
- 173 In response to an advance notification issued by CAR on 17 August 2021, the individual stated that they registered as a director of World Logistic Group in June 2012 and after two months they requested to be removed from the directorship, because their Czech work visa was denied. Further, they stated that they had only travelled to the Czech Republic once, to register as director, and did not carry out any operational activities during their time as director.
- 174 Russian passport renewal database, accessed via C4ADS Seamless Horizons database.
- 175 Главное управление региональной безопасности Московской области.
- 176 Федеральная служба исполнения наказаний.
- 177 On 31 May 2021, Tillotson responded to a formal trace request issued by CAR on 27 May 2021. Tillotson confirmed that, from the evidence provided, the marks present on the item subject to CAR's trace request, are consistent with a genuine cover for a Tillotson manufactured HE Series carburettor. However, as CAR was unable to document or provide information regarding additional marks that should be present on the item, Tillotson could not concretely confirm the authenticity or establish the origins and supply route of the fuel-pump cover, HE Series carburettor.
- On 23 June 2021, Modellbau Lindinger GmbH responded to a formal trace request issued by CAR on 27 May 2021. This response confirms that: 1) Robbe Modellsport GmbH, Germany sold the Digital Servo Futaba S3150, the subject of CAR's trace request, to an unspecified recipient; 2) Robbe Modellsport GmbH went out of business in 2015; and 3) Ripmax GmbH is the current distributor of these servos in Germany and the UK.
- On 29 June 2021, 3W Professional GmbH responded to a formal trace request issued by CAR on 27 May 2021. This response confirms that: 1) 3W Professional GmbH is unable to provide information on the transfer of the 3W-55i tractor rugged single-cylinder engine with IIS ignition, subject to CAR's trace request, due to the item not bearing the full serial number in the crankcase; 2) due to the missing serial number, the item looks different to a genuine 3W Professional GmbH manufactured 3W-55i engine; and 3) between 2019 and 2021, 3W Professional GmbH sold 3W-55i engines to the following countries: Belgium, Germany, Greece, Indonesia, the Netherlands, Sweden, and the US. In addition, 3W Professional GmbH informed CAR that IIS ignitions, like the item documented by CAR, do not bear a serial number and can be used with any 3W Professional GmbH manufactured 1-cylinder engines.
- On 24 June 2021, Xilinx responded to a formal trace request issued by CAR on 27 May 2021. This response claims that: 1) the Xilinx-labelled Spartan XC3S250E field-programmable gate array integrated circuit, the subject of CAR's trace request, is counterfeit; and 2) Xilinx is unaware of the origin of the counterfeit item.
- On 24 June 2021, Silicon Sensing Systems Limited responded to a formal trace request issued by CAR on 27 May 2021. This response confirms that: 1) Silicon Sensing Systems Limited manufactured the DMU10 inertial sensor with CMS300 and CMS390 accelerometers, the subject of CAR's trace request; 2) Silicon Sensing Systems Limited were unable to locate shipping documents to confirm the end user and precise circumstances of delivery for the item that CAR documented; 3) based on an internal review, Silicon Sensing Systems Limited very probably sold the item to its Russian distributor, Radiant-Elcom CJSC, now known as Radiant Group LLC (65, bld. 1, Profsoyuznaya st. Moscow, 117246, Russia) for export between 2014 and 2015; 4) between October and December 2014, Silicon Sensing Systems Ltd supplied over 200 parts to Radiant-Elcom CJSC including DMU10-21 dynamic measurement units, CMS300 combi-sensor modules and CMS390 combi-sensor modules, all of which do not exceed the performance parameters defined within the UK Strategic Export Controls list; and 5) the DMU10 inertial sensor has been discontinued and replaced with the DMU11 product.

- 178 On 27 May 2021, CAR submitted a trace request to NXP Semiconductors N.V. regarding a component found in the UAV. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.
- On 27 May 2021, CAR submitted a trace request to Analog Devices, Inc. regarding a component found in the UAV. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.
- On 27 May 2021, CAR submitted a trace request to Samsung Electronics regarding a component found in the UAV. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.
- On 27 May 2021, CAR submitted a trace request to WIZnet regarding a component found in the UAV. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.
- On 27 May 2021, CAR submitted a trace request to Marvell Semiconductor regarding a component found in the UAV. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.
- On 27 May 2021, CAR submitted trace requests to Texas Instruments regarding components found in the UAV. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.
- On 27 May 2021, CAR submitted a trace request to Digi International regarding a component found in the UAV. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.
- On 27 May 2021, CAR submitted a trace request to Sunon regarding a component found in the UAV. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.
- On 27 May 2021, CAR submitted a trace request to Kypom regarding a component found in the UAV. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.
- On 27 May 2021, CAR submitted a trace request to NGK Plug regarding a component found in the UAV. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.
- 179 On 24 June 2021, Silicon Sensing Systems Limited responded to a formal trace request issued by CAR on 27 May 2021. This response confirms that: 1) Silicon Sensing Systems Limited manufactured the DMU10 inertial sensor with CMS300 and CMS390 accelerometers, the subject of CAR's trace request; 2) Silicon Sensing Systems Limited were unable to locate shipping documents to confirm the end user and precise circumstances of delivery for the item that CAR documented; 3) based on an internal review, Silicon Sensing Systems Limited very probably sold the item to its Russian distributor, Radiant-Elcom CJSC, now known as Radiant Group LLC (65, bld. 1, Profsoyuznaya st. Moscow, 117246, Russia) for export between 2014 and 2015; 4) between October and December 2014, Silicon Sensing Systems Ltd supplied over 200 parts to Radiant-Elcom CJSC including DMU10-21 dynamic measurement units, CMS300 combi-sensor modules and CMS390 combi-sensor modules, all of which do not exceed the performance parameters defined within the UK Strategic Export Controls list; and 5) the DMU10 inertial sensor has been discontinued and replaced with the DMU11 product.
- 180 On 18 March 2021, CAR submitted trace requests to the Permanent Mission of the Russian Federation to the United Nations regarding these items. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.
- 181 On 4 March 2020, STMicroelectronics responded promptly to a formal trace request issued by CAR on 14 February 2020. This response confirms that: 1) STMicroelectronics manufactured the 32b Microcontroller Unit, with product code STM32F415-RGT6, the object of CARs trace request; 2) the item was assembled in China and shipped in 2014; 3) 30,000 items with product code STM32F415-RGT6 were sold to distributors in Europe (Belgium, Germany, Russia), Asia (Hong Kong, South Korea) and North America (Canada, USA); and 4) STM32F415-RGT6 belongs to the STM32F microcontroller family, suitable for a wide range of applications including: motor drive and application control, medical equipment, industrial applications, printers, and

scanners, alarm systems and home audio appliances. STMicroelectronics additionally informed CAR that since 2014, 1,500,000 microcontroller parts have been sold.

- 182 On 14 February 2020, CAR submitted trace requests to Sony and Olympus regarding these items. At the time of writing, CAR had not yet received any responses.
- 183 On 18 March 2021, CAR submitted a trace request to the Permanent Mission of the Russian Federation to the United Nations regarding this item. At the time of writing, CAR had not yet received a response. Given the absence of a trace response, CAR cannot pronounce on the legality of the transfer in question.
- 184 CAR did not trace this item with its manufacturer because it did not feature traceable markings.
- 185 On 20 December 2020, Intel Corporation responded to a formal trace request issued by CAR on 16 December 2020. This response confirms that: 1) the lot number and trace code marks on the Altera-labelled item, the subject of CAR's trace request, do not exactly match any Altera products; 2) the subject of CAR's trace request could be one of six Altera products; 3) Intel has sold thousands of units of the six products, through multiple distribution channels around the world and therefore the company is unable to identify the recipient of the item that CAR documented; 4) Intel products are general purpose computing products that can be incorporated into countless systems and applications; 5) Intel products are resold by a large number of distributors and original equipment manufacturers; and 6) Intel does not support or tolerate its products being used to violate human rights.
- 186 On 14 April 2021, Pulse Electronics GmbH responded to a formal trace request issued by CAR on 16 December 2020. This response confirms: 1) Pulse Electronics GmbH manufactured the 10/100 PC Card LAN Magnetic Module, bearing part number 'HX0068ANL' the subject of CAR's trace request, at Mian Yang Pulse Electronics Co., Ltd. (Mianyang City, China) during the 48th week of 2013; 2) Pulse Electronics GmbH manufactured 11,360 units of the module bearing the date code '1348-M', which it sold and shipped to four of its franchised distributors in December 2013 (Arrow Electronics received 2,440 units; Digi-Key received 4,000 units; TTI, Inc received 2,440 units; and Fortune Electronic Co. Ltd received 2,480 units); and 3) Pulse Electronics GmbH retains no record of onward sales from its distributors. In addition, Pulse Electronics GmbH informed CAR that between 2015 and 2016, their company introduced collection of distribution channel point of sales data.

On 15 June 2021, TTI, Inc. responded to a formal trace request issued by CAR on 11 June 2021. This response confirms that: 1) TTI, Inc. is a distributor of passive electronic components; 2) TTI, Inc. does not have the capability to record its sales by batch number and is therefore unable to determine which customer received the 10/100 PC Card LAN Magnetic Module bearing the part number HX0068ANL, the subject of CAR's trace request; and 3) TTI, Inc. only sold this part to three customers: Speedboard Assembly Services Ltd. (1a Alma Road, Windsor, United Kingdom); MSC Technologies GmbH (Lager Industriestrasse 16, De 76297 Stutensee, Germany); and Zollner Elektronik AG (Manfred-zollner-str. 1, De 93499 Zandt, Germany). TTI, Inc. included a copy of the relevant shipment information in its response to CAR.

On 21 June 2021, Speedboard responded to a formal trace request issued by CAR on 18 June 2021. This response confirms that Speedboard purchased a 10/100 PC Card LAN Magnetic Module bearing the part number HX0068ANL, the subject of CAR's trace request, from TTI, Inc. in September 2014; 2) Speedboard did not assemble the Shenzhen King Brother Electronics Technology Co Ltd-manufactured PCB board, produced in 2016 as the company has never purchased from this supplier; and 3) Speedboard would not purchase a component in 2014 for use in 2016 as it only purchases components when they are needed.

On 29 June 2021, a representative for Digi-Key responded to a formal trace request issued by CAR on 11 June 2021. Digi-Key stated that it would provide the information requested to a US government agency or law enforcement unit but not to CAR directly.

On 13 July 2021, MSC Technologies GmbH responded to a formal trace request issued by CAR on 18 June 2021. This response confirms that: 1) MSC Technologies GmbH sold and delivered the 10/100 PC Card LAN Magnetic Module bearing the part number HX0068ANL, the subject of CAR's trace request, assembled on electronic boards to CONISTICS Sp. z o.o. (Os. Przemyslowe 24, 69-100 Slubice, Poland); and 2) on 16 February 2016 (under delivery Note 81559324), 20 October 2015 (under delivery note 81540985), 12 August 2015 (under delivery note 81530128) and 22 July 2015 (under delivery note 81526952) CONISTICS Sp. z o.o delivered the item, as part of a larger consignment, to FRABA GmbH (Zeppelinstraße 2, 50667 Köln, Germany).

- 187 On 17 December 2020, MaxAmps responded promptly to a formal trace request issued by CAR on 16 December 2020. This response confirmed that: 1) MaxAmps manufactured the LiPo 11000 18.5v battery, the object of CAR's

- trace request; 2) over the past 15 years, MaxAmps has sold thousands of LiPo 11000 18.5v batteries to retailers, private companies, resellers, and state entities; 3) the object of CAR's trace request does not bear any unique identifying information to enable traceability and therefore MaxAmps is unable to provide any information regarding the transfer of the item; and 4) the white label bearing the marks "B(illegible)TT LiPo 18,5 V 5S / (illegible)000 mAh / N144225" was not applied during manufacture and likely applied after the battery was shipped. In addition, MaxAmps informed CAR that it does not ship batteries directly to Ukraine.
- 188 On 18 December 2020, MODEL MOTORS s. r. o. responded promptly to a formal trace request issued by CAR on 16 December 2020. This response confirmed that: 1) MODEL MOTORS s. r. o. manufactured the AXI 2826/10 Gold Line, bearing part number AXI 2826/10, which was the object of CAR's trace request; 2) MODEL MOTORS s. r. o. manufactured the AXI 2826 model between 2005 and 2017, which was sold as a motor for use in model aircraft constructed by hobbyists; 3) 99 per cent of the manufacturer's buyers are located in Austria, the Czech Republic, Germany, the United Kingdom, and the United States of America; and 4) MODEL MOTORS s. r. o. has never had an agent in Ukraine or Russia.
- 189 On 22 October 2020, CAR submitted trace requests to Hacker Motor GmbH, Tadiran Spectralink, and VWeb Corporation regarding these items. At the time of writing, CAR had not yet received any responses. Given the absence of a trace response, CAR cannot pronounce on the legality of the transfers in question.
- 190 On 18 March 2021, CAR submitted a trace request to the Permanent Mission of the Russian Federation to the United Nations regarding this item. At the time of writing, CAR had not yet received a response. Given the absence of a trace response, CAR cannot pronounce on the legality of the transfer in question.
- 191 For more information on the EU arms embargo imposed on Russia in 2014, see European Council (2014).
- 192 On 23 October 2020, UAV Navigation responded promptly to a formal trace request issued by CAR on 22 October 2020. This response confirms that: 1) UAV Navigation manufactured the AP04M unit bearing the serial number 0501, which was the object of CAR's trace request; 2) UAV Navigation supplied the item, as part of a larger system, to Israel Aerospace Industries on 13 December 2012; 3) the markings on the white label are not consistent with genuine UAV Navigation markings (which are typically engraved directly on the item); 4) at the time of export, UAV Navigation understood that it was not required to obtain an export licence or end user undertaking, and therefore no such documents were sought; and 5) the AP04M unit was discontinued in 2016.
- In its response, UAV Navigation provided additional information on the current export licencing requirements for UAV components. This response states that: 1) UAV Navigation must obtain authorisation from the Spanish Ministry of Industry and Commerce prior to exporting this type of materiel (UAV Navigation states that it understood that previously this type of materiel was not subject to export controls); 2) to obtain an export licence, UAV Navigation must provide an end-user undertaking to the Spanish Ministry of Industry and Commerce; 3) a condition of the end-user undertaking requires the recipient of the item to ask permission from the Spanish authorities prior to re-transferring the materiel; and 4) UAV Navigation is compliant with export licencing requirements, and does not believe that the technology used in its products falls within the category of dual use material requiring export licencing, as detailed in the relevant Spanish law.
- 193 On 25 January 2021, the Government of Spain responded to a request for information issued by CAR on 16 December 2020. This response confirms that: 1) the Government of Spain requires an export licence for the export of AP04M autopilots; and 2) the export licence has been a requirement prior to 2012.
- 194 Spanish Criminal Court No. 17 (Madrid), Oral Hearing No. 47/15, Sentence No. 421/15, 3 December 2015, on file with CAR.
- 195 CAR correspondence with UAV Navigation, 12 October 2021.
- 196 Email correspondence from UAV Navigation to CAR, 25 October 2021.
- 197 Russian bill-of-lading-level trade data obtained and provided by Import Genius LLC.
- 198 On 10 November 2020, UAV Navigation responded promptly to a request for information issued by CAR on 6 November 2020. This response confirms that: 1) on 4 December 2012, UAV Navigation exported the AP04M unit with serial number 0506 to its commercial representative in Israel, for supply to Israel Aerospace Industries, a current customer of UAV Navigation; and 2) UAV Navigation has no information regarding the transfer of the item in 2016, from Israel Aerospace Industries to a Russian UAV manufacturer.
- 199 On 20 July 2021 and again on 8 September 2021, u-blox AG responded to a formal trace request issued by CAR on 8 July 2021. This response confirms that: 1) u-blox AG sold the LEA-5H GPS module, bearing bar code '17421200797', the subject of CAR's trace request, to UAV Navigation S.L. (La Granja 74, 28108 Alcobendas, Spain);

2) the LEA-5H GPS module model is around 9 years old; 3) u-blox AG's products are not designed for use in military material; and 4) u-blox AG follows a policy of not selling to embargoed countries, which includes the occupied territories of Ukraine.

