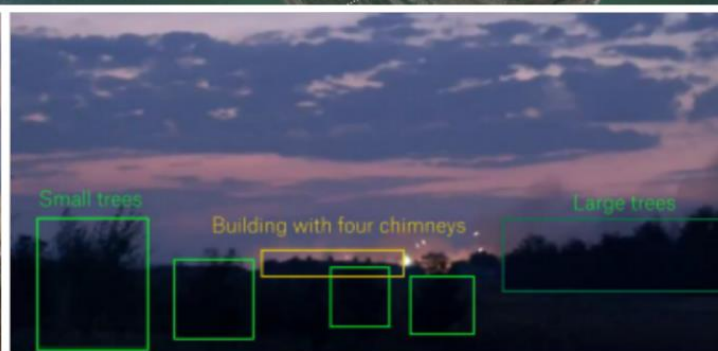


The Burning Road to Mariupol



The Burning Road to Mariupol

Attacks from Russia during the Novoazovs'k Offensive of August 2014

A bellingcat Investigation

by Sean Case, Klement Anders, Aric Toler, Eliot Higgins

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Summary

We present evidence from social media and satellite imagery² showing that artillery attacks and armored vehicles sighted in the area of Novoazovs'k in July / August 2014 came from Russia (summarized in Figure 1 and Table 1). Two artillery attacks on 23 August 2014 came from Russian territory, and two T-72Bs and one 2s19 Msta-S sighted in Novoazovs'k after its capture were transported from Russia. The report also provides analysis of several other attacks in the Novoazovs'k area during July / August 2014, all with some evidence suggesting Russian involvement.



Figure 1. Summary of artillery attacks in the Novoazovs'k region, from 21 July to 26 August 2014. Red solid lines indicate the trajectory of artillery fire that has been matched to a firing point found from satellite or social media evidence. Orange lines indicate a trajectory estimated from photo or video at the attack site – the firing point is unknown. The green line indicates the movement of attacking forces after advancing across the border on 25 August 2014.

On 23 August 2014, Multiple Launch Rocket System (MLRS) and other artillery fired from Russian territory struck a Ukrainian military base close to the town of Kholodne; more than 30 kilometers from the nearest position of the Russian-armed separatist forces within Ukraine (attack A, Table 1). After this, another artillery system within Russia struck the same position (attack B). Two Ukrainian checkpoints on the road from Novoazovs'k border crossing point (BCP) to Novoazovs'k town were attacked by MLRS fire from a firing position less than one kilometer from the Russian border, with visible tracks leading back to a crossing point into Russian territory, and/or from a position within Russia (attack D).

On 25 August 2014, satellite imagery evidence supports media reports and witness testimony that Russian-armed separatist forces crossed into Ukraine through a crossing

² primarily from Yandex maps satellite imagery from 31 August 2014, Google Earth satellite imagery from October 2014 and TerraServer satellite imagery from 2014 - 2015

point (visible on satellite imagery) north of Novoazovs'k BCP, and attacked Ukrainian forces to the east of the town of Novoazovs'k (attack E). On 25-26 August 2014, videos and photos show the aftermath of MLRS and artillery shelling of roads, houses, a cemetery, a bread factory and a hospital as Russian-armed separatist forces fought to take control of Novoazovs'k (attack F – H). Following the capture of Novoazovs'k on 27 August 2014, T-72Bs and 2s19 Msta-S were sighted in Novoazovs'k. Two of these T-72Bs and one 2s19 Msta-S were earlier sighted inside Russia, demonstrating the Russian origin of these vehicles.

The attacks discussed in this report are summarized in Table 1.

Table 1. A summary of the incidents and evidence investigated in this report.

Attack name	Date	Source of fire	Evidence	Page discussed
A. MLRS attack on Kholodne	23 August 2014	Russia	Video of rocket launch. Video of Kholodne under attack. Firing point and attack craters located on satellite images.	Page 9
B. Self-propelled artillery shelling of Kholodne	23 August 2014	Russia	Video of artillery firing site. Video of Kholodne under attack. Firing point located on satellite images. Trajectory analysis of artillery fire.	Page 16
C. Mortar shelling of Novoazovs'k border crossing point	25 July – 24 August 2014	Russia (unconfirmed)	Potential firing site located on satellite images. Witness reports.	Page 21
D. MLRS and artillery shelling of checkpoints on road to Novoazovs'k	21 July, 23 – 27 August	Inside Ukraine, Within 1 kilometer of Russian border	Firing site located, and vehicle tracks leading back to Russia. A second potential firing position identified in Russia. Artillery trajectories determined from photos taken at attack sites. Crater trajectory analysis of satellite imagery at attack site.	Page 24
E. Armored assault from Russia on Novoazovs'k area	25 August 2014	Crossed border from Russia between Markyne and Shcherbak, advanced on Novoazovs'k	Witness reports. Border crossing point, route of vehicle convoy and subsequent battle identified on satellite images.	Page 31
F. MLRS attack on Sedovo – Novoazovs'k road	26 August 2014 morning	Ukraine or Russia northeast of Novoazovs'k – unknown	Videos / photos of the attack site shortly after the attack. Crater trajectories analyzed from photos / video.	Page 36
G. Bread factory northeast Novoazovs'k artillery strike	26 August 2014 morning	Ukraine or Russia northeast of Novoazovs'k – unknown	Videos / photos of the attack site during and shortly after the attack. Crater trajectories analyzed from photos / video.	Page 39

Attack name	Date	Source of fire	Evidence	Page discussed
H. Northwest Novoazovs'k artillery strike	26 August 2014 afternoon	Ukraine – northeast of Novoazovs'k in are southeast of Rozy Lyuksemburh	Videos / photos of the attack site during and shortly after the attack. Crater trajectories analyzed from satellite images. Potential firing point located.	Page 40
I. Presence of 2 x T-72Bs and 1 x 2s19 Msta-S from Russia inside Ukraine	27 August to early September	NA	Videos and photos of convoys in Russia with matching vehicles sighted in Ukraine	Page 44

Introduction

NOTE: a timeline of the events, and links to all the videos considered in this report are provided at the end of the document (Table 6, Table 7).

In mid-August 2014, Ukrainian armed forces had pushed back the Russian-armed separatist forces to the areas close to the cities of Donetsk and Luhansk. Until this time, the area of the Donetsk region close to Novoazovs'k and Mariupol, overlooking the Sea of Azov, had been spared the worst of the fighting. Before 23 August 2014, Ukrainian forces had sporadically come under artillery fire³ (on 21 July^{4 5}, 25 July^{6 7}, 21 August⁸); however, there were no clear signs of forces massing in the area at the time to threaten a large-scale attack (Figure 2).

This changed on the morning of 23 August 2014, with large-scale and frequent artillery attacks on Ukrainian positions close to Novoazovs'k border crossing point (BCP), which continued over the next few days. By the morning of 25 August 2014, it was clear that towns along the Azov coast were now targets of the Russian-armed separatist forces.

³ It should be noted that during this time, the nearest 'separatist' military positions in Ukraine were at least 30 km away: <http://www.reuters.com/article/2014/08/26/us-ukraine-crisis-novoazovsk-exclusive-idUSKBN0GQ19U20140826>
<https://web.archive.org/web/20151010120421/http://www.reuters.com/article/2014/08/26/us-ukraine-crisis-novoazovsk-exclusive-idUSKBN0GQ19U20140826>

⁴ <http://tsn.ua/video/video-novini/ukrayinskiy-kordon-na-donechchini-vnochi-z-sistem-grad-obstrilyali-z-boku-rosiyskoyi-federaciyi.html> <https://archive.is/GCVZ4>

⁵

<https://www.facebook.com/photo.php?fbid=678160598918381&set=a.380896298644814.78458.10001733418697>
<https://web.archive.org/web/20151103203806/https://www.facebook.com/photo.php?fbid=678160598918381&set=a.380896298644814.78458.10001733418697>

⁶ http://24tv.ua/ukrayina/teroristi_masovo_obstrilyuyut_ukrayinskih_prikordonnikov_foto/n468570
<https://archive.is/ETRZe>

⁷ http://durdor.in.ua/uk/main/article_print/article_id/23235.phtml
https://web.archive.org/web/20140826014727/http://durdor.in.ua/uk/main/article_print/article_id/23235.phtml

⁸ <http://www.mariupolnews.com.ua/descr/48277>
<https://web.archive.org/web/20140825013412/http://www.mariupolnews.com.ua/descr/48277>