- 200 CAR submitted trace requests to Shenzhen Hobbywing Technology and Allegro (Shanghai) Micro Electronics Commercial & Trading Co., Ltd. on 14 June 2019, and to Microchip Technology Corporation on 20 June 2019. At the time of writing, CAR had not yet received any responses.
- 201 On 19 June 2019, Scorpion Power System Ltd responded promptly to a formal trace request issued by CAR on 14 June 2019. This response confirms that: 1) Scorpion Power System Ltd manufactured the SII-4020-420KV with serial number QE0068, the object of CAR's trace request, in May 2016; 2) Scorpion Power System Ltd sold SII-4020-420KV units to 11 companies (Frontier Tech Motor, Innov8tive Designs, Shiau Yau Enterprise Co Ltd, Robitronic Electronic Ges.m.b.H, Empire Hobby, LLC, Polaris Export Ltd, HMX, Yongin Aero Models Association, eflight GmbH, PilotTR Hobby, Electric Flight in Australia); 3) Scorpion Power System Ltd does not record buyer information by serial number and is unable to establish the supply chain of the item; and 4) SII-4020-420KV is designed for recreational use in radio controlled model airplanes, not in any military applications, and is not sold to any military organisations. Scorpion Power System included a document detailing all sales of Scorpion SII-4020-420KV completed in May 2016 in its response to CAR.
- 202 On 12 September 2019, Innov8tive Designs, Inc. responded to a formal trace request issued by CAR on 7 August 2019. This response confirms that: 1) between October 2006 and October 2018, Innov8tive Designs was the sole US distributor of Scorpion Power System Co., LTD. manufactured products; 2) a review of sales records since 2016 identified no high quantity purchases; and 3) Innov8tive Designs' final Scorpion stock was sold on 2 August 2018. Innov8tive Designs included a copy of their sales records in their response to CAR and confirmed that all sales of this type of product between 1 January 2016 and 2 August 2018 went to US-based customers. Innov8tive Designs additionally informed CAR that the full part number, QE0068, subject to CAR's trace request, signifies that this was the 68th motor built in May 2016 of this model.

On 30 March 2021, Robitronic Electronic GmbH responded to a formal trace request issued by CAR on 7 August 2019. This response confirms that: 1) Robitronic Electronic GmbH received a shipment containing two SII-4020-420KV engines from Scorpion Power System Co., LTD. in 2016; 2) Robitronic Electronic GmbH sold one engine to a customer in Germany and one to a customer in France; 3) Robitronic Electronic GmbH does not record sales by serial number; and 4) due to the company's data privacy policies, Robitronic Electronic GmbH is unable to provide buyer information to CAR. In addition, Robitronic Electronic GmbH informed CAR that it sold SII-4020-420KV engines between three and eight years ago, but no longer sells this type of item.

On 12 August 2019, Empire Hobby, LLC responded promptly to a formal trace request issued by CAR on 7 August 2019. This response confirms that: 1) Empire Hobby, LLC has no records of the SII-4020-420KV with serial number QE0068, subject to CAR's trace request; 2) the manufacturer neither provides Empire Hobby, LLC with any unique identifying information, nor marks the serial number on the packaging of the item, which would enable identification of the next recipient of the item; and 3) Empire Hobby, LLC only exports this type of motor to North America, Canada and Mexico.

On 7 August 2019, Polaris Export Ltd. responded promptly to a formal trace request issued by CAR on 7 August 2019. Polaris Export Ltd. confirmed that: 1) the company has no records of the SII-4020-420KV with serial number QE0068, subject to CAR's trace request; and 2) Polaris Export Ltd. has never exported this type of item overseas.

- 203 On 18 March 2021, CAR submitted a trace request to Zapas regarding this item. At the time of writing, CAR had not yet received a response.
- 204 On 18 March 2021, CAR submitted a trace request to KamAZ Engineering JSC regarding this item. At the time of writing, CAR had not yet received a response. Given the absence of a trace response, CAR cannot pronounce on the legality of the transfer in question.
- 205 CAR observed that the standoff distance of over 40 mm and geometry of the bar armour indicates that the vehicle was being modified to improve survivability against PG-7 warheads.
- 206 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 22 January 2020. This trace request sought information on the KamAZ-5350 truck tractor bearing number 'XTC 535000A2370590'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen or lost.

On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 22 January 2020. This trace request sought information on the KamAZ-5350 truck tractor bearing number 'XTC

431140Y2138931'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen or lost.

On 24 June 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 16 March 2021. This trace request sought information on the KamAZ-5350 truck tractor with chassis number XTC53500092356254. In response, the Government of Ukraine confirmed that this item was not registered with the Armed Forces of Ukraine before its seizure. It is now registered with military unit A0363 (city of Okhlyrka).

On 24 June 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 16 March 2021. This trace request sought information on the KamAZ-5350 truck tractor with chassis number XTC535000A2370566. In response, the Government of Ukraine confirmed that this item was not registered with the Armed Forces of Ukraine before its seizure. It is now registered with military unit A2077 (city of Kropyvnytskyi).

On 24 June 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 16 March 2021. This trace request sought information on the KamAZ-5350 truck tractor with chassis number XTC53500092353830. In response, the Government of Ukraine confirmed that this item was not registered with the Armed Forces of Ukraine before its seizure. It is now registered with military unit A4176 (city of Bakhmut).

- 207 On 18 March 2021, CAR submitted trace requests to the Permanent Mission of the Russian Federation to the United Nations regarding these items. At the time of writing, CAR had not received a response. Given the absence of a trace response, CAR cannot assess the legality of the transfer/s in question.
- 208 ООО «Авиатех Плюс».
- 209 Донецкий филиал ООО «Авиатех».
- 210 АО «АВИА-ФЭД-СЕРВИС».
- 211 Государственное предприятие «Луганский авиационный ремонтный завод».
- 212 ООО «АСЗ».
- 213 CAR was not able to find contact details for the State Enterprise 'Yunost' (Государственное предприятие «Юность») before this report was published.
- 214 ООО НПП «Промэлектрон».
- 215 ООО «ЦМК-Аэро».
- 216 ООО «Гермес».
- 217 ООО «НОМИНАЛ».
- 218 CAR was not able to find contact details for the correct Aviatech company before this report was published.
- 219 CAR was not able to find contact details for the Pervomayskiy Mechanical Plant (ЧАО «Первомайский механический завод») before this report was published.
- 220 CAR analysis of Russian bill-of-lading-level data provided by Import Genius LLC.
- 221 CAR's assessment of the presence of small-calibre ammunition headstamps in Ukrainian inventory is based on responses from Ukrainian authorities received prior to publication.
- 222 On 16 August 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 2 June 2021. This response confirms that: 1) the Government of Ukraine has records of the Arsenal JSCo 7.62 x 54 mm R ammunition, manufactured in 1972, bearing the headstamp marks '10_72', the subject of CAR's trace request, in its national arsenals; 2) the following entities have records of this ammunition, which was not reported as lost or stolen:
- a) the State Border Guard Service of Ukraine;
 - b) the National Guard of Ukraine;
- 3) the Department of State Property and Resources of the Ministry of Internal Affairs of Ukraine established that the ammunition was not registered with the following entities, nor was it reported as stolen or lost:
- a) Odesa State University of Internal Affairs;
 - b) Dnipropetrovsk State University of Internal Affairs;
 - c) Lviv State University of Internal Affairs;
 - d) Donetsk Law Institute of the Ministry of Internal Affairs of Ukraine;

4) the Luhansk Didorenko State University of Internal Affairs cannot confirm if the ammunition was registered with the university prior to 2014 because the official records remained in Luhansk in the temporarily occupied territory of Ukraine; and 5) since 2014, the ammunition has not been registered with the Luhansk Didorenko State University of Internal Affairs, nor has it been reported as stolen or lost.

223 On 15 April 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 10 September 2020. This response confirmed that: 1) the State Border Guard Service of Ukraine has records of the Barnaul Cartridge Plant CJSC 7.62 × 54R mm ammunition, manufactured in 1948, bearing the headstamp marks '17_48', the subject of CAR's trace request, in its national arsenals; and 2) the following entities of the State Border Guard Service of Ukraine have records of this ammunition, which was not reported as lost or stolen:

- a) Podilsky Border Guard Detachment
- b) Berdyansk Border Guard Detachment
- c) Chernihiv Border Guard Detachment; and

3) as of 1 November 2020, the following military entities of the National Guard of Ukraine have records of this ammunition, which was not reported as lost or stolen:

- a) Unit 3053 (city of Khmelnytsky)
- b) Unit 2276 (city of Okhtyrka)
- c) Unit 3007 (city of Zolochiv)
- d) Unit 3056 (city of Kherson)
- e) Unit 3077 (city of Vyshgorod).

224 On 16 August 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 2 June 2021. This response confirms that: 1) the Government of Ukraine has records of the Barnaul Cartridge Plant CJSC 7.62 × 54 mm R ammunition, manufactured in 1949, bearing the headstamp marks '17_49', the subject of CAR's trace request, in its national arsenals; and 2) the following entities have records of this ammunition, which was not reported as lost or stolen:

- a) the State Border Guard Service of Ukraine;
- b) the National Guard of Ukraine.

3) the Department of State Property and Resources of the Ministry of Internal Affairs of Ukraine established that the ammunition was not registered with the following entities, nor was it reported as stolen or lost:

- a) Odesa State University of Internal Affairs;
- b) Dnipropetrovsk State University of Internal Affairs;
- c) Lviv State University of Internal Affairs;
- d) Donetsk Law Institute of the Ministry of Internal Affairs of Ukraine;

4) the Luhansk Didorenko State University of Internal Affairs cannot confirm if the ammunition was registered with the university prior to 2014 because the official records remained in Luhansk in the temporarily occupied territory of Ukraine; and 5) since 2014, the ammunition has not been registered with the Luhansk Didorenko State University of Internal Affairs, nor has it been reported as stolen or lost.

225 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 21 January 2019. This response confirmed that: 1) the State Border Guard Service of Ukraine has records of Barnaul Cartridge Plant CJSC 7.62 × 54R mm ammunition, manufactured in 1973, bearing headstamp marks '17_73', the subject of CAR's trace request, in its national arsenals; and 2) the following entities of the State Border Guard Service of Ukraine have records of this ammunition, which was not reported as lost or stolen:

- a) Chernihiv Border Guard Detachment
- b) Mariupol Maritime Border Guard Detachment
- c) Mohyliv-Podilsk Border Guard Detachment
- d) Bilhorod-Dnistrovskiy Border Guard Detachment
- e) Odessa Border Guard Detachment
- f) Berdyansk Border Guard Detachment
- g) Kharkiv Border Guard Detachment
- h) Luhansk Border Guard Detachment (with Lisichansk municipal police);

3) as of 1 June 2020, the following military entities of the National Guard of Ukraine have records of this ammunition, which was not reported as lost or stolen:

- a) Unit 3036 (city of Dnipro)
- b) Unit 3052 (city of Poltava)

- c) Unit 3011 (city of Kriviy Rih)
- d) Unit 3033 (city of Zaporizhyya);

4) the following military entities of the Armed Forces of Ukraine also have records of this ammunition, which was not reported as stolen:

- a) Unit A1479 (with a lot transferred to Unit A0704)
- b) Unit A2192
- c) Unit A2736.

On 15 April 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 10 September 2020. This response confirmed that: 1) the State Border Guard Service of Ukraine has records of the Barnaul Cartridge Plant CJSC 7.62 × 54R mm ammunition, manufactured in 1973, bearing the headstamp marks '17_73', the subject of CAR's trace request, in its national arsenals; 2) the following entities of the State Border Guard Service of Ukraine have records of this ammunition, which was not reported as lost or stolen:

- a) Mohyliv-Podilsky Border Guard Detachment
- b) Bilhorod-Dnistrovskyi Border Guard Detachment
- c) Berdyansk Border Guard Detachment
- d) Izmail Border Guard Detachment
- e) Chernihiv Border Guard Detachment
- f) Major General Ihor Momot Main Personnel Training Centre (city of Cherkasy); and

3) as of 1 November 2020, the following military entities of the National Guard of Ukraine have records of this ammunition, which was not reported as lost or stolen:

- a) Unit 3036 (city of Dnipro)
- b) Unit 3052 (city of Poltava)
- c) Unit 2276 (Okhlyrka)
- d) Unit 3030 (city of Kyiv)
- e) Unit 3029 (city of Zaporizhyya); and

4) the Logistics Command of the Armed Forces of Ukraine has records of this ammunition with the following military units, and has not been reported as lost or stolen:

- a) A1588 (some lots transferred to units A1352, A0224, A0704, A1225, A1744, B2612, A1358, and B2304)
- b) A3199
- c) A1201 (transferred to unit A1588 field artillery storage)
- d) A1215
- e) A1451.

226 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 21 January 2019. This response confirmed that: 1) as of 1 June 2020, the National Guard of Ukraine has records of Barnaul Cartridge Plant CJSC 7.62 × 54R mm ammunition, manufactured in 1976, bearing headstamp marks '17_76', the subject of CAR's trace request, in their national arsenals; and 2) the following military entity of the National Guard of Ukraine has records of this ammunition:

- a) National Academy of National Guard of Ukraine (city of Kharkiv);

3) the following military entities of the Armed Forces of Ukraine also have records of this ammunition, which was not reported as stolen:

- a) Volyn Regional Military Commissariat
- b) Unit A1479 (with a lot transferred to Unit A0473).

227 On 16 August 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 2 June 2021. This response confirms that: 1) the National Guard of Ukraine has records of the Barnaul Cartridge Plant CJSC 7.62 × 54 mm R ammunition, manufactured in 1979, bearing the headstamp marks '17_79', the subject of CAR's trace request, in its national arsenals; 2) the Department of State Property and Resources of the Ministry of Internal Affairs of Ukraine established that the ammunition was not registered with the following entities, nor was it reported as stolen or lost:

- a) Odesa State University of Internal Affairs;
- b) Dnipropetrovsk State University of Internal Affairs;
- c) Lviv State University of Internal Affairs;
- d) Donetsk Law Institute of the Ministry of Internal Affairs of Ukraine;

3) the Luhansk Didorenko State University of Internal Affairs cannot confirm if the ammunition was registered with the university prior to 2014 because the official records remained in Luhansk in the temporarily occupied territory of Ukraine; and 4) since 2014, the ammunition has not been registered with the Luhansk Didorenko State University of Internal Affairs, nor has it been reported as stolen or lost.

228 On 15 April 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 10 September 2020. This response confirmed that: 1) the State Border Guard Service of Ukraine has records of the Barnaul Cartridge Plant CJSC 5.45 × 39 mm ammunition, manufactured in 1982, bearing the headstamp marks '17_82', the subject of CAR's trace request, in its national arsenals; 2) the following entity of the State Border Guard Service of Ukraine has records of this ammunition, which was not reported as lost or stolen:

- a) Bilhorod-Dnistrovskiy Border Guard Detachment
- b) Izmail Border Guard Detachment
- c) Odessa Sea Guard Detachment
- d) Bohdan Khmelnytskyi National Academy of the State Border Guard Service of Ukraine (Khmelnyskyi);

3) as of 1 November 2020, the following military entities of the National Guard of Ukraine have records of this ammunition, which was not reported as lost or stolen:

- a) Unit 3043 (city of Netishyn)
- b) Unit 2269 (city of Oleksandria)
- c) Unit 3011 (city of Kryvyi Rih)
- d) Unit 3059 (city of Kremenchuk)
- e) Units 3054 and 3021 (city of Dnipro)
- f) Unit 2276 (city of Okhtyrka)
- g) Unit 3007 (city of Zolochiv)
- h) Units 3029 and 3033 (city of Zaporizhzhya)
- i) Unit 3012 (city of Odessa)
- j) Unit 3039 (city of Mykolayiv); and

4) the Logistics Command of the Armed Forces of Ukraine has records of this ammunition with the following military units, and has not been reported as lost or stolen:

- a) A1519
- b) A2502
- c) A1588 (with lots transferred to units A0704, A1402, A0693, and A3283)
- d) A1358 (transferred to units A0665, A2298, A2772 for A1182, A1476, A1619, and A2007)
- e) A1402
- f) A3767
- g) A1604
- h) h) A4239
- i) A3199
- j) A1201 (transferred to Zaporizhya Oblast Recruitment Office; as well as unit A0680)
- k) A1880
- l) A3406
- m) A0593
- n) A1352 field artillery storage
- o) Zhytomyr Oblast Recruitment Office and Support Center (transferred to unit A2254)
- p) A4240
- q) A0665
- r) Kharkiv Air Force University
- s) A2192
- t) A1978
- u) A4465.

As of April 2016, the Ministry of Interior of Ukraine had RGN hand grenades without fuzes, Makarov pistols, 5.45 × 39 mm AK-74 rifles, 40 mm RPG-7V rocket launchers, 40 mm GP-25 under barrel grenade launchers, 5.45 × 39 mm ammunition cartridges, 7.62 × 25 mm ammunition cartridges, 5.56 × 45 mm ammunition cartridges, and 9 × 19 mm ammunition cartridges in its inventory. The Ministry of Interior of Ukraine does not record information on markings, serial numbers, lot numbers, or years of manufacture and therefore no further information is available.

229 On 15 April 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 10 September 2020. This trace request sought information on the 5.45 × 39 mm ammunition bearing the

headstamp marks '17_86'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen or lost.

As of April 2016, the Ministry of Interior of Ukraine had RGN hand grenades without fuzes, Makarov pistols, 5.45 × 39 mm AK-74 rifles, 40 mm RPG-7V rocket launchers, 40 mm GP-25 under barrel grenade launchers, 5.45 × 39 mm ammunition cartridges, 7.62 × 25 mm ammunition cartridges, 5.56 × 45 mm ammunition cartridges, and 9 × 19 mm ammunition cartridges in its inventory. The Ministry of Interior of Ukraine does not record information on markings, serial numbers, lot numbers, or years of manufacture and therefore no further information is available.

230 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 21 January 2019. This response confirmed that: 1) the State Border Guard Service of Ukraine has records of Barnaul Cartridge Plant CJSC 7.62 × 54R mm ammunition, manufactured in 1988, bearing headstamp marks '17_88', the subject of CAR's trace request, in their national arsenals; and 2) the following entity of the State Border Guard Service of Ukraine also has records of this ammunition, which was not reported as lost or stolen:

a) Donetsk Border Guard Detachment (with Mariupol municipal police);

and 3) the following military entities of the Armed Forces of Ukraine also have records of this ammunition, which was not reported as stolen:

a) Unit A2736

b) Unit A1479.

231 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 21 January 2019. This response confirmed that: 1) as of 1 June 2020, the National Guard of Ukraine has records of Barnaul Cartridge Plant CJSC 7.62 × 54R mm ammunition manufactured in 1989, bearing headstamp marks '17_89', the subject of CAR's trace request, in its national arsenals; and 2) the following military entities of the National Guard of Ukraine have a record of this ammunition:

a) Unit 3051 (city of Sumy)

b) Unit 3028 (city of Kalinivka)

c) Unit 3008 (city of Vinnitsa)

d) Unit 4114 (city of Lviv);

3) the following military entities of the Armed Forces of Ukraine also have records of this ammunition, which was not reported as stolen:

a) Unit A1479

b) Kharkiv Regional Military Commissariat.

232 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 21 January 2019. This response confirmed that: 1) as of 1 June 2020, the National Guard of Ukraine has records of the Barnaul Cartridge Plant CJSC 5.45 × 39 mm ammunition, manufactured in 1990, bearing headstamp marks '17_90', the subject of CAR's trace request, in its arsenals; and 2) the following entities of the National Guard of Ukraine have records of this ammunition:

a) Unit 3036 (city of Dnipro)

b) Unit 3011 (city of Kriviy Rih)

c) Unit 3002 (city of Lviv)

d) Units 3012 and 3014 (city of Odessa)

e) Unit 3039 (city of Mykolaiv)

f) Unit 3044 (city of Yuzhnoukrainsk)

g) Unit 3021 (city of Dnipro)

h) Unit 3022 (city of Shostka)

i) Unit 3007 (city of Zolochiv);

3) further, the following military units of the Armed Forces of Ukraine have records of this ammunition, which was not reported as stolen:

a) Unit A3767

b) Unit A1358.

As of April 2016, the Ministry of Interior of Ukraine had RGN hand grenades without fuzes, Makarov pistols, 5.45 × 39 mm AK-74 rifles, 40 mm RPG-7V rocket launchers, 40 mm GP-25 under barrel grenade launchers, 5.45 × 39 mm ammunition cartridges, 7.62 × 25 mm ammunition cartridges, 5.56 × 45 mm ammunition cartridges, and 9

× 19 mm ammunition cartridges in its inventory. The Ministry of Interior of Ukraine does not record information on markings, serial numbers, lot numbers, or years of manufacture and therefore no further information is available.

- 233 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 21 January 2019. This response confirmed that: 1) the State Border Guard Service of Ukraine has records of Barnaul Cartridge Plant CJSC 5.45 × 39 mm ammunition, manufactured in 1993, bearing headstamp marks '17_93', the subject of CAR's trace request, in its national arsenals; and 2) the following entity of the State Border Guard Service of Ukraine has records of this ammunition, which was not reported as lost or stolen:
- a) Main Personnel Training Center of the State Border Guard Service "Major-General Ihor Momot";
- 3) the following military entities of the Armed Forces of Ukraine also have records of this ammunition, which was not reported as stolen:

- a) Unit A1479
- b) Unit A1352
- c) Unit A1358;

and 4) (recovering force unspecified) recovered ammunition bearing these headstamp marks from illegal military formations and temporarily registered and stored it with military Unit 2276, National Guard of Ukraine (city of Okhtyrka).

As of April 2016, the Ministry of Interior of Ukraine had RGN hand grenades without fuzes, Makarov pistols, 5.45 × 39 mm AK-74 rifles, 40 mm RPG-7V rocket launchers, 40 mm GP-25 under barrel grenade launchers, 5.45 × 39 mm ammunition cartridges, 7.62 × 25 mm ammunition cartridges, 5.56 × 45 mm ammunition cartridges, and 9 × 19 mm ammunition cartridges in its inventory. The Ministry of Interior of Ukraine does not record information on markings, serial numbers, lot numbers, or years of manufacture and therefore no further information is available.

- 234 On 15 April 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 10 September 2020. This trace request sought information on the 5.45 × 39 mm ammunition bearing the headstamp marks '17_94'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen or lost.

As of April 2016, the Ministry of Interior of Ukraine had RGN hand grenades without fuzes, Makarov pistols, 5.45 × 39 mm AK-74 rifles, 40 mm RPG-7V rocket launchers, 40 mm GP-25 under barrel grenade launchers, 5.45 × 39 mm ammunition cartridges, 7.62 × 25 mm ammunition cartridges, 5.56 × 45 mm ammunition cartridges, and 9 × 19 mm ammunition cartridges in its inventory. The Ministry of Interior of Ukraine does not record information on markings, serial numbers, lot numbers, or years of manufacture and therefore no further information is available.

- 235 The headstamp is assumed to be 17_94 because the lot number is A24-94-17. As this ammunition was documented in an unopened tin, however, the headstamps were not confirmed.

- 236 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 22 January 2020. This trace request sought information on the 5.45 × 39 mm ammunition bearing lot number 'A24-94-17'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen or lost.

As of April 2016, the Ministry of Interior of Ukraine had RGN hand grenades without fuzes, Makarov pistols, 5.45 × 39 mm AK-74 rifles, 40 mm RPG-7V rocket launchers, 40 mm GP-25 under barrel grenade launchers, 5.45 × 39 mm ammunition cartridges, 7.62 × 25 mm ammunition cartridges, 5.56 × 45 mm ammunition cartridges, and 9 × 19 mm ammunition cartridges in its inventory. The Ministry of Interior of Ukraine does not record information on markings, serial numbers, lot numbers, or years of manufacture and therefore no further information is available.

- 237 On 15 April 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 10 September 2020. This trace request sought information on the 5.45 × 39 mm ammunition bearing the headstamp marks '17_96'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen or lost.

As of April 2016, the Ministry of Interior of Ukraine had RGN hand grenades without fuzes, Makarov pistols, 5.45 × 39 mm AK-74 rifles, 40 mm RPG-7V rocket launchers, 40 mm GP-25 under barrel grenade launchers, 5.45 × 39 mm ammunition cartridges, 7.62 × 25 mm ammunition cartridges, 5.56 × 45 mm ammunition cartridges, and 9 × 19 mm ammunition cartridges in its inventory. The Ministry of Interior of Ukraine does not record information

- on markings, serial numbers, lot numbers, or years of manufacture and therefore no further information is available.
- 238 The headstamp is assumed to be 17_96 because the lot number is Г04-96-17. As this ammunition was documented in an unopened tin, however, the headstamps were not confirmed.
- 239 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 22 January 2020. This trace request sought information on the 7.62 × 54R mm ammunition bearing lot number ‘Г04-96-17’. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen, lost or written-off and has never been transferred to any other military units.
- 240 On 16 August 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 2 June 2021. This response confirms that: 1) the State Border Guard Service of Ukraine has records of the LVE Novosibirsk Cartridge Plant (JSC NPZ) 7.62 x 54 mm R ammunition, manufactured in 1962, bearing the headstamp marks ‘188_62’, the subject of CAR’s trace request, in its national arsenals; 2) the Department of State Property and Resources of the Ministry of Internal Affairs of Ukraine established that the ammunition was not registered with the following entities, nor was it reported as stolen or lost:
- a) Odesa State University of Internal Affairs;
 - b) Dnipropetrovsk State University of Internal Affairs;
 - c) Lviv State University of Internal Affairs;
 - d) Donetsk Law Institute of the Ministry of Internal Affairs of Ukraine;
- 3) the Luhansk Didorenko State University of Internal Affairs cannot confirm if the ammunition was registered with the university prior to 2014 because the official records remained in Luhansk in the temporarily occupied territory of Ukraine; and 4) since 2014, the ammunition has not been registered with the Luhansk Didorenko State University of Internal Affairs, nor has it been reported as stolen or lost.
- 241 On 16 August 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 2 June 2021. This response confirms that: 1) the State Border Guard Service of Ukraine has records of the LVE Novosibirsk Cartridge Plant (JSC NPZ) 7.62 x 54 mm R ammunition, manufactured in 1968, bearing the headstamp marks ‘188_68’, the subject of CAR’s trace request, in its national arsenals; 2) the Department of State Property and Resources of the Ministry of Internal Affairs of Ukraine established that the ammunition was not registered with the following entities, nor was it reported as stolen or lost:
- a) Odesa State University of Internal Affairs;
 - b) Dnipropetrovsk State University of Internal Affairs;
 - c) Lviv State University of Internal Affairs;
 - d) Donetsk Law Institute of the Ministry of Internal Affairs of Ukraine;
- 3) the Luhansk Didorenko State University of Internal Affairs cannot confirm if the ammunition was registered with the university prior to 2014 because the official records remained in Luhansk in the temporarily occupied territory of Ukraine; and 4) since 2014, the ammunition has not been registered with the Luhansk Didorenko State University of Internal Affairs, nor has it been reported as stolen or lost.
- 242 On 16 August 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 2 June 2021. This response confirms that: 1) the Government of Ukraine has records of the LVE Novosibirsk Cartridge Plant (JSC NPZ) 12.7 x 108 mm ammunition, manufactured in 1970, bearing the headstamp marks ‘188_[star]_70_[star]’; the subject of CAR’s trace request, in its national arsenals; and 2) the following entities have records of this ammunition, which was not reported as lost or stolen:
- a) the State Border Guard Service of Ukraine;
 - b) the National Guard of Ukraine.
- 3) the Department of State Property and Resources of the Ministry of Internal Affairs of Ukraine established that the ammunition was not registered with the following entities, nor was it reported as stolen or lost:
- a) Odesa State University of Internal Affairs;
 - b) Dnipropetrovsk State University of Internal Affairs;
 - c) Lviv State University of Internal Affairs;
 - d) Donetsk Law Institute of the Ministry of Internal Affairs of Ukraine;
- 4) the Luhansk Didorenko State University of Internal Affairs cannot confirm if the ammunition was registered with the university prior to 2014 because the official records remained in Luhansk in the temporarily occupied

territory of Ukraine; and 5) since 2014, the ammunition has not been registered with the Luhansk Didorenko State University of Internal Affairs, nor has it been reported as stolen or lost.