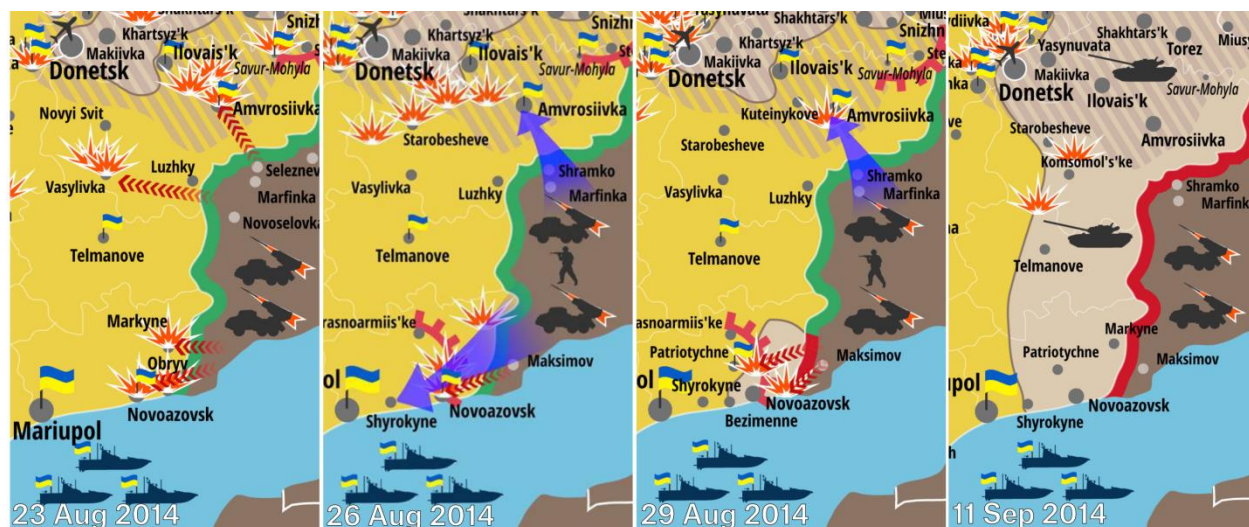


Figure 2. National Security and Defense Council of Ukraine⁹ situation maps from 17 August to 11 September 2014. The area of interest in this study is the area to the south, next to the Black sea and east of Mariupol.

The Ukrainian armed forces on the Azov coast came under sustained MLRS fire and mortar attack on the morning of 23 August 2014. According to Ukrainian media sources, between 4:00 and 5:00 am¹⁰, and from 6:00 to 6:25 am Novoazovsk BCP came under mortar attack (attack C)¹¹, and between 4:00 am and 6:00 am Ukrainian forces close to the BCP came under MLRS attack¹² (attack A). Afterwards, both areas were attacked again by mortars and howitzers¹³ (attack B), and nearby checkpoints were attacked by MLRS fire during the day¹⁴ (attack D). Several media and Ukrainian official sources reported on these attacks^{15 16 17}.

⁹ <http://www.rnbo.gov.ua/en/>

¹⁰ All times in this report are Eastern European Summer Time (EEST, UTC + 3 hours) unless otherwise noted.

¹¹ <http://www.mariupolnews.com.ua/descr/48347>
<https://web.archive.org/web/20140826122123/http://www.mariupolnews.com.ua/descr/48347>

¹² <https://www.youtube.com/watch?v=1hCA8LDWJPY> backup:
<https://www.youtube.com/watch?v=bmqbu3IJpZw>

¹³ <http://hubs.com.ua/discussions/gradyi-buki.html>
<https://web.archive.org/web/20150324205341/http://hubs.com.ua/discussions/gradyi-buki.html>

¹⁴ <http://uacrisis.org/ua/8255-rnbo-40>
<https://web.archive.org/web/20150624054822/http://uacrisis.org/ua/8255-rnbo-40>

¹⁵ <http://hubs.com.ua/discussions/gradyi-buki.html>
<https://web.archive.org/web/20150324205341/http://hubs.com.ua/discussions/gradyi-buki.html>

¹⁶ <http://uacrisis.org/8244-rnbo-39>
<https://web.archive.org/web/20151103201507/http://uacrisis.org/8244-rnbo-39>

¹⁷ http://www.dialog.ua/news/14501_1408791547
https://web.archive.org/web/20140825033732/http://www.dialog.ua/news/14501_1408791547

The BCP was attacked again on 24 August 2014¹⁸. On the morning of 25 August, it was reported by Ukrainian forces that a significant number of armored military vehicles had crossed the border and was advancing on Ukrainian positions close to Novoazovs'k^{19 20}. Journalists and local residents widely reported further shelling of the town of Novoazovs'k on 26 August²¹. By 27 August 2014, Russian-armed separatist forces captured Novoazovs'k²². In the week that followed, Russian-armed separatists further pushed back Ukrainian forces, and took every town along the Azov coast on the road to Mariupol, including Bezimenne and Shyrokyne, before threatening the major port city itself. The ceasefire agreement signed in Minsk on 5 September possibly saved the city from this fate²³.

This report aims to investigate the claims of Russian involvement in the attacks leading up to and during the assault on Novoazovs'k during 23 – 27 August 2014. The report will first analyze open source evidence to determine the source of artillery fire on Ukrainian units in the Novoazovs'k area during this period. A previous report has shown that artillery was fired from Russian territory on multiple occasions close to other areas of the border²⁴. However, in the area of Novoazovs'k in late August 2014, Russian officials have denied that artillery attacks came from Russian territory²⁵.

¹⁸ <http://uacrisis.org/ua/8255-rnbo-40>
<https://web.archive.org/web/20150624054822/http://uacrisis.org/ua/8255-rnbo-40>

¹⁹ <https://www.youtube.com/watch?v=HkrUQM62CCE>

²⁰ <https://news.vice.com/video/russian-roulette-dispatch-72> <https://archive.is/z9blZ>

²¹ See 'Shelling of Novoazovs'k 26 August 2014', page 32

²² <https://news.vice.com/article/pro-russia-forces-gain-ground-as-ukraines-volunteer-battalions-decry-kiev-leaders>
<https://web.archive.org/web/20150416032759/https://news.vice.com/article/pro-russia-forces-gain-ground-as-ukraines-volunteer-battalions-decry-kiev-leaders>

²³ <http://www.theguardian.com/world/2014/sep/05/ukraine-ceasefire-east-minsk-peace-talks>
<https://web.archive.org/web/20151119045552/http://www.theguardian.com/world/2014/sep/05/ukraine-ceasefire-east-minsk-peace-talks>

²⁴ <https://www.bellingcat.com/news/uk-and-europe/2015/02/17/origin-of-artillery-attacks/>
<https://archive.is/g21SF>

²⁵ <http://www.reuters.com/article/2014/08/26/us-ukraine-crisis-novoazovsk-exclusive-idUSKBN0GQ19U20140826>
<https://web.archive.org/web/20151010120421/http://www.reuters.com/article/2014/08/26/us-ukraine-crisis-novoazovsk-exclusive-idUSKBN0GQ19U20140826>



Figure 3. Comparison of the Yandex maps imagery (left) and the Astrium satellite image²⁶ from 2014. Note the matching smoke plume in the upper-right portion of both satellite images.

Videos, photos, and satellite imagery evidence²⁷ (Figure 3) allow us to identify the target, trajectory and source of several artillery attacks that took place in the area between 21 July and 27 August 2014. This report concludes that on multiple occasions, artillery attacks came from Russian territory, or from areas just next to the border²⁸.

The report also investigates the origin of T-72B armored main battle tanks (MBTs) and howitzers that were filmed or photographed close to Novoazovs'k after the town was taken. Building on previous work^{29 30 31}, we show that two T-72B tanks and one 2s19 Msta-S 152-mm self-propelled howitzer was transferred from Russia to Ukraine in late summer 2014.

²⁶ http://ql.astrium-geo.com/catalog/img/getfeatureimage.aspx/DS_PHR1A_201408310854150_FR1_PX_E038N47_0204_02408 <https://archive.is/RzHQq>

²⁷ Note: all of the satellite imagery evidence considered here came from publicly-available images provided by Google Earth / Digital Globe (October 2014), Yandex maps (31 August 2014), and TerraServer preview images (2014 – 2015). All of these mapping services use a WGS-1984 world projection, and so the latitude and longitudes given in this report are convertible between each service.

²⁸ Several crater analyses are performed on artillery craters visible on satellite images, based on the method described in the US Army Tactics, Techniques and Publications document ATTP 3-21.90 'Tactical Employment of Mortars', 2011 available here: http://armypubs.army.mil/doctrine/7_Series_Collection_1.html. Further details about the method used are provided in the previous Bellingcat report "Origin of Artillery Attacks on Ukrainian Military Positions in Eastern Ukraine Between 14 July 2014 and 8 August 2014" <https://www.bellingcat.com/news/uk-and-europe/2015/02/17/origin-of-artillery-attacks/> <https://archive.is/g21SF>

²⁹ <https://www.bellingcat.com/resources/case-studies/2015/05/29/confirming-the-location-of-the-same-msta-s-in-russia-and-ukraine/> <https://archive.is/g21SF>