243 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 21 January 2019. This response confirmed that: 1) the State Border Guard Service of Ukraine has records of LVE Novosibirsk Cartridge Plant (JSC NPZ) 7.62 x 54R mm ammunition, manufactured in 1974, bearing headstamp marks '188_74', the subject of CAR's trace request, in its national arsenals; and 2) the following entities of the State Border Guard Service of Ukraine have records of this ammunition, which was not reported as lost or stolen:

- a) Chernihiv Border Guard Detachment
- b) Bilhorod-Dnistrovskiy Border Guard Detachment
- c) Izmail Border Guard Detachment
- d) Odessa Border Guard Detachment
- e) Kharkiv Border Guard Detachment
- f) Luhansk Border Guard Detachment (with Lisichansk municipal police)
- g) Chernivtsy Border Guard Detachment;

3) as of 1 June 2020, the National Guard of Ukraine has records of LVE Novosibirsk Cartridge Plant (JSC NPZ) 7.62 x 54R mm ammunition, manufactured in 1974, bearing headstamp marks 188_74, the object of CAR's trace request, in its national arsenals; 4) the following military entities of the National Guard of Ukraine have records of this ammunition, which was not reported as lost or stolen:

- a) Unit 3057 (city of Mariupol)
- b) Unit 3028 (city of Kalinivka)
- c) Unit 1141 (city of Lutsk)
- d) Unit 4114 (city of Lviv)
- e) Unit 3033 (city of Zaporizhyya)
- f) Unit 3042 (city of Enerhodar)
- g) Unit 3044 (city of Yuzhnoukrainsk); and

5) the following military entities of the Armed Forces of Ukraine also have records of this ammunition, which was not reported as lost or stolen:

- a) Unit A2192
- b) Kharkiv National Air Force University
- c) Volyn Regional Military Commissariat (with a lot transferred to Unit B0116)
- d) Unit A1352
- e) Unit A1479 (with lots transferred to Units A1319, A1479, and A0665)
- f) Unit A4245.

244 On 16 August 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 2 June 2021. This response confirms that: 1) the Government of Ukraine has records of the LVE Novosibirsk Cartridge Plant (JSC NPZ) 7.62 x 54 mm R ammunition, manufactured in 1975, bearing the headstamp marks '188_75', the subject of CAR's trace request, in its national arsenals; and 2) the following entities have records of this ammunition, which was not reported as lost or stolen:

- a) the State Border Guard Service of Ukraine;
- b) the National Guard of Ukraine.

3) the Department of State Property and Resources of the Ministry of Internal Affairs of Ukraine established that the ammunition was not registered with the following entities, nor was it reported as stolen or lost:

- a) Odesa State University of Internal Affairs;
- b) Dnipropetrovsk State University of Internal Affairs;
- c) Lviv State University of Internal Affairs;
- d) Donetsk Law Institute of the Ministry of Internal Affairs of Ukraine;

4) the Luhansk Didorenko State University of Internal Affairs cannot confirm if the ammunition was registered with the university prior to 2014 because the official records remained in Luhansk in the temporarily occupied territory of Ukraine; and 5) since 2014, the ammunition has not been registered with the Luhansk Didorenko State University of Internal Affairs, nor has it been reported as stolen or lost.

245 On 15 April 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 10 September 2020. This response confirmed that: 1) the State Border Guard Service of Ukraine has records of

the LVE Novosibirsk Cartridge Plant (JSC NPZ) 7.62 × 54R mm ammunition, manufactured in 1976, bearing the headstamp marks '188_76', the subject of CAR's trace request, in its national arsenals; 2) the following entities of the State Border Guard Service of Ukraine have records of this ammunition, which was not reported as lost or stolen:

- a) Mukachevo Border Guard Detachment
- b) Podilsky Border Guard Detachment
- c) Bilhorod-Dnistrovskiy Border Guard Detachment
- d) Izmail Border Guard Detachment
- e) Kherson Border Guard Detachment
- f) Bohdan Khmelnytskyi National Academy of the State Border Guard Service of Ukraine (city of Khmelnytskyi);

3) as of 1 November 2020, the following military entities of the National Guard of Ukraine have records of this ammunition, which was not reported as lost or stolen:

- a) Unit 3014 (city of Odessa);
- b) Unit 3033 (city of Zaporizhia); and

4) the Logistics Command of the Armed Forces of Ukraine has records of this ammunition with the following military units, and has not been reported as lost or stolen:

- a) A1588 (with lots transferred to unit A1828 and the Odessa Military Academy)
- b) A3767
- c) A1604
- d) A4239
- e) A1201 (with lots transferred to units A0680, A1588 field artillery storage, A3283, and A1352)
- f) Zhytomyr Oblast Recruitment Office and Support Centre (transferred to A2254)
- g) A2192
- h) A4465.

246 On 16 August 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 2 June 2021. This response confirms that: 1) the Government of Ukraine has records of the LVE Novosibirsk Cartridge Plant (JSC NPZ) 7.62 x 54 mm R ammunition, manufactured in 1980, bearing the headstamp marks '188_80', the subject of CAR's trace request, in its national arsenals; and 2) the following entities have records of this ammunition, which was not reported as lost or stolen:

- a) the State Border Guard Service of Ukraine;
- b) the National Guard of Ukraine.

3) the Department of State Property and Resources of the Ministry of Internal Affairs of Ukraine established that the ammunition was not registered with the following entities, nor was it reported as stolen or lost:

- a) Odesa State University of Internal Affairs;
- b) Dnipropetrovsk State University of Internal Affairs;
- c) Lviv State University of Internal Affairs;
- d) Donetsk Law Institute of the Ministry of Internal Affairs of Ukraine;

4) the Luhansk Didorenko State University of Internal Affairs cannot confirm if the ammunition was registered with the university prior to 2014 because the official records remained in Luhansk in the temporarily occupied territory of Ukraine; and 5) since 2014, the ammunition has not been registered with the Luhansk Didorenko State University of Internal Affairs, nor has it been reported as stolen or lost.

247 On 16 August 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 2 June 2021. This response confirms that: 1) the Government of Ukraine has records of the LVE Novosibirsk Cartridge Plant (JSC NPZ) 12.7 x 108 mm ammunition, manufactured in 1982, bearing the headstamp marks '188_[star]_82_[star]', the subject of CAR's trace request, in its national arsenals; and 2) the following entities have records of this ammunition, which was not reported as lost or stolen:

- a) the State Border Guard Service of Ukraine;
- b) the National Guard of Ukraine.

3) the Department of State Property and Resources of the Ministry of Internal Affairs of Ukraine established that the ammunition was not registered with the following entities, nor was it reported as stolen or lost:

- a) Odesa State University of Internal Affairs;

- b) Dnipropetrovsk State University of Internal Affairs;
- c) Lviv State University of Internal Affairs;
- d) Donetsk Law Institute of the Ministry of Internal Affairs of Ukraine;

4) the Luhansk Didorenko State University of Internal Affairs cannot confirm if the ammunition was registered with the university prior to 2014 because the official records remained in Luhansk in the temporarily occupied territory of Ukraine; and 5) since 2014, the ammunition has not been registered with the Luhansk Didorenko State University of Internal Affairs, nor has it been reported as stolen or lost.

248 On 16 August 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 2 June 2021. This response confirms that: 1) the Government of Ukraine has records of the LVE Novosibirsk Cartridge Plant (JSC NPZ) 7.62 x 54 mm R ammunition, manufactured in 1985, bearing the headstamp marks '188_85', the subject of CAR's trace request, in its national arsenals; and 2) the following entities have records of this ammunition, which was not reported as lost or stolen:

- a) the State Border Guard Service of Ukraine;
- b) the National Guard of Ukraine.

3) the Department of State Property and Resources of the Ministry of Internal Affairs of Ukraine established that the ammunition was not registered with the following entities, nor was it reported as stolen or lost:

- a) Odesa State University of Internal Affairs;
- b) Dnipropetrovsk State University of Internal Affairs;
- c) Lviv State University of Internal Affairs;
- d) Donetsk Law Institute of the Ministry of Internal Affairs of Ukraine;

4) the Luhansk Didorenko State University of Internal Affairs cannot confirm if the ammunition was registered with the university prior to 2014 because the official records remained in Luhansk in the temporarily occupied territory of Ukraine; and 5) since 2014, the ammunition has not been registered with the Luhansk Didorenko State University of Internal Affairs, nor has it been reported as stolen or lost.

249 On 16 August 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 2 June 2021. This response confirms that: 1) the Government of Ukraine has records of the LVE Novosibirsk Cartridge Plant (JSC NPZ) 7.62 x 54 mm R ammunition, manufactured in 1986, bearing the headstamp marks '188_86', the subject of CAR's trace request, in its national arsenals; and 2) the following entities have records of this ammunition, which was not reported as lost or stolen:

- a) the State Border Guard Service of Ukraine;
- b) the National Guard of Ukraine.

3) the Department of State Property and Resources of the Ministry of Internal Affairs of Ukraine established that the ammunition was not registered with the following entities, nor was it reported as stolen or lost:

- a) Odesa State University of Internal Affairs;
- b) Dnipropetrovsk State University of Internal Affairs;
- c) Lviv State University of Internal Affairs;
- d) Donetsk Law Institute of the Ministry of Internal Affairs of Ukraine;

4) the Luhansk Didorenko State University of Internal Affairs cannot confirm if the ammunition was registered with the university prior to 2014 because the official records remained in Luhansk in the temporarily occupied territory of Ukraine; and 5) since 2014, the ammunition has not been registered with the Luhansk Didorenko State University of Internal Affairs, nor has it been reported as stolen or lost.

250 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 21 January 2019. This response confirmed that: 1) the Armed Forces of Ukraine has records of LVE Novosibirsk Cartridge Plant (JSC NPZ) 7.62 x 54R mm ammunition manufactured in 2001, bearing headstamp marks '188_01', the subject of CAR's trace request, in its national arsenals; and 2) the following military entities of the Armed Forces of Ukraine also have records of this ammunition, which was not reported as stolen:

- a) Unit A1479
- b) Unit A1352.

251 On 16 August 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 2 June 2021. This response confirms that: 1) the Government of Ukraine has records of the PJSC Luhansk Cartridge Works 7.62 x 39 mm ammunition, manufactured in 1971, bearing the headstamp marks '270_71', the subject of

CAR's trace request, in its national arsenals; and 2) the following entities have records of this ammunition, which was not reported as lost or stolen:

- a) the State Border Guard Service of Ukraine;
- b) the National Guard of Ukraine.

3) the Department of State Property and Resources of the Ministry of Internal Affairs of Ukraine established that the ammunition was not registered with the following entities, nor was it reported as stolen or lost:

- a) Odesa State University of Internal Affairs;
- b) Dnipropetrovsk State University of Internal Affairs;
- c) Lviv State University of Internal Affairs;
- d) Donetsk Law Institute of the Ministry of Internal Affairs of Ukraine;

4) the Luhansk Didorenko State University of Internal Affairs cannot confirm if the ammunition was registered with the university prior to 2014 because the official records remained in Luhansk in the temporarily occupied territory of Ukraine; and 5) since 2014, the ammunition has not been registered with the Luhansk Didorenko State University of Internal Affairs, nor has it been reported as stolen or lost.

252 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 21 January 2019. This response confirmed that: 1) the State Border Guard Service of Ukraine has records of PJSC Luhansk Cartridge Works 5.45 × 39 mm ammunition, manufactured in 1981, bearing headstamp marks '270_81', the subject of CAR's trace request, in its national arsenals; and 2) the following entities of the State Border Guard Service of Ukraine have records of this ammunition, which was not reported as lost or stolen:

- a) National State Border Guard Service Academy (city of Khmelnytskyi)
- b) Mohyliv-Podilsk Border Guard Detachment
- c) Luhansk Border Guard Detachment (with Lisichansk municipal police);

3) as of 1 June 2020, the following military entities of the National Guard of Ukraine have records of this ammunition:

- a) Unit 3082 (city of Chernihiv)
- b) Unit 1141 (city of Lutsk)
- c) Unit 3002 (city of Lviv)
- d) Unit 3053 (city of Khmelnytskyi)
- e) Unit 3012 (city of Odessa)
- f) Unit 3039 (city of Mykolaiv)
- g) Unit 2276 (city of Okhtyrka)
- h) Unit 3018 (town of Gostomel)
- i) Unit 2269 (city of Olexandria);

4) the following military entities of the Armed Forces of Ukraine also have records of this ammunition, which was not reported as stolen:

- a) Unit 2192
- b) Military Police
- c) Unit A1880
- d) Kharkiv National Air Force University
- e) Unit A2502
- f) Volyn Regional Military Commissariat
- g) Lviv Regional Military Commissariat
- h) Unit A0707
- i) Unit A3767
- j) Unit A1588
- k) Unit A0415
- l) The Center for Ensuring the Official Activities of the Ministry of Defence and the General Staff of the Armed Forces
- m) Unit A1479 (with lots transferred to Units A1215, A0704, A2975, A4558, A0743, A1358, A1479, the Security Service of Ukraine, and the Ministry of Internal Affairs of Ukraine);

and 5) (recovering force unspecified) recovered ammunition bearing these headstamp marks from illegal military formations and temporarily registered and stored it with military Unit 2276, National Guard of Ukraine (city of Okhtyrka).

As of April 2016, the Ministry of Interior of Ukraine had RGN hand grenades without fuzes, Makarov pistols, 5.45 × 39 mm AK-74 rifles, 40 mm RPG-7V rocket launchers, 40 mm GP-25 under barrel grenade launchers, 5.45 × 39 mm ammunition cartridges, 7.62 × 25 mm ammunition cartridges, 5.56 × 45 mm ammunition cartridges, and 9 × 19 mm ammunition cartridges in its inventory. The Ministry of Interior of Ukraine does not record information on markings, serial numbers, lot numbers, or years of manufacture and therefore no further information is available.