Artillery attacks east of Novoazovs'k, July / August 2014

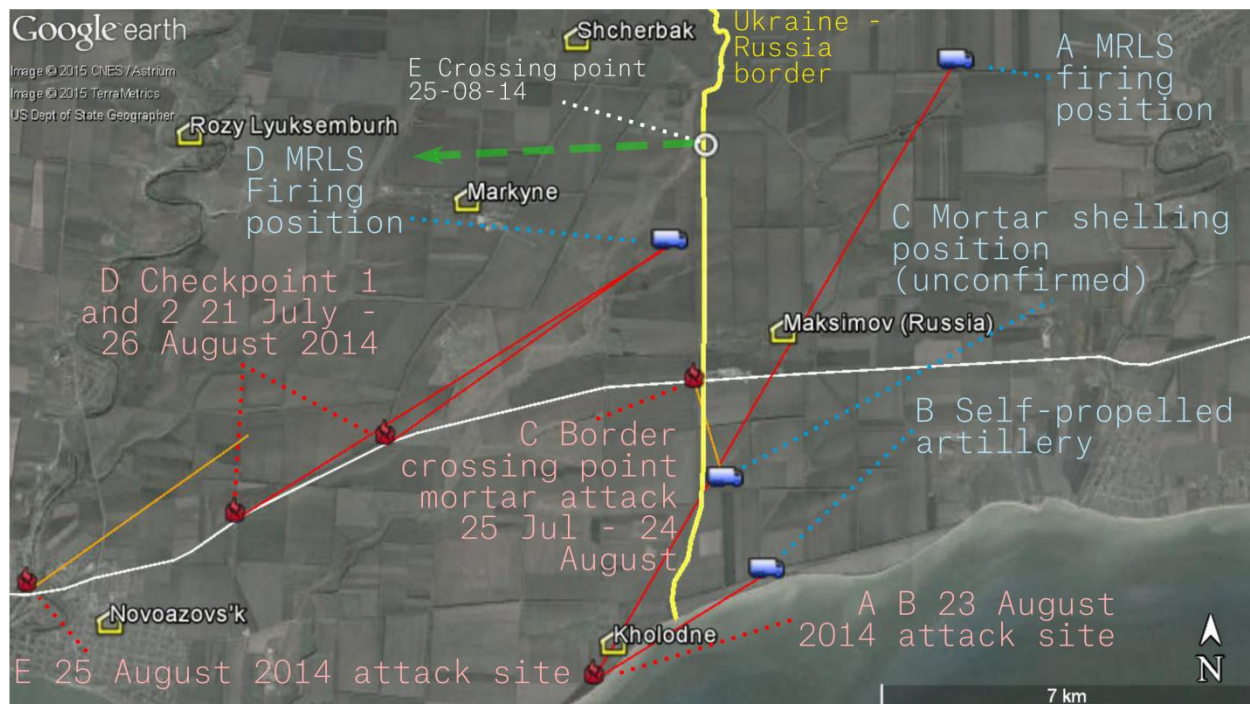


Figure 4. Artillery attacks in the Novoazovs'k region, 23-25 August 2014. Red solid lines indicate the trajectory of artillery fire that has been matched to a firing point found from satellite or social media evidence. Orange lines indicate a trajectory estimated from photo or video at the attack site – the firing point is unknown. The green line indicates the proposed direction of armored forces after advancing across the border.

A. MLRS attack on Kholodne from Russia, morning of 23 August 2014

On the morning of 23 August 2014 at around 4:50 am, a Ukrainian army camp close to the village of Kholodne was attacked by a barrage of MLRS rockets. Multiple videos of the event prove that this attack came from Russia.

Determining the type and location of the artillery fire

Video 23-¹³² was filmed within Ukraine on 23 August 2014, within two kilometers of the Russian border at Novoazovs'k BCP. The video shows nine rockets being fired within the first six seconds of the video; it is very likely that there were additional rockets fired before the start of the video, which prompted the local to start filming.

The video begins from the approximate location of 47.158348, 38.210027, with the person shooting the video driving along the M14 to the east between Novoazovs'k and Novoazovs'k

³⁰ <http://surpher.livejournal.com/762.html> <https://archive.is/XedLS>

³¹ <http://sled-vzayt.livejournal.com/1730.html?page=> <https://archive.is/GYQsL>

³² https://www.youtube.com/watch?v=r7zabXxF_bE backup: <https://www.youtube.com/watch?v=RulO66G8npA>

BCP. The sky is red towards the direction that the camera is facing, suggesting that the video was filmed in the early morning.



Figure 5. Geolocation of Video 23-1 at 00:01 (47.158380, 38.210218). The yellow lines indicate the left and right extent of the camera view. The red line indicates the view directly towards the Grad fire.

The position of the trees in between the camera and the Grad fire enable us to determine that the fire comes from the northeast, towards the Russian border (Figure 5). Other clues in the video give us an indication of the range. The last visible rocket fire occurs at 6.07 seconds into the video. By calculating the average time that each rocket is visible on screen (0.62 seconds), we estimate that the final visible rocket was fired at 5.45 seconds into the video. From 21 seconds, when the car stops, we can hear the regular sounds of 8 rocket launches from 25 to 30 seconds. The last time that we hear a rocket launch is at 29.9 seconds, a sound which we assumed was that of the final visible rocket being fired.

The time difference between seeing the last rocket launch and hearing the last rocket launch is therefore ~24.5 seconds. Calculating from the speed of sound (approximately 340 meters per second³³) we estimate that the location of fire is 8.3 km away³⁴. Using Google Earth, we can extrapolate this distance from the position the cameraman was standing at

³³ All of the case studies considered in this report involve altitudes of less than 70 meters above sea level, so we have assumed the speed of sound at sea level for our analysis (340 meters per second). Further variations due to temperature and air pressure were assumed to be negligible.

³⁴ The blogger "Dajey Petros" (Ukraine @ War) also attempted this analysis, which matches closely to the findings of this analysis: <http://ukraineatwar.blogspot.dk/2014/08/russia-shelling-ukrainian-village-from.html>
<https://web.archive.org/web/20151109214644/http://ukraineatwar.blogspot.dk/2014/08/russia-shelling-ukrainian-village-from.html>

the time of the last blast sound (the end of video position) to estimate firing position for this MLRS fire (Figure 6).



Figure 6. The estimated firing point of the 23 August 2014 MLRS attack on Kholodne from audio analysis of video 23-1, next to the images of the scorch marks at the firing point position found on Yandex maps (image date 08-31-2014, position: 47.210984, 38.300544, also visible on Google Earth 10/11/2014 image). Focus image of scorch marks from Klement Anders

The approximate firing point based on analysis of the video is several kilometers inside Russia. The evidence from Video 23-1 leaves no doubt that this rocket attack came from Russia. Using further video evidence, below we can also determine the target and timing of the attack.

Confirming the firing position, trajectory and attack site position

Imagery from Yandex maps of the area was updated in 31 August 2014³⁵ (a Russian internet company; Yandex.ru is one of the most the most popular websites in Russia) show both the site attacked by rocket fire on 23 August as well as the position from which the rockets were fired.

Less than one kilometer east from the firing position predicted from video 23-1 are two clear scorch marks in a field (at 47.210984, 38.300544, Figure 6), 54 meters above sea level with an elevation profile that drops down to Kholodne (elevation 12 meters) approximately 13 kilometers away.

³⁵ Satellite imagery in the area considered in this report is also available on Google Earth on 11 October 2014.

The scorch marks clearly face towards the southwest. It has been shown in previous reports that MLRS systems leave scorch marks in fields that point towards the target point³⁶. By extending linearly from the direction the scorch marks are facing, we find that the trajectory passes very close to the crater field at the Ukrainian army camp at Kholodne (Figure 7).



Figure 7. The firing position for the 23 Aug 2014 MLRS attack on Kholodne (47.210984, 38.300544) and the trajectory of fire based on the direction that the scorch marks are facing (red line), and the position of attack craters at the attack site (red fire symbols (close to 47.109397, 38.211529); In the top left image, the Yandex attack site image has been superimposed on the Google Earth base layer

Analyzing Yandex maps satellite imagery in the area next to Kholodne (imagery date 31 August 2014) clearly shows an artillery attack site with at 19 visible artillery craters (Figure 7). The craters were not clear enough to be analyzed to determine the trajectory using crater analysis techniques.

The craters were at least 3 meters in diameter, suggesting the use of at least 122-mm munitions³⁷. Considering Russian MLRS systems, the BM-21 Grad launcher fires 122-mm rockets, and can carry a payload of up to 40 rockets, and has a range of 20 km. A BM-27 Uragan fires 220-mm rockets and has a range of 34 km and can carry up to 16 rockets, while a BM-30 Smerch fires 300-mm rockets, has a range of 70 km and can carry up to 12 rockets. From the available evidence, we could not determine with certainty the type of MLRS system was used in this attack.

³⁶ <https://www.bellingcat.com/news/uk-and-europe/2015/02/17/origin-of-artillery-attacks/>
<https://archive.is/g21SF>

³⁷ <http://www.winterwar.com/Weapons/artinfo.htm>
<https://web.archive.org/web/20150628201819/http://www.winterwar.com/Weapons/artinfo.htm>

Table 2. The artillery craters identified at the Kholodne Ukrainian army base from Yandex satellite imagery taken in 31 August 2014 (close to 47.109397, 38.211529).

Area	Number of craters identified	Number of craters clear enough to determine trajectory	Results	Reference
Ukrainian army base southwest of Kholodne	23	17 (not clear enough for precise trajectory analysis)	17 from northeast	Figure 7

Additional evidence regarding the attack location is provided in Video 23-2³⁸. This video shows some of the damage from the attacks of that morning, and interviews with Ukrainian soldiers.



Figure 8. Image of the Kholodne Ukrainian army base at 55 seconds into video 23-2³⁹ on top of the 10/11/2014 Google Earth image (47.109521, 38.211557).