253 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 21 January 2019. This response confirmed that: 1) the State Border Guard Service of Ukraine has records of PJSC Luhansk Cartridge Works 5.45 x 39 mm ammunition, manufactured in 1982, bearing headstamp marks '270_82', the subject of CAR's trace request, in its national arsenals; 2) the following entities of the State Border Guard Service of Ukraine have records of this ammunition, which was not reported as lost or stolen:

- a) Chernihiv Border Guard Detachment
- b) Zhytomyr Border Guard Detachment
- c) National State Border Guard Service Academy
- d) Berdyansk Border Guard Detachment
- e) Kramatorsk Border Guard Detachment
- f) Lutsk Border Guard Detachment
- g) Mariupol Maritime Border Guard Detachment
- h) Kharkiv Border Guard Detachment
- i) Donetsk Border Guard Detachment (with Mariupol municipal police);

3) as of 1 June 2020, the following military entities of the National Guard of Ukraine have records of this ammunition, which was not reported as lost or stolen:

- a) Unit 3036 (city of Dnipro)
- b) Unit 3052 (city of Poltava)
- c) Unit 3011 (city of Kriviy Rih)
- d) Unit 3017 (city of Kharkiv)
- e) Unit 3057 (city of Mariupol)
- f) Unit 3027 and Unit 3077 (city of Vyshgorod)
- g) Unit 3066 and Unit 2260 (city of Kyiv)
- h) Unit 3082 (city of Chernihiv)
- i) Unit 3061 (city of Cherkassy)
- j) Unit 3028 (city of Kalinivka)
- k) Unit 1141 (city of Lutsk)
- l) Unit 3008 (city of Vinnitsa)
- m) Unit 3002 (city of Lviv)
- n) Unit 3055 (city of Rivne)
- o) Unit 3012 and Unit 3014 (city of Odessa)
- p) Unit 3029 and Unit 3033 (city of Zaporizhyya)
- q) Unit 3039 (city of Mykolaiv)
- r) Unit 3041 (city of Slavutich)
- s) Unit 3043 (city of Netishyn)
- t) Unit 3044 (city of Yuzhnoukrainsk)
- u) Unit 2276 (city of Okhtyrka)
- v) Unit 3070 (Stare village)
- w) Unit 3022 (city of Shostka)
- x) Unit 3024 (city of Pavlograd)
- y) Unit 3007 (city of Zolochiv)
- z) Unit 3018 (town of Gostomel)
- aa) Unit 2269 (city of Olexandria);

4) the following military entities of the Armed Forces of Ukraine also have records of this ammunition, which was not reported as lost or stolen:

- a) Unit A2192
- b) Unit A4245
- c) Military Police
- d) Unit A2736
- e) Unit A3767

- f) Unit A1358
- g) Unit A1588
- h) Unit A0563
- i) Unit 3438 (transferred to Unit B1109)
- j) Lviv Regional Military Commissariat
- k) Unit A0415;

5) individuals obtained 420 rounds of this ammunition, bearing the same headstamp marks, when they disarmed personnel of the 10th Mobile Border Guard Detachment, State Border Guard Service of Ukraine, in the city of Druzhkivka, Donetsk Oblast during an anti-terrorist operation mission on 18 April 2014. The ammunition cartridges were written off; 6) in April 2018, personnel of BGS “Preobrazhenka”, Kherson Border Guard Detachment, State Border Guard Service of Ukraine, lost two rounds of this ammunition, bearing the same headstamp marks, during a mission; and 7) 3,896 5.45 × 39 mm ammunition cartridges with PS bullets of lot number «E09-82-270» (thus bearing the headstamp marks ‘270_82’) were destroyed during combat activity to enforce law and order along the State Border of Ukraine in Donetsk Oblast after 2014. The aforementioned quantity of ammunitions was written off from registers; and 8) (recovering force unspecified) recovered ammunition bearing these headstamp marks from illegal military formations and temporarily registered and stored it with military Unit 2276, National Guard of Ukraine (city of Okhtyrka).

As of April 2016, the Ministry of Interior of Ukraine had RGN hand grenades without fuzes, Makarov pistols, 5.45 × 39 mm AK-74 rifles, 40 mm RPG-7V rocket launchers, 40 mm GP-25 under barrel grenade launchers, 5.45 × 39 mm ammunition cartridges, 7.62 × 25 mm ammunition cartridges, 5.56 × 45 mm ammunition cartridges, and 9 × 19 mm ammunition cartridges in its inventory. The Ministry of Interior of Ukraine does not record information on markings, serial numbers, lot numbers, or years of manufacture and therefore no further information is available.

254 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 21 January 2019. This response confirmed that: 1) as of 1 June 2020, the National Guard of Ukraine has records of PJSC Luhansk Cartridge Works 5.45 × 39 mm ammunition, manufactured in 1983, bearing headstamp marks ‘270_83’, the subject of CAR’s trace request, in its national arsenals; and 2) the following military entities of the National Guard of Ukraine have records of this ammunition, which was not reported as lost or stolen:

- a) Unit 3052 (city of Poltava)
- b) Unit 3011 (city of Kriviy Rih)
- c) Unit 3017 (city of Kharkiv)
- d) Unit 3057 (city of Mariupol)
- e) Unit 3008 (city of Vinnitsa)
- f) Unit 3029 (city of Zaporizhyya)
- g) Unit 3041 (city of Slavutich)
- h) Unit 3042 (city of Enerhodar)
- i) Unit 3042 (city of Yuzhnoukrainsk)
- j) the National Academy of National Guard of Ukraine (city of Kharkiv)
- k) Unit 3024 (city of Pavlograd)
- l) Unit 3077 (city of Vyshgorod)
- m) Unit 3007 (city of Zolochiv)
- n) Unit 3018 (town of Gostomel)

3) the following military entities of the Armed Forces of Ukraine also have records of this ammunition, which was not reported as lost or stolen:

- a) Unit A3767
- b) Unit A1358
- c) Unit A1538
- d) Unit A1479 (transferred to Unit A1302 in the town of Cherkasske)
- e) Kharkiv Regional Military Commissariat
- f) Kharkiv National Air Force University
- g) Unit A2502
- h) Unit A2192
- i) Unit A3438 (transferred to Unit B1109)
- j) Volyn Regional Military Commissariat
- k) Unit A0415

- l) Unit A1479 (with lots transferred to Units A1358, A1352, A1319, A0327, A3620, A1546, A2615, A2368, B2050, A4398, A1119, A1615, A3628, A1479 (Logistics), A1225, A1352, A1588, the Chernihiv Regional Military Commissariat, the National University of Defence of Ukraine named after Ivan Chernyakhovs'kyi, the Ministry of Internal Affairs of Ukraine, and the Ministry of Defence of Ukraine); and

4) the following entities of the State Border Guard Service of Ukraine also have records of this ammunition, which was not reported as lost or stolen:

- a) Chernihiv Border Guard Detachment
- b) Zhytomyr Border Guard Detachment
- c) National State Border Guard Service Academy (city of Khmelnytskyi)
- d) Separate Security and Support Garrison Headquarters of Kyiv
- e) Main Personnel Training Center of the State Border Guard Service “Major-General Ihor Momot”
- f) Podilsk Border Guard Detachment
- g) Izmail Border Guard Detachment
- h) Odessa Border Guard Detachment
- i) Kherson Border Guard Detachment
- j) Berdyansk Border Guard Detachment
- k) Kramatorsk Border Guard Detachment.

As of April 2016, the Ministry of Interior of Ukraine had RGN hand grenades without fuzes, Makarov pistols, 5.45 × 39 mm AK-74 rifles, 40 mm RPG-7V rocket launchers, 40 mm GP-25 under barrel grenade launchers, 5.45 × 39 mm ammunition cartridges, 7.62 × 25 mm ammunition cartridges, 5.56 × 45 mm ammunition cartridges, and 9 × 19 mm ammunition cartridges in its inventory. The Ministry of Interior of Ukraine does not record information on markings, serial numbers, lot numbers, or years of manufacture and therefore no further information is available.

255 On 15 April 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 10 September 2020. This response confirmed that: 1) the State Border Guard Service of Ukraine has records of the PJSC Luhansk Cartridge Works 5.45 × 39 mm ammunition, manufactured in 1984, bearing the headstamp marks ‘270_84’, the subject of CAR’s trace request, in its national arsenals; and 2) the following entities of the State Border Guard Service of Ukraine have records of this ammunition, which was not reported as lost or stolen:

- a) Chop Border Guard Detachment
- b) Lutsk Border Guard Detachment
- c) K-9 Training Centre in Velyki Mosty
- d) Donetsk Border Guard Detachment
- e) Odessa Border Guard Detachment
- f) Berdyansk Border Guard Detachment
- g) Chernihiv Border Guard Detachment
- h) Zhytomyr Border Guard Detachment
- i) Bohdan Khmelnytskyi National Academy of the State Border Guard Service of Ukraine (Khmelnytskyi);

3) as of 1 November 2020, the following military entities of the National Guard of Ukraine have records of this ammunition, which was not reported as lost or stolen:

- a) Unit 3070 (city of Stare)
- b) Unit 2276 (city of Okhtyrka)
- c) Unit 3012 (city of Odessa)
- d) Unit 3045 (city of Varani); and

4) the Logistics Command of the Armed Forces of Ukraine has records of this ammunition with the following military units, and has not been reported as lost or stolen:

- a) A1519
- b) A2502
- c) A1588 (some lots transferred to units A2791, A3193, A2802, A0327, A3193; as well as to the Poltava Oblast Recruitment Office)
- d) A1358
- e) Kharkiv Air Force University
- f) A0222

- g) A2192
- h) A4249
- i) A1624
- j) A1215
- k) A1201 (transferred to units A1302, A1840, A3160, A0734, A3821, A3163, A1363, A2656, A0224, A2110, A0593, B4745, A0284, A4608, A1978, A1352, A3821, A1965, A1126, A1358 field artillery storage, A1979 field artillery storage, A0327 for A1225; as well as to the Dnipropetrovsk Oblast Recruitment Office, the Odessa Military Academy, the Zaporizhya Oblast Recruitment Office, and the Kirovohrad Oblast Recruitment Office (B4533)).

256 On 15 April 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 10 September 2020. This response confirmed that: 1) the State Border Guard Service of Ukraine has records of the PJSC Luhansk Cartridge Works 5.45 × 39 mm ammunition, manufactured in 1987, bearing the headstamp marks '270_87', the subject of CAR's trace request, in its national arsenals; 2) as of 1 November 2020, the following military entities of the National Guard of Ukraine have records of this ammunition, which was not reported as lost or stolen:

- a) Unit 2269 (city of Oleksandria)
- b) Unit 3042 (city of Energodar)
- c) Unit 3029 (city of Zaporizhia); and

3) the Logistics Command of the Armed Forces of Ukraine has records of this ammunition with the following military units, and has not been reported as lost or stolen:

- a) A1588 (with lots transferred to the Cherkasy Oblast Recruitment Office)
- b) A0981
- c) Zhytomyr Oblast Recruitment Office and Support Centre (transferred to unit A2254)
- d) A2192.

As of April 2016, the Ministry of Interior of Ukraine had RGN hand grenades without fuzes, Makarov pistols, 5.45 × 39 mm AK-74 rifles, 40 mm RPG-7V rocket launchers, 40 mm GP-25 under barrel grenade launchers, 5.45 × 39 mm ammunition cartridges, 7.62 × 25 mm ammunition cartridges, 5.56 × 45 mm ammunition cartridges, and 9 × 19 mm ammunition cartridges in its inventory. The Ministry of Interior of Ukraine does not record information on markings, serial numbers, lot numbers, or years of manufacture and therefore no further information is available.

257 On 15 April 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 10 September 2020. This response confirmed that: 1) the National Guard of Ukraine has records of the PJSC Luhansk Cartridge Works 5.45 × 39 mm ammunition, manufactured in 1988, bearing the headstamp marks '270_88', the subject of CAR's trace request, in its national arsenals; 2) as of 1 November 2020, the following military entities of the National Guard of Ukraine have records of this ammunition, which was not reported as lost or stolen:

- a) Unit 2276 (city of Okhtyrka)
- b) Unit 3029 (city of Zaporizhia); and

3) the Logistics Command of the Armed Forces of Ukraine has records of this ammunition with the following military units, and has not been reported as lost or stolen:

- a) A1358 (transferred to unit A1807 field artillery storage)
- b) A1201 (transferred to Dnipropetrovsk Oblast Recruitment Office)
- c) A1451
- d) A1352 field artillery storage
- e) Lviv Oblast Recruitment Office and Support Centre.

As of April 2016, the Ministry of Interior of Ukraine had RGN hand grenades without fuzes, Makarov pistols, 5.45 × 39 mm AK-74 rifles, 40 mm RPG-7V rocket launchers, 40 mm GP-25 under barrel grenade launchers, 5.45 × 39 mm ammunition cartridges, 7.62 × 25 mm ammunition cartridges, 5.56 × 45 mm ammunition cartridges, and 9 × 19 mm ammunition cartridges in its inventory. The Ministry of Interior of Ukraine does not record information on markings, serial numbers, lot numbers, or years of manufacture and therefore no further information is available.

258 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 21 January 2019. This response confirmed that: 1) the State Border Guard Service of Ukraine has records of PJSC Luhansk Cartridge Works 5.45 x 39 mm ammunition, manufactured in 1993, bearing headstamp marks '270_93', the subject of CAR's trace request, in their national arsenals; and 2) the following entities of the State Border Guard Service of Ukraine have records of this ammunition, which was not reported as lost or stolen:

- a) Main Personnel Training Center of the State Border Guard Service "Major-General Ihor Momot"
- b) Kharkiv Border Guard Detachment
- c) Donetsk Border Guard Detachment (with Mariupol municipal police);

3) as of 1 June 2020, the following military entities of the National Guard of Ukraine have records of this ammunition, which was not reported as lost or stolen:

- a) Unit 3036 (city of Dnipro)
- b) Unit 3052 (city of Poltava)
- c) Unit 3059 (city of Kremenchuk)
- d) Unit 3011 (city of Kriviy Rih)
- e) Unit 3051 (city of Sumy)
- f) Unit 3057 (city of Mariupol)
- g) Unit 3028 (city of Kalinivka)
- h) Unit 1141 (city of Lutsk)
- i) Unit 3008 (city of Vinnitsa)
- j) Unit 3055 (city of Rivne)
- k) Unit 4114 (city of Lviv)
- l) Unit 3012 and Unit 3014 (city of Odessa)
- m) Unit 3029 and Unit 3033 (city of Zaporizhyya)
- n) Unit 3039 (city of Mykolaiv)
- o) Unit 3042 (city of Energodar)
- p) Unit 3021 (city of Dnipro)
- q) Unit 3024 (city of Pavlograd)
- r) Unit 3077 (city of Vyshgorod)
- s) Unit 3007 (city of Zolochiv)
- t) Unit 2269 (city of Olexandria);

5) the following military entities of the Armed Forces of Ukraine also have records of this ammunition, which was not reported as lost or stolen:

- a) Unit A2192
- b) Unit A2736
- c) Unit A1352
- d) Unit A1479 (with a lot transferred to Unit A1358).