The first part of the video shows burnt ground, and damaged equipment and vehicles. These first 1 minute and 16 seconds appear to have been filmed at the Ukrainian military base next to Kholodne. At 55 seconds we see a large square trench in which beds and furniture are stored, which can be located in the area close to 47.109521, 38.211557.

³⁸ <https://www.youtube.com/watch?v=1hCA8LDWJPY> backup: <https://www.youtube.com/watch?v=bmqbu3IJpZw>

³⁹ <https://www.youtube.com/watch?v=1hCA8LDWJPY> backup: <https://www.youtube.com/watch?v=bmqbu3IJpZw>

Confirming the location, scale, and time of the MLRS attack

Video 23-3⁴⁰ shows the attack on the Kholodne army base as it is happening. In the video, nine explosions are visible between 0.5 and 7 seconds in. 23 blasts are heard in 14 seconds (Which may include secondary explosions and not primary rocket impacts). By comparing the time between the last visible flash (6.7s) and the last blast impact sound (14.1s), the distance between the camera position and explosion can be estimated to be 2.5 kilometers. Using the landscape features and buildings shown in the video, the filming position was geolocated to the position shown in Figure 9 (47.101406, 38.180351).



Figure 9. Geolocation of video 23-3, filmed from 47.101406, 38.180351. The green lines indicate the left and right extent of the camera view. The TerraServer preview image (top left of the figure) shows the copse of trees in which the video was likely filmed.

The sky in video 23-3 is red, which suggests that the video was filmed early in the morning; however, it does not confirm the exact filming time. We need further evidence to confirm the exact time of the attack.

Confirming the time of the attack

Video 23-4⁴¹ is filmed completely in the dark, but gives us a time and location of an artillery attack in the area. We can hear a woman's voice followed by a number of explosions in the distance. She identifies the time and location of the video by saying the following:

⁴⁰ <https://www.youtube.com/watch?v=SnRqBDoBz9s> backup:
<https://www.youtube.com/watch?v=BqaHUVnVcJs>

⁴¹ <https://www.youtube.com/watch?v=NQdGQqgnJmw> backup:
<https://www.youtube.com/watch?v=tato8DW7gis>

“Sedovo...4:50am... the date is the 24...23, yes 23rd of August”

Shortly after she finishes speaking, we hear a number of explosions that begin just after 27 seconds into the video. A number of explosions are heard in quick succession, the timings of which are compared with video 23-3 below (Table 3).

Table 3. A comparison of the number and duration of explosions heard in videos 23-3⁴² and 23-4⁴³.

Video number	23-3	23-4
Time during which explosions are audible (s)	14	15
Number of audible explosions	23	20

In both Video 23-3 and 23-4 there is a similar long interval of 20+ explosions, indicating that it is very likely both videos were recording the same artillery attack event (no other artillery strike of a similar intensity was reported in the area at the time). Therefore, we can say that it was almost certain that both videos were filmed at the same time, and we can confirm that the MLRS attack on Kholodne occurred at around 4:50 am on 23 August 2014.

Further confirmation that an MLRS attack on Kholodne occurred on the morning of 23 August 2014 can be gained from VKontakte group discussions. Figure 10 shows examples of comments from VK users about the attack on the same day.

⁴² <https://www.youtube.com/watch?v=SnRqBDoBz9s> backup:
<https://www.youtube.com/watch?v=BqaHUVnVcJs>

⁴³ <https://www.youtube.com/watch?v=NOdGQqgnJmw> backup:
<https://www.youtube.com/watch?v=tato8DW7gis>

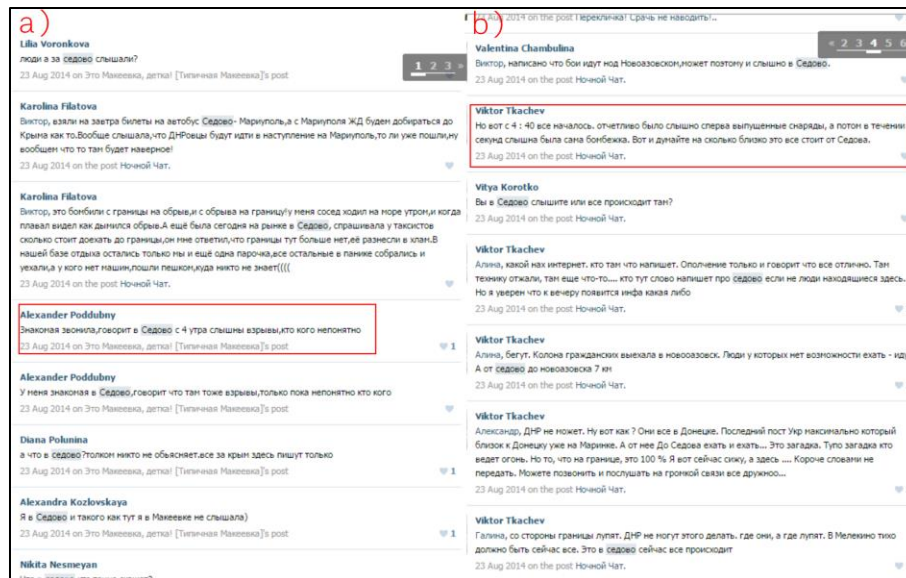


Figure 10. Translations of VK posts relating to the attacks of 23 August 2014, taken from the same VKontakte search⁴⁴; a) comment from username Alexander Poddubny: “A friend of mine called and said that explosions were heard in Sedovo from 4am, it’s unclear who is going at whom”, and b) comment from username Viktor Tkachev confirming that an attack happened at approximately 4.40am on 23 August 2014: “Well right from 4:40am it all started. There was a very distinct sound of outgoing shells, and then over the course of 5 seconds the bombing itself was audible. Just think about how close this all is from Sedovo”

B. Further artillery shelling on Kholodne from Russia, morning of 23 August 2014

Later in the morning of 23 August 2014 (after 4:40am), there were further artillery attacks from Russia on the Ukrainian military base at Kholodne. Due to the longer spacing between shots (around 20 seconds), these artillery attacks were most likely not conducted with MLRS fire. Analysis of videos from the event suggests that self-propelled artillery may have been used in this attack.

Video of the attack in progress

In video 23-5⁴⁵ we see thick smoke in the distance and can hear several explosions. Smoke is visible from the start of the video, and only four sporadic blasts can be heard, which suggests that the weapon used is not MLRS artillery, and is more likely mortars or howitzers.

The video was filmed from 47.082537, 38.175397 (Figure 11), a geolocation that was based on the distinctive landscape features (the promenade, distant outcrop of land, and position of tree line). The only visible explosion in the video (at 60 seconds in) occurs almost 12

⁴⁴ <https://vk.com/wall-55653790?day=23082014&q=%D0%A1%D0%95%D0%94%D0%9E%D0%92%D0%9E>

⁴⁵ <https://www.youtube.com/watch?v=6yJN5lvW6DQ> backup: https://www.youtube.com/watch?v=OTTSHu_jwIM

seconds before the next loud blast sound, which suggests a distance of around 4 kilometers from camera to explosion, and matches the distance to the attack site next to Kholodne.

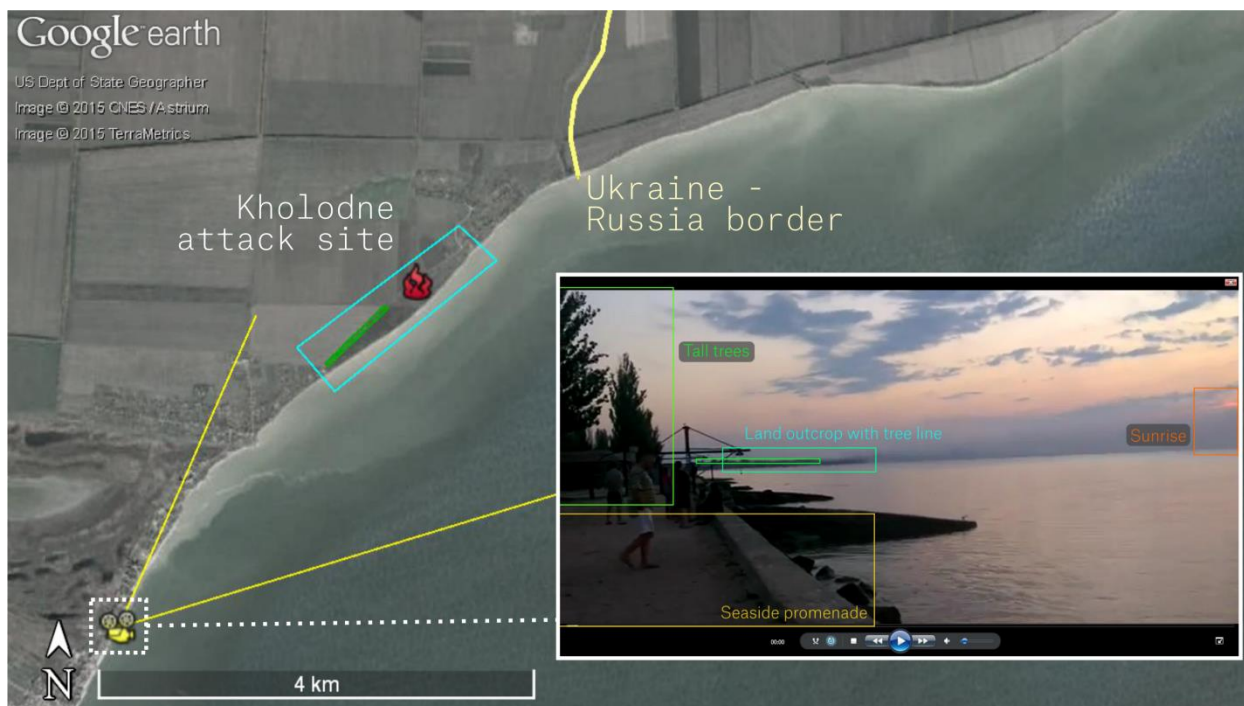


Figure 11. Geolocation of video 23-5 'Sedovo clashing' filmed from 47.082537, 38.175397. The yellow straight lines indicate the left and right extent of the camera view.

By comparing the position of the sun with known sunrise and sunset times using SunCalc, the time that the video was taken was estimated to be just after sunrise, after 4:40 am on 23 August at this location⁴⁶.

Video of the launch site in Russia

Video 23-6 is made of two parts (23-6a⁴⁷, 23-6b⁴⁸). Both videos are filmed next to the sea towards a cliff edge, from the approximate position 47.119943, 38.230202 (Figure 12, however the exact location was not determined). The videos take place early in the morning, as the sky is red, so we can assume it is a short time after the earlier videos we have considered for attack A (i.e. videos 23-1, 23-3, 23-5).

When the cameraman zooms in, three large objects can be seen (positioned at approximately 47.125404, 38.253428). It was not possible to identify these objects from the video alone. From satellite imagery from Yandex and TerraServer (Figure 12), at least one, and possibly two, of these objects appears to be a building. During the video, the

⁴⁶ <http://suncalc.net>

⁴⁷ <https://www.youtube.com/watch?v=xc-EIPnEMSw> backup:
<https://www.youtube.com/watch?v=CnrrA4GGj8w>

⁴⁸ <https://www.youtube.com/watch?v=ZYBBU7gJy8o> backup:
<https://www.youtube.com/watch?v=zBxfpVluQ0>

cameraman says that he can see a Kamaz truck, which may explain the presence of a third object. However, the resolution of the camera was too low to confirm the identity of these objects.

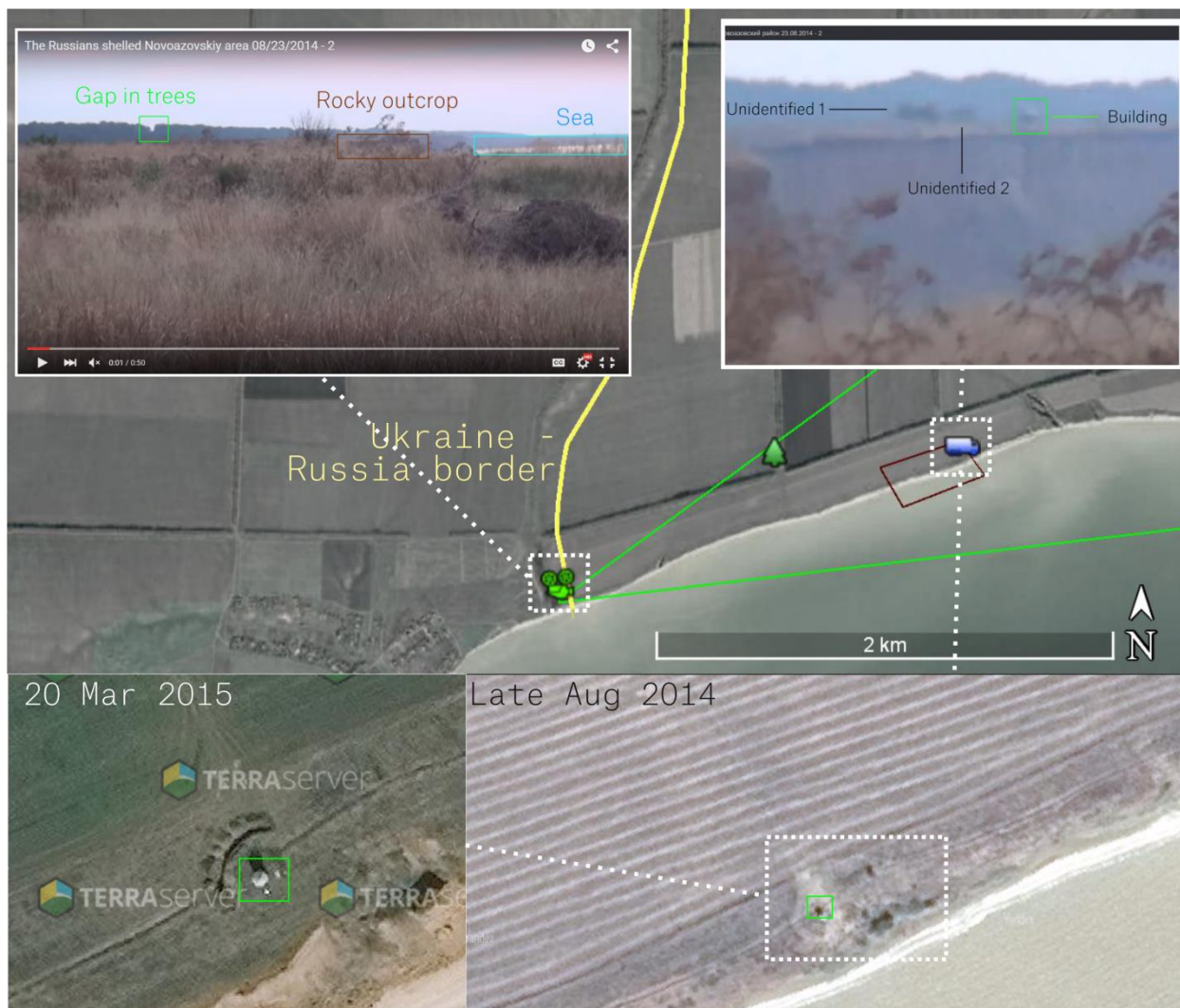


Figure 12. Geolocation of video 23-6 filmed from approximately 47.119943, 38.230202 and looking towards a firing point at 47.125404, 38.253428 inside Russia. The green lines indicate the left and right extent of the camera view. The top satellite image was taken from Google Earth (Digital Globe satellite images); the bottom right satellite image was taken from Yandex maps from an image 31 August 2015.

The loud percussive sounds heard in video 23-6b suggested that a weapon was fired close to the camera position. Twice in video 23-6b we hear a bang, followed by a whistling sound a few seconds later that fades out after several seconds, followed by another loud bang a few seconds later, which we assumed to be the impact of the artillery fire. The difference in timing we hear between the firing and impact of the artillery fire on these two instances were 9.3 and 9.6 seconds. Taking into account the relative positions of the camera, attack

site and launch site⁴⁹, these were equivalent to a real flight time of 9.7 and 10.1 seconds respectively.

The characteristics of the sound support the cameraman's assertion that a weapon was being fired from Russia. A loud whistle heard for several seconds suggests that the round was travelling very close to the cameraman⁵⁰. The loud bang heard 5-6 seconds after this is more than adequate for the round to travel into Ukrainian territory, to the Kholodne Ukrainian army base, or beyond.

To check these assumptions, we compared the timing of the firing and impact using NASA's 'HitModeler' tool⁵¹, a free trajectory calculation tool that takes into account the dimensions of the projectile as well as air resistance. Taking into account the position of the camera and suspected firing positions (Figure 12), several weapons systems were tested using several assumptions about known artillery shell characteristics (122-mm howitzer, 152-mm howitzer, mortar, 2s9 NONA 120-mm artillery shells). The 2s9 NONA 120-mm self-propelled mortar firing artillery shells was found to fit most closely to the sounds heard in the video⁵².

⁴⁹ It was assumed that the target of the fire was the Ukrainian army base at Kholodne, approximately 1.7 km from the camera position, and the firing position was approximately 1.85 km in front of the camera position. The direct distance from the firing position to the attack site was approximately 3.5 km

⁵⁰

<https://web.archive.org/web/20150912080347/http://www.amtrac.org/1atbn/Chronicles/Incoming.asp>

⁵¹ https://www.grc.nasa.gov/www/k-12/freesoftware_page.htm . Minor modification to the Java code was required to allow for heavier and faster projectiles than the program was originally designed for

⁵² In this analysis, it was assumed that the weapon being fired was a 2s9 NONA firing 120-mm artillery shells, which had a muzzle velocity of 367 m / s, weight of 17.3 kg, and the shells had a drag co-efficient of 0.15. Based on values from the following sources:
https://web.archive.org/web/20150906014953/http://www.military-today.com/artillery/2s9_nona_s.htm
https://web.archive.org/web/20140312223935/http://www.armyrecognition.com/russia_russian_army_vehicles_system_artillery_uk/2s9_nona-s_so-120_120mm_self-propelled_mortar_carrier_system_technical_data_sheet_pictures_video.html



Figure 13. 120-mm self-propelled gun 2S9 'Nona' in Saint-Petersburg Artillery museum. Wikicommons⁵³. This is the weapons system suspected of having been used in the artillery attack from Russia on 23 August 2014 (attack B).