As of April 2016, the Ministry of Interior of Ukraine had RGN hand grenades without fuzes, Makarov pistols, 5.45 x 39 mm AK-74 rifles, 40 mm RPG-7V rocket launchers, 40 mm GP-25 under barrel grenade launchers, 5.45 x 39 mm ammunition cartridges, 7.62 x 25 mm ammunition cartridges, 5.56 x 45 mm ammunition cartridges, and 9 x 19 mm ammunition cartridges in its inventory. The Ministry of Interior of Ukraine does not record information on markings, serial numbers, lot numbers, or years of manufacture and therefore no further information is available.

259 On 15 April 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 10 September 2020. This response confirmed that: 1) the State Border Guard Service of Ukraine has records of the PJSC Luhansk Cartridge Works 5.45 x 39 mm ammunition, manufactured in 1994, bearing the headstamp marks '270_94', the subject of CAR's trace request, in its national arsenals; 2) the following entities of the State Border Guard Service of Ukraine have records of this ammunition, which was not reported as lost or stolen:

- a) Donetsk Border Guard Detachment
- b) Odessa Border Guard Detachment
- c) Bilhorod-Dnistrovskiy Border Guard Detachment;

3) as of 1 November 2020, the following military entities of the National Guard of Ukraine have records of this ammunition, which was not reported as lost or stolen:

- a) Unit 3008 (city of Vinnytsia)
- b) Unit 3028 (city of Kalynivka)

- c) Unit 3002 (city of Lviv)
- d) Unit 3011 (city of Kryvyi Rih)
- e) Unit 3054 (city of Dnipro)
- f) Unit 3033 (city of Zaporizhia); and

4) the Logistics Command of the Armed Forces of Ukraine has records of this ammunition with the following military units, and has not been reported as lost or stolen:

- a) A1519
- b) A1358
- c) A3199
- d) A1807
- e) A1451
- f) A1352 (field artillery storage).

As of April 2016, the Ministry of Interior of Ukraine had RGN hand grenades without fuzes, Makarov pistols, 5.45 × 39 mm AK-74 rifles, 40 mm RPG-7V rocket launchers, 40 mm GP-25 under barrel grenade launchers, 5.45 × 39 mm ammunition cartridges, 7.62 × 25 mm ammunition cartridges, 5.56 × 45 mm ammunition cartridges, and 9 × 19 mm ammunition cartridges in its inventory. The Ministry of Interior of Ukraine does not record information on markings, serial numbers, lot numbers, or years of manufacture and therefore no further information is available.

260 On 15 April 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 10 September 2020. This response confirmed that: 1) the National Guard of Ukraine has records of the PJSC Luhansk Cartridge Works 5.45 × 39 mm ammunition, manufactured in 1995, bearing the headstamp marks '270_95', the subject of CAR's trace request, in its national arsenals; and 2) as of 1 November 2020, the following military entities of the National Guard of Ukraine have records of this ammunition, which was not reported as lost or stolen:

- a) Unit 3014 (city of Odessa)
- b) Unit 3033 (city of Zaporizhia).

As of April 2016, the Ministry of Interior of Ukraine had RGN hand grenades without fuzes, Makarov pistols, 5.45 × 39 mm AK-74 rifles, 40 mm RPG-7V rocket launchers, 40 mm GP-25 under barrel grenade launchers, 5.45 × 39 mm ammunition cartridges, 7.62 × 25 mm ammunition cartridges, 5.56 × 45 mm ammunition cartridges, and 9 × 19 mm ammunition cartridges in its inventory. The Ministry of Interior of Ukraine does not record information on markings, serial numbers, lot numbers, or years of manufacture and therefore no further information is available.

261 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 21 January 2019. This response confirmed that: 1) the State Border Guard Service of Ukraine has records of PJSC Luhansk Cartridge Works 5.45 × 39 mm ammunition, manufactured in 2003, bearing headstamp marks '270_03', the subject of CAR's trace request, in its national arsenals; and 2) the following entity of the State Border Guard Service of Ukraine has records of this ammunition, which was not reported as lost or stolen:

- a) National State Border Guard Service Academy (city of Khmelnytskyi);

3) as of 1 June 2020, the National Guard of Ukraine has records of PJSC Luhansk Cartridge Works 5.45 × 39 mm ammunition, manufactured in 2003, bearing headstamp marks 270_03, the object of CAR's trace request, in its national arsenals, which was not reported as lost or stolen; and 4) the following military entity of the National Guard of Ukraine has records of this ammunition:

- a) Unit 3033 (city of Zaporizhya);

5) the following military entities of the Armed Forces of Ukraine also have records of this ammunition, was not reported as lost or stolen:

- a) Unit A1352
- b) Unit A3199
- c) Unit A1358
- d) Unit A1479 (with a lot transferred to Unit A1352).

As of April 2016, the Ministry of Interior of Ukraine had RGN hand grenades without fuzes, Makarov pistols, 5.45 × 39 mm AK-74 rifles, 40 mm RPG-7V rocket launchers, 40 mm GP-25 under barrel grenade launchers, 5.45 × 39 mm ammunition cartridges, 7.62 × 25 mm ammunition cartridges, 5.56 × 45 mm ammunition cartridges, and 9

× 19 mm ammunition cartridges in its inventory. The Ministry of Interior of Ukraine does not record information on markings, serial numbers, lot numbers, or years of manufacture and therefore no further information is available.

262 On 15 April 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 10 September 2020. This trace request sought information on the 9 × 18 mm ammunition bearing the headstamp marks 'LCW_9x18'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen or lost.

263 On 15 April 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 10 September 2020. This response confirmed that: 1) the State Border Guard Service of Ukraine has records of the Ulyanovsk Mechanical Plant 14.5 × 114 mm ammunition, manufactured in 1951, bearing the headstamp marks '3_[star]_51_[star]'; the subject of CAR's trace request, in its national arsenals; and 2) the following entities of the State Border Guard Service of Ukraine have records of this ammunition, which was not reported as lost or stolen:

- a) Bilhorod-Dnistrovskiy Border Guard Detachment;
- b) Izmail Border Guard Detachment;
- c) Major General Ihor Momot Main Personnel Training Centre (city of Cherkasy); and

3) as of 1 November 2020, the following military entities of the National Guard of Ukraine have records of this ammunition, which was not reported as lost or stolen:

- a) Unit 3070 (city of Stare)
- b) Unit 2276 (city of Okhtyrka)
- c) Unit 3082 (city of Chernihiv)
- d) the National Academy of the National Guard of Ukraine (city of Kharkiv).

264 On 15 April 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 10 September 2020. This response confirmed that: 1) the State Border Guard Service of Ukraine has records of the Ulyanovsk Mechanical Plant 5.45 × 39 mm ammunition, manufactured in 1978, bearing the headstamp marks '3_78'; the subject of CAR's trace request, in its national arsenals; 2) as of 1 November 2020, the following military entities of the National Guard of Ukraine have records of this ammunition, which was not reported as lost or stolen:

- a) Unit 3054 (city of Dnipro)
- b) Unit 2276 (city of Okhtyrka)
- c) Unit 3035 (city of Slovyansk); and

3) the Logistics Command of the Armed Forces of Ukraine has records of this ammunition with the following military units, and has not been reported as lost or stolen:

- a) a) A3199
- b) b) A3406.

As of April 2016, the Ministry of Interior of Ukraine had RGN hand grenades without fuzes, Makarov pistols, 5.45 × 39 mm AK-74 rifles, 40 mm RPG-7V rocket launchers, 40 mm GP-25 under barrel grenade launchers, 5.45 × 39 mm ammunition cartridges, 7.62 × 25 mm ammunition cartridges, 5.56 × 45 mm ammunition cartridges, and 9 × 19 mm ammunition cartridges in its inventory. The Ministry of Interior of Ukraine does not record information on markings, serial numbers, lot numbers, or years of manufacture and therefore no further information is available.

265 On 16 August 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 2 June 2021. This response confirms that: 1) the National Guard of Ukraine has records of the Ulyanovsk Mechanical Plant 14.5 × 114 mm ammunition, manufactured in 1979, bearing the headstamp marks '3_[star]_79_[star]'; the subject of CAR's trace request, in its national arsenals; 2) the Department of State Property and Resources of the Ministry of Internal Affairs of Ukraine established that the ammunition was not registered with the following entities, nor was it reported as stolen or lost:

- a) Odesa State University of Internal Affairs;
- b) Dnipropetrovsk State University of Internal Affairs;
- c) Lviv State University of Internal Affairs;
- d) Donetsk Law Institute of the Ministry of Internal Affairs of Ukraine;

3) the Luhansk Didorenko State University of Internal Affairs cannot confirm if the ammunition was registered with the university prior to 2014 because the official records remained in Luhansk in the temporarily occupied

territory of Ukraine; and 4) since 2014, the ammunition has not been registered with the Luhansk Didorenko State University of Internal Affairs, nor has it been reported as stolen or lost.

266 On 16 August 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 2 June 2021. This response confirms that: 1) the Government of Ukraine has records of Ulyanovsk Mechanical Plant 5.45 x 39 mm ammunition, manufactured in 1982, bearing the headstamp marks '3_82', the subject of CAR's trace request, in its national arsenals; and 2) the following entities have records of this ammunition, which was not reported as lost or stolen:

- a) the State Border Guard Service of Ukraine;
- b) the National Guard of Ukraine.

3) the Department of State Property and Resources of the Ministry of Internal Affairs of Ukraine established that the ammunition was not registered with the following entities, nor was it reported as stolen or lost:

- a) Odesa State University of Internal Affairs;
- b) Dnipropetrovsk State University of Internal Affairs;
- c) Lviv State University of Internal Affairs;
- d) Donetsk Law Institute of the Ministry of Internal Affairs of Ukraine;

4) the Luhansk Didorenko State University of Internal Affairs cannot confirm if the ammunition was registered with the university prior to 2014 because the official records remained in Luhansk in the temporarily occupied territory of Ukraine; and 5) since 2014, the ammunition has not been registered with the Luhansk Didorenko State University of Internal Affairs, nor has it been reported as stolen or lost.

267 On 15 April 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 10 September 2020. This response confirmed that: 1) the State Border Guard Service of Ukraine has records of the Ulyanovsk Mechanical Plant 5.45 x 39 mm ammunition, manufactured in 1985, bearing the headstamp marks '3_85', the subject of CAR's trace request, in its national arsenals; 2) the following entities of the State Border Guard Service of Ukraine have records of this ammunition, which was not reported as lost or stolen:

- a) Lviv Border Guard Detachment
- b) K-9 Training Centre in Velyki Mosty
- c) Donetsk Border Guard Detachment
- d) Mohyliv-Podilsky Border Guard Detachment
- e) Podilsky Border Guard Detachment
- f) Bilhorod-Dnistrovskiy Border Guard Detachment
- g) Kherson Border Guard Detachment
- h) Berdyansk Border Guard Detachment
- i) Odessa Sea Guard Detachment
- j) Chernihiv Border Guard Detachment
- k) Zhytomyr Border Guard Detachment
- l) Separate Commandant's Office for security and logistics in Kyiv; and

3) as of 1 November 2020, the following military entities of the National Guard of Ukraine have records of this ammunition, which was not reported as lost or stolen:

- a) Unit 3043 (city of Netishyn)
- b) Units 2260 and 3030 (city of Kyiv)
- c) Unit 3008 (city of Vinnytsia)
- d) Unit 3028 (city of Kalynivka)
- e) Unit 1141 (city of Lutsk)
- f) Unit 3055 (city of Rivne)
- g) Unit 3002 (city of Lviv)
- h) Unit 3053 (city of Khmelnytskyi)
- i) Unit 3011 (city of Kryvyi Rih)
- j) Unit 3059 (city of Kremenchuk)
- k) Units 3036 and 3054 (city of Dnipro)
- l) Unit 3052 (city of Poltava)
- m) Unit 3039 (city of Mykolayiv)
- n) Unit 2276 (city of Okhtyrka)
- o) Unit 3082 (city of Chernihiv)
- p) Unit 3047 (city of Zhytomyr)

- q) Unit 3061 (city of Cherkasy)
- r) Unit 3035 (city of Slovyansk)
- s) Unit 3005 (city of Kharkiv)
- t) Unit 3042 (city of Energodar)
- u) Unit 3056 (city of Kherson),
- v) Unit 3014 (city of Odessa),
- w) Unit 3033 (city of Zaporizhia)
- x) Unit 3045 (city of Varash)
- y) Unit 3022 (city of Shostka); and

4) the Logistics Command of the Armed Forces of Ukraine has records of this ammunition with the following military units, which has not been reported as lost or stolen:

- a) A2502
- b) A1588 (with some lots transferred to units A0222, A4750, A2326, A3808, A2110, B2304, A0543, A1035, A2488, A0543, A2975, A4167, A1744, A1978, A1080, A2326, B2231, A1201, A3283, A4167, A3193, A2791, A3990, A2167, A1435, A0501, A0853, A1978, A0473, A0331; as well as to the Kirovohrad Oblast Recruitment Office, the Cherkasy Oblast Recruitment Office, the Poltava Oblast Recruitment Office, and the Dnipropetrovsk Oblast Recruitment Office)
- c) A1358 (transferred to unit A1807 field artillery storage)
- d) Kharkiv Air Force University
- e) A3767
- f) A1604
- g) A3199
- h) A0222
- i) A1880
- j) A0593
- k) A4608
- l) A1451
- m) A1352 field artillery storage
- n) A2215
- o) A2192;
- p) A1978
- q) A4465 (transferred to A0780 (A0959))
- r) A1201 (with some lots transferred to units A0680, A1126; as well as to the Dnipropetrovsk Oblast Recruitment Office).