Compared to the 9.7 and 10.1 second flight time from the video, the NASA hit modeler predicted a 10.7 second flight time from the suspected firing point to the middle of the Ukrainian army base at Kholodne using 120-mm 2s9 NONA artillery shells. Variations in the strike point of the artillery shells of just couple of hundred meters could account for this discrepancy. It is also worth considering that the towed version of the 120-mm NONA cannon (the 2B-16^{54 55}) could have been used; however the muzzle velocities for this weapon were slightly different to that of the 2s9 and the model did not fit the explosion timings in the video as well as the 2s9. Finally, the 120-mm 2s9 NONA has been sighted in use during the conflict in Ukraine⁵⁶. We consider that a NONA artillery system, and most likely the 2s9 NONA, was used to shell the Ukrainian Kholodne base in this instance.

Continuing artillery attacks

Video 23-7 supports the evidence that artillery attacks were taking place in the Sedovo area in the day of 23 August⁵⁷. Although nothing is directly seen in this video, two bangs are heard suggestive of artillery shell impacts. The sky is completely blue, which suggests at least that the artillery attacks continued into the day, likely later than the attacks shown in videos 23-5 and 23-6a-b.

⁵³

https://web.archive.org/web/20151103202410/https://commons.wikimedia.org/wiki/File:2S9_Nona_in_Saint-Petersburg.jpg

⁵⁴ <http://www.army-guide.com/eng/product1786.html>
<https://web.archive.org/web/20150717161815/http://www.army-guide.com/eng/product1786.html>

⁵⁵ <http://www.enemyforces.net/artillery/nonak.htm>
<https://web.archive.org/web/20150910003433/http://www.enemyforces.net/artillery/nonak.htm>

⁵⁶ E.g. <https://youtu.be/UvMle636LIs?t=5m25s>

⁵⁷ <https://www.youtube.com/watch?v=4-7DbcYtXVA> backup:
<https://www.youtube.com/watch?v=U0aitW57M7k>

C. Mortar shelling of Novoazovs'k border crossing point 25 July to 24 August 2014

Numerous news reports from July and August 2014 reported that the Novoazovs'k BCP was attacked by artillery fire on 25 July^{58 59}, 21 August⁶⁰, 23 August⁶¹, and 24 August⁶², after which time the BCP was closed⁶³. According to the reports, in each of the four cases at least some of the fire came from mortars.

Part of video 23-2 is filmed at the Ukrainian side of the Novoazovs'k BCP, which gives us insights into the extent of the damage and the weapons used to attack the BCP. Extensive damage to the roof of buildings at the BCP is shown (particularly at 1:49 in the video), damage which is also visible on Yandex maps close to 47.159586, 38.234528, especially the buildings and fields on the south side of the BCP (Figure 14).

⁵⁸ http://24tv.ua/ukrayina/teroristi_masovo_obstrilyuyut_ukrayinskih_prikordonnikiv_foto/n468570
<https://archive.is/ETRZe>

⁵⁹ https://web.archive.org/web/20140826014727/http://durdum.in.ua/uk/main/article_print/article_id/23235.phtml

⁶⁰ <https://web.archive.org/web/20140825013412/http://www.mariupolnews.com.ua/descr/48277>

⁶¹ https://web.archive.org/web/20150420052636/http://www.dialog.ua/news/14566_1408816020

⁶² <https://web.archive.org/web/20150701184046/http://www.pravda.com.ua/rus/news/2014/08/24/7035653/>

⁶³ <https://web.archive.org/web/20140827014723/http://www.mariupolnews.com.ua/descr/48368>



Figure 14. Evidence of the mortar attack on Novoazovs'k BCP from Yandex maps (47.159586, 38.234528). Reports indicate that this BCP was attacked by mortar fire on 25 July, 21 August, 23 August and 24 August. Photos come from the following sources: a) from hub^s.ua article⁶⁴ 23 Aug 2014, photo by Алексей Макульский (Alex Makulsky) b) from video 23-2, c) from Mariupol News article⁶⁵ 23 Aug 2014, photo by Николаем Рябченко (Nikolay Ryabchenko) d) from Facebook post⁶⁶ on 23 Aug 2014 by Konstantin Batozsky, e) image of a Russian 82 mm mortar shell replica (image reproduced with permission from Inert Products LLC⁶⁷)

The Yandex satellite images at Novoazovs'k BCP (from 31 August 2014) do not show us artillery craters that are clear enough to analyze to determine the trajectory of fire; the 82-mm craters are too small and the 0.5 m resolution satellite image is too poorly-defined. So we cannot confirm with certainty the source of the fire towards the BCP. Also, the presence of artillery craters from attacks on at least four different occasions (25 July, 21 August, 23

⁶⁴ <http://hubs.ua/discussions/gradyi-buki-19221.html>
<https://web.archive.org/web/20150620203355/http://hubs.ua/discussions/gradyi-buki-19221.html>

⁶⁵ <http://www.mariupolnews.com.ua/descr/48361>
<https://web.archive.org/web/20140826113306/http://www.mariupolnews.com.ua/descr/48361>

⁶⁶ <https://www.facebook.com/batozsky/timeline/story?ut=43&wstart=1406876400&wend=1409554799&hash=-4859686937895323016&pagefilter=3> <https://archive.is/5J6FQ>

⁶⁷ <http://www.inertproducts.com/>

August, and 24 August) makes it impossible to be sure which crater came from which direction on which day. However, by analyzing mortar fragments from the BCP on 23 August 2014, and looking at satellite images of the area within 4 km of the BCP, we were able to identify the caliber of mortar used and a possible firing position.

Determining the type of mortar and the origin of the mortar fire

Video 23-2 shows the tail end of shell at 2:10, which is also visible in photos from several other sources (Figure 14). Comparing to other images of Russian mortar shells (particularly noting the hole positions on the tail) we found it most likely belonged to an 82-mm mortar shell⁶⁸ (Figure 14).

The Russian-armed separatist armed forces have been seen to use the 2B14 Podnos 82-mm mortar in videos during the conflict⁶⁹, a mortar that has a maximum range of around 4 km⁷⁰. A mortar position in the area was identified in a previous Bellingcat report⁷¹ at 47.141012, 38.242545 (Figure 15), inside Russia, and which is in range of Novoazovs'k BCP (2.1 km), and features a small yet distinctive hole in the ground that may have been used to hold a baseplate (used to aid the stability of the 2B14 Podnos 82-mm mortar frame as shown in this video¹⁷). Also visible are vehicle tracks leading off the field. Although not conclusive, the evidence suggests that it is possible that at least on one occasion between 25 July and 24 August, this firing position was used to fire mortars at Novoazovs'k from inside Russia.

Unconfirmed witness testimony suggests that mortars were fired at Novoazovs'k BCP on 25 July from two locations on the Ukrainian border, and one inside Russia⁷². However, we have no further evidence to support this claim or identify further firing point locations.

⁶⁸ Page B-8 of the 1990 version of the US army field manual '6-121 - Tactics, Techniques, and Procedures for Field Artillery Target Acquisition' shows a detailed diagram of a Russian 82-mm mortar shell http://library.enlistment.us/field-manuals/series-1/FM6_121/APPB.PDF

⁶⁹ <https://www.youtube.com/watch?v=MeAN7j99BkE>

⁷⁰ <https://web.archive.org/save/http://warfare.be/db/catid/240/linkid/2432/>

⁷¹ Russia's Path(s) to War https://www.bellingcat.com/wp-content/uploads/2015/09/russia_s_path_s_to_war.pdf

⁷² https://durdum.in.ua/uk/main/article_print/article_id/23235.phtml
https://web.archive.org/web/20140826014727/http://durdum.in.ua/uk/main/article_print/article_id/23235.phtml



Figure 15. The position of the suspected 82-mm mortar firing point 2.1 km from Novoazovs'k BCP (47.141012, 38.242545), and a Yandex satellite image close up of the launch position showing the tracks leading off the field and the small hole that may have been used for a baseplate for the 2B14 Podnos 82-mm mortar system.

D. MLRS attacks and artillery shelling of Ukrainian army checkpoints on road to Novoazovs'k from the border area: 21 July 2014 or 23 – 26 August 2014

The MLRS, self-propelled artillery, and mortar attacks of the morning of 23 August against Kholodne and Novoazovs'k BCP were not the only artillery attacks of the day. The Ukrainian National Security and Defense Council (NSDC) reported that at 11:10am, three Grad systems fired from the town of Maksimov destroyed a checkpoint near Novoazovs'k⁷³. Local VKontakte users also reported fire towards a checkpoint close to Novoazovs'k⁷⁴.

Yandex map imagery from 31 August 2014 clearly shows the position of two Ukrainian army checkpoints at road junctions in between Novoazovs'k and the Novoazovs'k BCP close to 10 km to the east. In this report, the eastern-most checkpoint is called Checkpoint 1 (47.149172, 38.159002), while the checkpoint at a road junction next to Novoazovs'k is called Checkpoint 2 (47.136150, 38.121798). Recent Yandex maps updates have obscured many of the artillery craters at these checkpoints; however, the relevant images were saved before the Yandex maps update⁷⁵.