As of April 2016, the Ministry of Interior of Ukraine had RGN hand grenades without fuzes, Makarov pistols, 5.45 × 39 mm AK-74 rifles, 40 mm RPG-7V rocket launchers, 40 mm GP-25 under barrel grenade launchers, 5.45 × 39 mm ammunition cartridges, 7.62 × 25 mm ammunition cartridges, 5.56 × 45 mm ammunition cartridges, and 9 × 19 mm ammunition cartridges in its inventory. The Ministry of Interior of Ukraine does not record information on markings, serial numbers, lot numbers, or years of manufacture and therefore no further information is available.

268 On 15 April 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 10 September 2020. This response confirmed that: 1) the State Border Guard Service of Ukraine has records of the Ulyanovsk Mechanical Plant 5.45 × 39 mm ammunition, manufactured in 1988, bearing the headstamp marks '3_88', the subject of CAR's trace request, in its national arsenals; 2) the following entities of the State Border Guard Service of Ukraine have records of this ammunition, which was not reported as lost or stolen:

- a) Odessa Border Guard detachment
- b) Bilhorod-Dnistrovskiyi Border Guard detachment
- c) Izmail Border Guard detachment
- d) Berdyansk Border Guard detachment
- e) Kherson Border Guard detachment
- f) Chernihiv Border Guard detachment
- g) Major General Ihor Momot Main Personnel Training Center (Cherkasy); h) Separate Commandant's Office for security and logistics in Kyiv; and

3) as of 1 November 2020, the following military entities of the National Guard of Ukraine have records of this ammunition, which was not reported as lost or stolen:

- a) Unit 2260 (city of Kyiv)
- b) Unit 1141 (city of Lutsk)
- c) Unit 3011 (city of Kryvyi Rih)
- d) Unit 3059 (city of Kremenchuk)
- e) Unit 2276 (city of Okhtyrka)
- f) Unit 3035 (city of Slovyansk)
- g) Unit 3005 (city of Kharkiv)
- h) Unit 3056 (city of Kherson)
- i) Unit 3014 (city of Odessa)
- j) Unit 3022 (city of Shostka); and

4) the Logistics Command of the Armed Forces of Ukraine has records of this ammunition with the following military units, and has not been reported as lost or stolen:

- a) A1588 (with lots transferred to units A1546, A3519, A1080, A0473, A2167; as well as to the Poltava Oblast Recruitment Office)
- b) A3767
- c) A4239
- d) A0981
- e) A1201 (with lots transferred to units A3767 and A0981)
- f) A1880
- g) A3406
- h) A1352 field artillery storage
- i) A2215.

As of April 2016, the Ministry of Interior of Ukraine had RGN hand grenades without fuzes, Makarov pistols, 5.45 × 39 mm AK-74 rifles, 40 mm RPG-7V rocket launchers, 40 mm GP-25 under barrel grenade launchers, 5.45 × 39 mm ammunition cartridges, 7.62 × 25 mm ammunition cartridges, 5.56 × 45 mm ammunition cartridges, and 9 × 19 mm ammunition cartridges in its inventory. The Ministry of Interior of Ukraine does not record information on markings, serial numbers, lot numbers, or years of manufacture and therefore no further information is available.

- 269 The headstamp is assumed to be 3_94 because the lot number is Л156-94-3. As this ammunition was documented in an unopened tin, however, the headstamps were not confirmed.
- 270 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 22 January 2020. This trace request sought information on the 5.45 × 39 mm ammunition bearing lot number 'Л156-94-3'. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen or lost.

As of April 2016, the Ministry of Interior of Ukraine had RGN hand grenades without fuzes, Makarov pistols, 5.45 × 39 mm AK-74 rifles, 40 mm RPG-7V rocket launchers, 40 mm GP-25 under barrel grenade launchers, 5.45 × 39 mm ammunition cartridges, 7.62 × 25 mm ammunition cartridges, 5.56 × 45 mm ammunition cartridges, and 9 × 19 mm ammunition cartridges in its inventory. The Ministry of Interior of Ukraine does not record information on markings, serial numbers, lot numbers, or years of manufacture and therefore no further information is available.

- 271 On 16 August 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 2 June 2021. This response confirms that: 1) the State Border Guard Service of Ukraine has records of the Tula Cartridge Works 7.62 × 39 mm ammunition, manufactured in 1962, bearing the headstamp marks '539_62', the subject of CAR's trace request, in its national arsenals; and 2) the Department of State Property and Resources of the Ministry of Internal Affairs of Ukraine established that the ammunition was not registered with the following entities, nor was it reported as stolen or lost:

- a) Odesa State University of Internal Affairs;
- b) Dnipropetrovsk State University of Internal Affairs;
- c) Lviv State University of Internal Affairs;
- d) Donetsk Law Institute of the Ministry of Internal Affairs of Ukraine;

3) the Luhansk Didorenko State University of Internal Affairs cannot confirm if the ammunition was registered with the university prior to 2014 because the official records remained in Luhansk in the temporarily occupied territory of Ukraine; and 4) since 2014, the ammunition has not been registered with the Luhansk Didorenko State University of Internal Affairs, nor has it been reported as stolen or lost.

- 272 On 16 August 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 2 June 2021. This response confirms that: 1) the National Guard of Ukraine has records of the Tula Cartridge Works 7.62 x 39 mm ammunition, manufactured in 1982, bearing the headstamp marks '539_82', the subject of CAR's trace request, in its national arsenals; and 2) the Department of State Property and Resources of the Ministry of Internal Affairs of Ukraine established that the ammunition was not registered with the following entities, nor was it reported as stolen or lost:
- a) Odesa State University of Internal Affairs;
 - b) Dnipropetrovsk State University of Internal Affairs;
 - c) Lviv State University of Internal Affairs;
 - d) Donetsk Law Institute of the Ministry of Internal Affairs of Ukraine;
- 3) the Luhansk Didorenko State University of Internal Affairs cannot confirm if the ammunition was registered with the university prior to 2014 because the official records remained in Luhansk in the temporarily occupied territory of Ukraine; and 4) since 2014, the ammunition has not been registered with the Luhansk Didorenko State University of Internal Affairs, nor has it been reported as stolen or lost.
- 273 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 21 January 2019. This response confirmed that: 1) as of 1 June 2020, the National Guard of Ukraine has records of Tula Cartridge Works 5.45 x 39 mm ammunition, manufactured in 1990, bearing headstamp marks '539_90', the subject of CAR's trace request, in its national arsenals; and 2) the following military entities of the National Guard of Ukraine have records of this ammunition:
- a) Unit 3052 (city of Poltava)
 - b) Unit 3059 (city of Kremenchuk)
 - c) Unit 3011 (city of Kriviy Rih)
 - d) Unit 3017 (city of Kharkiv)
 - e) Unit 3027 (city of Vyshgorod)
 - f) Unit 3082 (city of Chernihiv)
 - g) Unit 3028 (city of Kalinivka)
 - h) Unit 3008 (city of Vinnitsa)
 - i) Unit 3014 (city of Odessa)
 - j) Unit 3043 (city of Netishyn)
 - k) Unit 3044 (city of Yuzhnoukrainsk)
 - l) Unit 2276 (city of Okhtyrka)
 - m) the National Academy of National Guard of Ukraine (city of Kharkiv)
 - n) Unit 3024 (city of Pavlograd)
- 3) the following military units of the Armed Forces of Ukraine also have records of this ammunition, which was not reported as stolen:
- a) Unit A3767
 - b) Unit A1358
 - c) Unit A3438 (transferred to unit B1109); and
- 4) (recovering force unspecified) recovered ammunition bearing these headstamp marks from illegal military formations and temporarily registered and stored it with military Unit 2276, National Guard of Ukraine (city of Okhtyrka).
- As of April 2016, the Ministry of Interior of Ukraine had RGN hand grenades without fuzes, Makarov pistols, 5.45 x 39 mm AK-74 rifles, 40 mm RPG-7V rocket launchers, 40 mm GP-25 under barrel grenade launchers, 5.45 x 39 mm ammunition cartridges, 7.62 x 25 mm ammunition cartridges, 5.56 x 45 mm ammunition cartridges, and 9 x 19 mm ammunition cartridges in its inventory. The Ministry of Interior of Ukraine does not record information on markings, serial numbers, lot numbers, or years of manufacture and therefore no further information is available.
- 274 On 16 August 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 2 June 2021. This response confirms that the Government of Ukraine holds no records of the JSC Bishkek Machine Engineering Plant 7.62 x 54 mm R ammunition, manufactured in 1971, bearing the headstamp marks '60_71', the subject of CAR's trace request, in its national arsenals.
- 275 On 16 August 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 2 June 2021. This response confirms that the Government of Ukraine holds no records of the JSC Bishkek Machine

- Engineering Plant 7.62 x 54 mm R ammunition, manufactured in 1974, bearing the headstamp marks '60_74', the subject of CAR's trace request, in its national arsenals.
- 276 On 15 April 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 10 September 2020. This response confirmed that: 1) the Logistics Command of the Armed Forces of Ukraine has records of the JSC Bishkek Machine Engineering Plant 7.62 x 54R mm ammunition, manufactured in 1977, bearing the headstamp marks '60_77', the subject of CAR's trace request, with the following military unit, and has not been reported as lost or stolen:
- a) A1201 (transferred to units A1588 field artillery storage, and A0680; as well as to the Ternopil Oblast Recruitment Office).
- 277 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 21 January 2019. This response confirmed that: 1) as of 1 June 2020, the National Guard of Ukraine has records of JSC Bishkek Machine Engineering Plant 5.45 x 39 mm ammunition manufactured in 1980, bearing headstamp marks '60_80', the subject of CAR's trace request, in its national arsenals; and 2) the following military entity of the National Guard of Ukraine has records of this ammunition:
- a) Unit 2276 (city of Okhtyrka);
- 3) the following military entities of the Armed Forces of Ukraine also have records of this ammunition, which was not reported as stolen:
- a) Unit A1479 (with lots transferred to Unit A2995, State-owned enterprise Ukrinmash, Kharkiv Regional Military Commissariat, and the Ministry of Internal Affairs of Ukraine)
 - b) Unit A3767
 - c) Unit A1358
 - d) Unit 3199; and
- 4) (recovering force unspecified) recovered ammunition bearing these headstamp marks from illegal military formations and temporarily registered and stored it with military Unit 2276, National Guard of Ukraine (city of Okhtyrka).
- 278 As of April 2016, the Ministry of Interior of Ukraine had RGN hand grenades without fuzes, Makarov pistols, 5.45 x 39 mm AK-74 rifles, 40 mm RPG-7V rocket launchers, 40 mm GP-25 under barrel grenade launchers, 5.45 x 39 mm ammunition cartridges, 7.62 x 25 mm ammunition cartridges, 5.56 x 45 mm ammunition cartridges, and 9 x 19 mm ammunition cartridges in its inventory. The Ministry of Interior of Ukraine does not record information on markings, serial numbers, lot numbers, or years of manufacture and therefore no further information is available.
- On 15 April 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 10 September 2020. This response confirmed that: 1) the State Border Guard Service of Ukraine has records of the JSC Bishkek Machine Engineering Plant 7.62 x 54R mm ammunition, manufactured in 1980, bearing the headstamp marks '60_80', the subject of CAR's trace request, in its national arsenals; 2) the following entity of the State Border Guard Service of Ukraine has records of this ammunition, which was not reported as lost or stolen:
- a) Chernihiv Border Guard Detachment; and
- 3) the Logistics Command of the Armed Forces of Ukraine has records of this ammunition with the following military units, and has not been reported as lost or stolen:
- a) A4239
 - b) A1201 (transferred to units A1588 field artillery storage, A1319 field artillery storage, and A0224 (B4174)).
- 279 On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 21 January 2019. This response confirmed that: 1) the Armed Forces of Ukraine have records of the JSC Bishkek Machine Engineering Plant 5.45 x 39 mm ammunition, manufactured in 1983, bearing headstamp marks '60_83', the subject of CAR's trace request, in their national arsenals; and 2) the following military units have records of this ammunition, which was not reported as stolen:
- a) Unit A3767
 - b) Unit A1358
 - c) Unit A1479.
- 280 As of April 2016, the Ministry of Interior of Ukraine had RGN hand grenades without fuzes, Makarov pistols, 5.45 x 39 mm AK-74 rifles, 40 mm RPG-7V rocket launchers, 40 mm GP-25 under barrel grenade launchers, 5.45 x 39 mm ammunition cartridges, 7.62 x 25 mm ammunition cartridges, 5.56 x 45 mm ammunition

cartridges, and 9 × 19 mm ammunition cartridges in its inventory. The Ministry of Interior of Ukraine does not record information on markings, serial numbers, lot numbers, or years of manufacture and therefore no further information is available.

On 16 August 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 2 June 2021. This response confirms that the Government of Ukraine holds no records of the JSC Bishkek Machine Engineering Plant 5.45 × 39 mm ammunition, manufactured in 1984, bearing the headstamp marks '60_84', the subject of CAR's trace request, in its national arsenals.

281 On 15 April 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 10 September 2020. This response confirmed that: 1) the Logistics Command of the Armed Forces of Ukraine has records of the JSC Bishkek Machine Engineering Plant 5.45 × 39 mm ammunition, manufactured in 1985, bearing the headstamp marks '60_85', the subject of CAR's trace request, with the following military unit, and has not been reported as lost or stolen:

a) A2192.

282 As of April 2016, the Ministry of Interior of Ukraine had RGN hand grenades without fuzes, Makarov pistols, 5.45 × 39 mm AK-74 rifles, 40 mm RPG-7V rocket launchers, 40 mm GP-25 under barrel grenade launchers, 5.45 × 39 mm ammunition cartridges, 7.62 × 25 mm ammunition cartridges, 5.56 × 45 mm ammunition cartridges, and 9 × 19 mm ammunition cartridges in its inventory. The Ministry of Interior of Ukraine does not record information on markings, serial numbers, lot numbers, or years of manufacture and therefore no further information is available.

On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 21 January 2019. This response confirmed that: 1) the State Border Guard Service of Ukraine has records of JSC Bishkek Machine Engineering Plant 5.45 × 39 mm ammunition, manufactured in 1989, bearing headstamp marks '60_89', the subject of CAR's trace request, in its national arsenals; and 2) the following entities of the State Border Guard Service of Ukraine have records of this ammunition, which was not reported as lost or stolen:

- a) Chernihiv Border Guard Detachment
- b) Zhytomyr Border Guard Detachment
- c) Port of Entry "Kyiv", Borispyl city
- d) Berdyansk Border Guard Detachment
- e) Kramatorsk Border Guard Detachment
- f) Luhansk Border Guard Detachment (with Lisichansk municipal police)
- g) Lutsk Border Guard Detachment; and

3) the following military entities of the Armed Forces of Ukraine also have records of this ammunition, which was not reported as stolen:

- a) Unit A1358
- b) Unit A1479 (with lots transferred to Units A1119, A1588, A1979, A1358, 0665, A1376, and the Kharkiv Regional Military Commissariat)
- c) Unit A3767.

283 As of April 2016, the Ministry of Interior of Ukraine had RGN hand grenades without fuzes, Makarov pistols, 5.45 × 39 mm AK-74 rifles, 40 mm RPG-7V rocket launchers, 40 mm GP-25 under barrel grenade launchers, 5.45 × 39 mm ammunition cartridges, 7.62 × 25 mm ammunition cartridges, 5.56 × 45 mm ammunition cartridges, and 9 × 19 mm ammunition cartridges in its inventory. The Ministry of Interior of Ukraine does not record information on markings, serial numbers, lot numbers, or years of manufacture and therefore no further information is available.

On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 21 January 2019. This response confirmed that: 1) the State Border Guard Service of Ukraine has records of JSC Bishkek Machine Engineering Plant 5.45 × 39 mm ammunition, manufactured in 1990, bearing headstamp marks '60_90', the subject of CAR's trace request, in its national arsenals; and 2) the following entity of the State Border Guard Service of Ukraine has records of this ammunition, which was not reported as lost or stolen:

- a) Luhansk Border Guard Detachment (with Lisichansk municipal police);

3) as of 1 June 2020, the National Guard of Ukraine has records of JSC Bishkek Machine Engineering Plant 5.45 × 39 mm ammunition, manufactured in 1990, bearing headstamp marks 60_90, the object of CAR's trace request, in its national arsenals, which was not reported as lost or stolen; and 4) the following military entities of the National Guard of Ukraine have records of this ammunition:

- a) Unit 3082 (city of Chernihiv)

b) Unit 2276 (city of Okhtyrka);

5) the following military entities of the Armed Forces of Ukraine also have records of this ammunition, which was not reported as lost or stolen:

- a) Volyn Regional Military Commissariat (transferred to Unit B0116)
- b) Unit A1352
- c) Unit 1358
- d) Unit 3199
- e) Unit A1479; and

6) (recovering force unspecified) recovered ammunition bearing these headstamp marks from illegal military formations and temporarily registered and stored it with military Unit 2276, National Guard of Ukraine (city of Okhtyrka).

284 As of April 2016, the Ministry of Interior of Ukraine had RGN hand grenades without fuzes, Makarov pistols, 5.45 × 39 mm AK-74 rifles, 40 mm RPG-7V rocket launchers, 40 mm GP-25 under barrel grenade launchers, 5.45 × 39 mm ammunition cartridges, 7.62 × 25 mm ammunition cartridges, 5.56 × 45 mm ammunition cartridges, and 9 × 19 mm ammunition cartridges in its inventory. The Ministry of Interior of Ukraine does not record information on markings, serial numbers, lot numbers, or years of manufacture and therefore no further information is available.

On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 21 January 2019. This response confirmed that: 1) the Armed Forces of Ukraine have records of Vypel State Production Association 5.45 × 39 mm ammunition, manufactured in 1989, bearing headstamp marks '7_89', the subject of CAR's trace request, in their national arsenals; and 2) the following military units have records of this ammunition, which was not reported as stolen:

- a) Unit A1358
- b) Unit A1479
- c) Unit A3767.

3) further, the Main Personnel Training Center of the State Border Guard Service "Major-General Ihor Momot" recorded ammunition bearing these headstamp marks, which was not reported as stolen or lost.

285 As of April 2016, the Ministry of Interior of Ukraine had RGN hand grenades without fuzes, Makarov pistols, 5.45 × 39 mm AK-74 rifles, 40 mm RPG-7V rocket launchers, 40 mm GP-25 under barrel grenade launchers, 5.45 × 39 mm ammunition cartridges, 7.62 × 25 mm ammunition cartridges, 5.56 × 45 mm ammunition cartridges, and 9 × 19 mm ammunition cartridges in its inventory. The Ministry of Interior of Ukraine does not record information on markings, serial numbers, lot numbers, or years of manufacture and therefore no further information is available.

On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 21 January 2019. This response confirmed that: 1) the Armed Forces of Ukraine have records of the Vypel State Production Association 5.45 × 39 mm ammunition, manufactured in 1991, bearing headstamp marks '7_91', the subject of CAR's trace request, in their national arsenals; and 2) the following military unit has records of this ammunition, which was not reported as stolen:

- a) Unit A3767.

3) further, (recovering force unspecified) recovered ammunition bearing these headstamp marks from illegal military formations and temporarily registered and stored it with military Unit 2276, National Guard of Ukraine (city of Okhtyrka).

286 As of April 2016, the Ministry of Interior of Ukraine had RGN hand grenades without fuzes, Makarov pistols, 5.45 × 39 mm AK-74 rifles, 40 mm RPG-7V rocket launchers, 40 mm GP-25 under barrel grenade launchers, 5.45 × 39 mm ammunition cartridges, 7.62 × 25 mm ammunition cartridges, 5.56 × 45 mm ammunition cartridges, and 9 × 19 mm ammunition cartridges in its inventory. The Ministry of Interior of Ukraine does not record information on markings, serial numbers, lot numbers, or years of manufacture and therefore no further information is available.

On 15 October 2020, the Government of Ukraine responded to a formal trace request issued by CAR on 21 January 2019. This response confirmed that: 1) the Armed Forces of Ukraine have records of Vypel State Production Association 5.45 × 39 mm ammunition, manufactured in 1993, bearing headstamp marks '7_93', the subject of CAR's trace request, in their national arsenals; and 2) the following military units have records of this ammunition, which was not reported as stolen:

- a) Unit A3767
- b) Unit A1358
- c) Unit A1479 (transferred to Unit A3283 in the city of Kriviy Rih); and

3) the Main Personnel Training Center of the State Border Guard Service “Major-General Ihor Momot” recorded ammunition bearing these headstamp marks, which was not reported as stolen or lost.

287 As of April 2016, the Ministry of Interior of Ukraine had RGN hand grenades without fuzes, Makarov pistols, 5.45 × 39 mm AK-74 rifles, 40 mm RPG-7V rocket launchers, 40 mm GP-25 under barrel grenade launchers, 5.45 × 39 mm ammunition cartridges, 7.62 × 25 mm ammunition cartridges, 5.56 × 45 mm ammunition cartridges, and 9 × 19 mm ammunition cartridges in its inventory. The Ministry of Interior of Ukraine does not record information on markings, serial numbers, lot numbers, or years of manufacture and therefore no further information is available.

On 15 April 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 10 September 2020. This trace request sought information on the 5.45 × 39 mm ammunition bearing the headstamp marks ‘7_98’. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen or lost.

As of April 2016, the Ministry of Interior of Ukraine had RGN hand grenades without fuzes, Makarov pistols, 5.45 × 39 mm AK-74 rifles, 40 mm RPG-7V rocket launchers, 40 mm GP-25 under barrel grenade launchers, 5.45 × 39 mm ammunition cartridges, 7.62 × 25 mm ammunition cartridges, 5.56 × 45 mm ammunition cartridges, and 9 × 19 mm ammunition cartridges in its inventory. The Ministry of Interior of Ukraine does not record information on markings, serial numbers, lot numbers, or years of manufacture and therefore no further information is available.

288 On 16 August 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 2 June 2021. This response confirms that the Government of Ukraine holds no records of the Klimovsk Specialized Ammunition Plant 7.62 × 39 mm ammunition, manufactured in 1989, bearing the headstamp marks ‘711_89’, the subject of CAR’s trace request, in its national arsenals.

289 On 15 April 2021, the Government of Ukraine responded to a formal trace request issued by CAR on 10 September 2020. This trace request sought information on the 9 × 39 mm ammunition bearing no headstamp marks. In response, the Government of Ukraine confirmed that this item is not in service with the Armed Forces of Ukraine, nor has it been recorded as stolen or lost.

REFERENCES

- AC Moscow (Arbitration Court of the City of Moscow). 2020. Decision of 26 June 2020 in Case No. A40-295732/2019. <https://kad.arbitr.ru/Document/Pdf/f76a8c36-49cb-4c28-aa2c-050aec15ab55/c4170cde-c4ed-40fa-b070-73355bd3ffbc/A40-295732-2019_20201225_Reshenija_i_postanovlenija.pdf?isAddStamp=True>
- Chekh, Artem. 2020. *Absolute Zero*. Glagoslav Publication. 1 May.
- Euromaidan Press. 2014. 'Russian "Humanitarian" Trucks Leaving with Stolen Factory Equipment.' 23 August. <<http://euromaidanpress.com/2014/08/23/russian-humanitarian-trucks-leaving-with-stolen-factory-equipment/>>
- European Council. 2014. Council Decision (CFSP) 2014/512. 31 July. <<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32014D0512>>
- . 2015. Council Decision (CFSP) 2015/432. 13 March. <<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32015D0432>>
- FAS (Federal Antimonopoly Service of the Russian Federation). 2016. Resolution on the Termination of Proceedings in Case No. 4-14.55-710/00-24-16.' 28 June. <<https://fas.gov.ru/documents/449462>>
- Ferguson, Jonathan and N.R. Jenzen-Jones. 2014. *Raising Red Flags: An Examination of Arms & Munitions in the Ongoing Conflict in Ukraine*. Perth: Armament Research Services (ARES). November. <<https://armamentresearch.com/Uploads/Research%20Report%20No.%203%20-%20Raising%20Red%20Flags.pdf>>
- GDMCPO (General Directorate of Military Cooperation and Peacekeeping Operations of the General Staff of the Armed Forces of Ukraine). 2016. 'Briefing on the Situation in the South-East of Ukraine (10.03-15.03.2016).'
- InformNapalm. 2017. 'A Kazakh Trace in Luhansk Cartridge Works Case.' 16 April. <<https://informnapalm.org/en/kazakh-trace-luhansk-cartridge-works-case/>>
- Kommersant (Kazan). 2013. 'Betaprom Passed the "Patent Corridor"' [in Russian]. 7 September. <<https://www.kommersant.ru/doc/2274171>>
- Luhansk Media Centre. 2016. 'Luhansk Cartridge Plant Fully Provides the People's Militia with Ammunition' [in Russian]. 9 March. <<https://lug-info.com/news/luganskii-patronnyi-zavod-polnostyu-obespechivaet-narodnyu-militsiyu-boepripasami-11401>>
- MIA (Ministry of Internal Affairs of Ukraine). n.d. 'Wanted Persons.' Accessed 8 April 2021. <<https://wanted.mvs.gov.ua/searchperson/details/?id=916274569766554>>
- OCHA (United Nations Office for the Coordination of Humanitarian Affairs). n.d. 'About OCHA Ukraine.' Accessed 31 May 2021. <<https://www.unocha.org/ukraine/about-ocha-ukraine>>
- OHCHR (Office of the United Nations High Commissioner for Human Rights). 2021. *Report of the Human Rights Situation in Ukraine: 1 August 2020–31 January 2021*. <<https://www.ohchr.org/Documents/Countries/UA/31stReportUkraine-en.pdf>>
- OMNITEK-H Ltd. n.d. Website. Accessed 24 January 2019. <<https://www.omnitek.ru/eng/company.html>>

- OSCE (Organization for Security and Co-operation in Europe). n.d. 'OSCE Special Monitoring Mission to Ukraine.' Accessed 6 May 2021. <<https://www.osce.org/special-monitoring-mission-to-ukraine>>
- Peker, Emre. 2015. 'Turkish Military Downs Drone that Entered Airspace from Syria.' *Wall Street Journal*. 16 October. <<https://www.wsj.com/articles/turkish-military-downs-unidentified-aircraft-violating-airspace-1444992779>>
- PRCD (Public Register and Collection of Documents, Ministry of Justice of the Czech Republic). n.d.a. 'Complete Extract from the Commercial Register: World Logistic Group s.r.o. in Liquidation, C 21733 Held at the Regional Court in Pilsen.' Accessed 14 June 2021. <https://or.justice.cz/ias/ui/rejstrik-firma_vysledky?subjektId=192931&typ=UPLNY>
- . n.d.b. Search. Accessed 30 June 2021. <<https://or.justice.cz/ias/ui/rejstrik>>
- Schroeder, Matt and Olena Shumska. 2021. *Making the Rounds: Illicit Ammunition in Ukraine*. Geneva: Small Arms Survey. January. <<http://www.smallarmssurvey.org/fileadmin/docs/U-Reports/SAS-Report-Illicit-Ammunition-Ukraine.pdf>>
- SSD Lithuania (State Security Department of the Republic of Lithuania). 2019. *National Threat Assessment 2019*. <<https://www.vsd.lt/wp-content/uploads/2019/02/2019-Gresmes-internetui-EN.pdf>>
- u-blox. n.d. 'NEO/LEA-6T.' Accessed 6 April 2021. <<https://www.u-blox.com/en/product/neolea-6t>>
- UNHCR (United Nations High Commissioner for Refugees). n.d. 'Ukraine: Registration of Internal Displacement.' Last updated 5 March 2021. <<https://app.powerbi.com/view?r=eyJrjoiY2RhMmExMjgtZWRIbS00YjcwLWI0MzktNmEwNDkwYzdmYTM0liwidCI6I-mU1YzM3OTgxLTY2NjQtNDZlZmM0YTBjLTY1NDNkMmFmODBiZSIsImMiOjh9>>
- UN (United Nations) in Ukraine. 2021. 'Landmines Still Pose a Threat to Two Million Ukrainians.' 5 April. <<https://ukraine.un.org/en/123917-landmines-still-pose-threat-two-million-ukrainians>>
- UNSC (United Nations Security Council). 2019. *Report of the Panel of Experts Pursuant to Security Council Resolution 1973 (2011), Concerning Libya*. S/2019/914 of 9 December. <<https://undocs.org/S/2019/914>>
- US (United States). 2017. Taking Additional Steps to Address the National Emergency with Respect to Significant Malicious Cyber-Enabled Activities. Executive Order 13757 of 28 December 2016. *Federal Register*, Vol. 81, No. 1. 3 January. <https://home.treasury.gov/system/files/126/cyber2_eo.pdf>
- USRLE (Unified State Register of Legal Entities, Russian Federation). n.d. 'Get Information from Business Registers (USRLE/USRLE)'. Accessed 8 April 2021. <<https://egrul.nalog.ru/index.html>>
- US Treasury (United States Department of the Treasury). 2018. *Report to Congress Pursuant to Section 241 of the Countering America's Adversaries Through Sanctions Act of 2017 Regarding Senior Foreign Political Figures and Oligarchs in the Russian Federation and Russian Parastatal Entities*. 29 January. <<http://prod-upp-image-read.ft.com/40911a30-057c-11e8-9650-9c0ad2d7c5b5>>



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