⁷³ <https://web.archive.org/web/20150624054822/http://uacrisis.org/ua/8255-rnbo-40>

⁷⁴ https://web.archive.org/web/20151103204018/https://vk.com/wall-55653790?day=23082014&owners_only=0&q=%D0%A5%D0%BE%D0%BB%D0%BE%D0%B4%D0%BD%D0%BE%D0%B5

⁷⁵ <http://imgur.com/a/j3BRE>

There are no videos of the reported MLRS attacks in this area on 23 August 2014. However, we can show from photo and satellite image evidence the targets of artillery attacks, the trajectory of the artillery fire, and a firing position.



Figure 16. A photo from Facebook purporting to show the remnants of a Grad rocket that was fired at a checkpoint near Novoazovs'k on 21 July 2014. The post was uploaded by Volodymyr Parasyuk on 22 July 2014⁷⁶. The attack was also reported in a tsn.ua news report⁷⁷. The rocket remains in the image were similar the typical design of a 9M22U 122-mm rocket commonly used in a BM-21 Grad MLRS launcher (note the design of the stabilizing fins)⁷⁸.

It should be noted that a checkpoint near Novoazovs'k was previously mentioned as the target of a Grad attack on 21 July 2014, with images of the alleged rocket fire on the checkpoint supporting this claim⁷⁹ (Figure 16). A video report from tsn.ua also discusses the

⁷⁶

<https://www.facebook.com/photo.php?fbid=678160598918381&set=a.380896298644814.78458.10001733418697>

https://web.archive.org/save/_embed/https://www.facebook.com/photo.php?fbid=678160598918381&set=a.380896298644814.78458.10001733418697

⁷⁷ <https://www.youtube.com/watch?v=XN6p7Zd3vI0>

⁷⁸ <http://ordata.info/ordnance?id=http%3A%2F%2Fcord.gichd.org%2Fontology%23Rocket3468>
<https://web.archive.org/web/20151120232446/http://ordata.info/ordnance?id=http%3A%2F%2Fcord.gichd.org%2Fontology%23Rocket3468>

⁷⁹

<https://www.facebook.com/photo.php?fbid=678160598918381&set=a.380896298644814.78458.10001733418697>

https://web.archive.org/save/_embed/https://www.facebook.com/photo.php?fbid=678160598918381&set=a.380896298644814.78458.10001733418697

attack⁸⁰. Also, videos from 25 – 27 August also seem to show artillery attacks on the area of Checkpoint 2 (25-1, 27-1, and 27-2). Therefore it cannot be determined that all of the artillery craters on satellite imagery discussed in the following section came from the attack on 23 August 2014, and some of them may have come from earlier or later attacks. However, regardless of the exact timing of the attacks, it is still possible to determine the source and trajectory of artillery fire on Checkpoint 1 and 2.

Satellite imagery analysis of artillery craters and their trajectory

Both Checkpoint 1 and Checkpoint 2 are surrounded by many artillery craters that were clear enough to conduct crater trajectory analysis (Table 4), and we were also able to locate the firing point next to the Russian border on satellite imagery (Figure 18).



Figure 17. The position of artillery craters at Checkpoint 1 and 2 (47.149172, 38.159002 and 47.136150, 38.121798), and the average trajectories of fire as determined from crater analysis (straight blue, red, green and yellow lines, see Table 4 for further description of the craters). The trajectory of fire was determined from crater analysis, and the suspected firing point (47.180351, 38.228642) that shows three clear scorch marks facing in a southwesterly direction (see Figure 18 for further details). Satellite images of the artillery crater sites at Checkpoint 1 and 2 are stored in an online album⁸¹.

Satellite imagery evidence used to determine the trajectory of the artillery fire against these targets was taken from Yandex maps (31 August 2014 image, Figure 17, Table 4). Crater analysis techniques, described in a previous Bellingcat report, were used to determine the trajectory⁸².

⁸⁰ <https://www.youtube.com/watch?v=XN6p7Zd3vI0>

⁸¹ <http://imgur.com/a/j3BRE>

⁸² based on the method described in the US Army Tactics, Techniques and Publications document ATPP 3-21.90 'Tactical Employment of Mortars', 2011 available here:

Table 4. Details of the crater analysis at Checkpoint 1 and 2 and their approximate average trajectory (visualized in Figure 17).

Area	Number of craters identified	Number of craters clear enough to determine trajectory	Results	Reference
Checkpoint 1	74	39	29 from Northeast (1)	Figure 17 green
			5 from Northeast (2)	Figure 17 blue
			5 from Southeast	Figure 17 yellow
Checkpoint 2	36	19	19 from Northeast	Figure 17 red

The primary direction of the artillery attacks on the two checkpoints was from the northeast (Figure 17 green line, Table 4). We then searched the area on either side of the average artillery firing trajectory of all of the individual artillery craters analyses. 6.3 km northeast of checkpoint 1, we located three clear scorch marks in a field close to the Russian border at 47.180351, 38.228642 (Figure 18). By analyzing the directions that the scorch marks were facing, we found a close match between the facing of the scorch marks towards the position of the two checkpoints attacked by artillery fire (Figure 18).

Also following the average artillery firing trajectory for checkpoint 1 and 2 was a grouping of three scorch marks at 47.210830, 38.332340, inside Russia approximately 14.9 km from checkpoint 1 at an elevation of 54 m. However, we could not clearly determine the direction that the scorch marks were facing towards, and so we could not confirm the target of artillery fire from this position.

http://armypubs.army.mil/doctrine/7_Series_Collection_1.html. Further details about the method used are provided in the previous Bellingcat report "Origin of Artillery Attacks on Ukrainian Military Positions in Eastern Ukraine Between 14 July 2014 and 8 August 2014"

<https://www.bellingcat.com/news/uk-and-europe/2015/02/17/origin-of-artillery-attacks/>
<https://archive.is/g21SF>

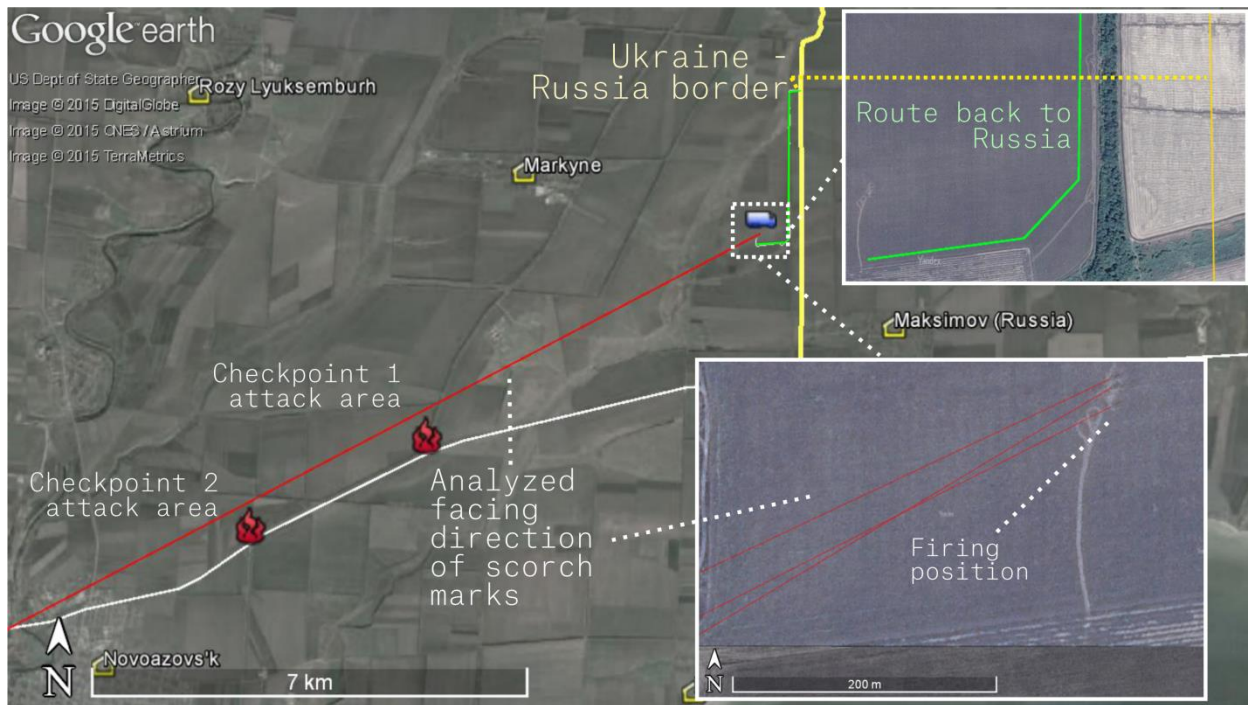


Figure 18. Analysis of the firing position scorch mark facings positioned at 47.180351, 38.228642 (thick red line is average trajectory on Google Earth image, thin red lines are individual trajectories on focused image in bottom right). The green line in the focus image of the top right corner highlights the proposed route that the MLRS systems used to travel back to Russia on Yandex maps. The crossing point, between Markyne and Shcherbak, is shown in Figure 24.

The location of these firing positions could not account for all of the craters identified at Checkpoint 1 (Table 4). The trajectory of five artillery craters pointed also to the northeast, to an area further north than the primary attack (the blue line on Figure 17). The average trajectory for these craters passes close to the villages of Markyne and Shcherbak, which was close to the area where a widely-reported armored assault across the border from Russia to Ukraine took place on 25 August 2014 (considered in more detail in this report on page 31, Armored assault from Russia on the Novoazov'sk area, morning of 25 August 2014). Satellite imagery in this area supports the reports that Russian-armed separatist forces crossed the border and fired on Ukrainian positions. So it is possible that these five artillery craters came from this attack.

Five more artillery craters indicated a trajectory from the southeast (the yellow line described in Figure 17 and Table 4). The average trajectory estimated for these craters crosses close to three dark scorch marks in a field that appear to be from the placement of vehicles or other large equipment, facing northwest at 47.127366, 38.231113 (Figure 19).



Figure 19. Dark marks in the ground found at 47.127366, 38.231113⁸³, and the average facing direction of the potential firing position compared with the average trajectory of the five relevant craters at Checkpoint 1.

The three marks are placed very closely together and are approximately 5.5 meters in length and just under 2 m in width. Given the uncommon size of the traces, it is not possible to identify which vehicle or weapon caused this traces. Therefore we cannot conclude with certainty that this position (47.127366, 38.231113) was used to fire artillery from the border to Ukrainian positions, despite the close match between the facing of the ground markings and the trajectory of five artillery craters at Checkpoint 1.

Geolocation and trajectory analysis of crater photos from journalists

Further proof of the timing and trajectory of artillery attacks at Checkpoint 1 and 2 is provided in photos taken at the attack locations by journalists on 23 August and 25 August 2014.

Photos at Checkpoint 1 on 23 August by national and local journalists show a bus destroyed by artillery fire^{84 85} (Figure 20). In some of the photos, artillery craters are visible, which are clear enough to determine that the trajectory of fire from the northeast.

⁸³ <http://i.imgur.com/xlIR3Ta.png>

⁸⁴ <https://web.archive.org/web/20150620203355/http://hubs.ua/discussions/gradyi-buki-19221.html>

⁸⁵ <https://web.archive.org/web/20140826113306/http://www.mariupolnews.com.ua/descr/48368>

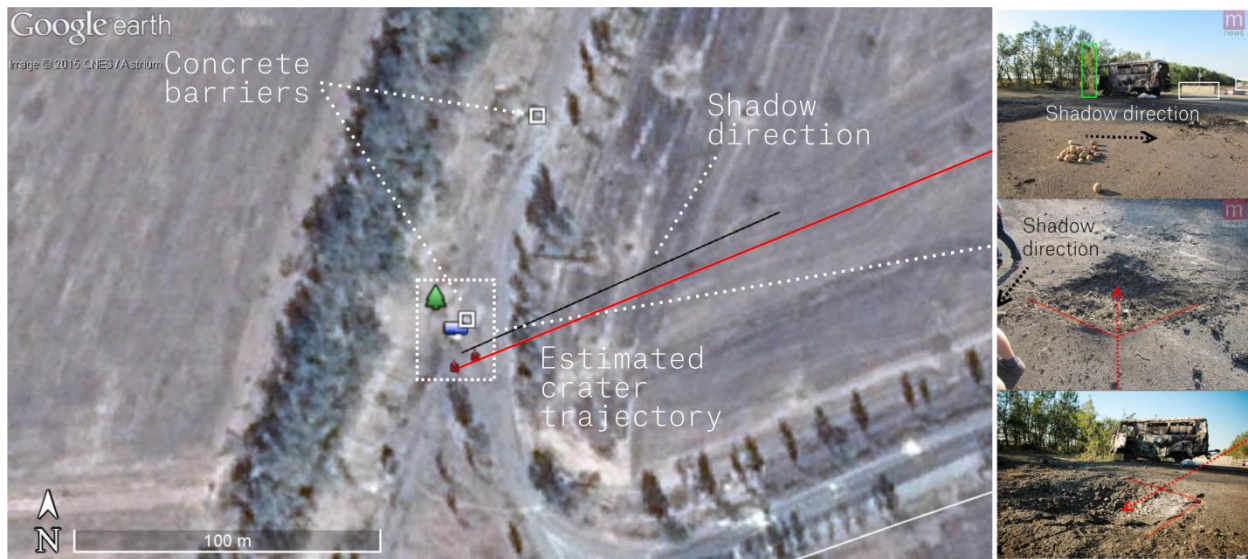


Figure 20. Geolocation of destroyed bus (47.150335, 38.159048) and adjacent crater near Checkpoint 1. On the right, the top two photos come from Mariupol News article⁸⁶ 23 Aug 2014, photo by Nikolay Ryabchenko. The bottom right photo comes from a hub⁸⁷.ua article⁸⁷ from 23 Aug 2014, photo by Aleksey Makulsky.

From this evidence we can conclude that Checkpoint 1 was attacked by artillery fire from the northeast before the evening of 23 August.

A photo at Checkpoint 2 on 25 August from Reuters journalists (Figure 21) shows an artillery crater that also indicates a trajectory of fire from the northeast. This crater is also visible on Yandex maps imagery from 31 August (the image was recently replaced, but the original was saved in an online album⁸⁸).



Figure 21. Geolocation of artillery crater at Checkpoint 2 (47.135496, 38.120714). Photo comes from a Reuters article from 26 August 2014⁸⁹, and was taken on 25 August 2014 by Maria Tsvetkova.

⁸⁶ <https://web.archive.org/web/20140826113306/http://www.mariupolnews.com.ua/descr/48368>

⁸⁷ <https://web.archive.org/web/20150620203355/http://hubs.ua/discussions/gradyi-buki-19221.html>

⁸⁸ <http://i.imgur.com/eTh1FUY.png>

⁸⁹ <http://www.reuters.com/article/2014/08/26/us-ukraine-crisis-novoazovsk-exclusive-idUSKBN0GQ19U20140826>

Both the photos of artillery craters from Figure 20 and Figure 21 support the crater analysis findings that the artillery attacks came from the northeast. They also prove that artillery attacks from this direction occurred on or before 23 August 2014 at Checkpoint 1, and on or before 25 August 2014 at Checkpoint 2.

E. Armored assault from Russia on the Novoazovs'k area, morning of 25 August 2014

Numerous media sources reported an invasion of armored forces from Russia to Ukraine close to the Novoazovs'k road on the morning of 25 August^{90 91 92 93 94}. The occurrence of a battle at this time is confirmed in Video 25-1⁹⁵, filmed on this same morning, and which shows a number of smoke plumes appearing on the east side of Novoazovs'k town at a time between 8 and 9 am (based on the shadows visible in the video⁹⁶).

<https://web.archive.org/web/20151010120421/http://www.reuters.com/article/2014/08/26/us-ukraine-crisis-novoazovsk-exclusive-idUSKBN0GQ19U20140826>

⁹⁰ <http://www.reuters.com/article/2014/08/26/us-ukraine-crisis-novoazovsk-exclusive-idUSKBN0GQ19U20140826>
<https://web.archive.org/web/20151010120421/http://www.reuters.com/article/2014/08/26/us-ukraine-crisis-novoazovsk-exclusive-idUSKBN0GQ19U20140826>

⁹¹ <https://web.archive.org/web/20150107004548/http://ru.tsn.ua/politika/rossiyskie-voyska-vtorglis-na-territoriyu-ukrainy-i-idut-na-mariupol-pogranichniki-383074.html>

⁹² <http://www.businessinsider.com/top-ukrainian-official-a-column-of-russian-tanks-have-entered-southeastern-ukraine-2014-8> <https://archive.is/3TDeV>

⁹³ <https://web.archive.org/web/20140829071626/http://delo.ua/ukraine/v-rajone-novoazovska-boj-vsu-sderzhivajut-nastuplenie-boevikov-na-245310/>

⁹⁴ <https://www.youtube.com/watch?v=hgrSb8G57cl>

⁹⁵ <https://www.youtube.com/watch?v=DY-iN5o8J6E> backup:
<https://www.youtube.com/watch?v=N8Bqfe4pWO8>

⁹⁶ <http://suncalc.net>



Figure 22. Geolocation of video 25-1⁹⁷. The camera position is at 47.118605, 38.105728. The solid red lines show the approximate directions in which smoke plumes are visible at different times in the video. The shadows visible during the video suggest that it was filmed between 8 and 9 am.

Also, photos of an artillery crater inside Novoazov'sk from the morning of 25 August 2014⁹⁸ (Figure 23) supports reports that artillery fire was coming from the northeast (in the direction of Shcherbak / Markyne) on this day. These photos also show that artillery fire was striking residential areas of Novoazov'sk on this day, and a video filmed the next day (video 26-8⁹⁹) proves that damage was caused to a house on the street from the artillery fire.

⁹⁷ <https://www.youtube.com/watch?v=DY-iN5o8J6E> backup:
<https://www.youtube.com/watch?v=N8Bqfe4pWO8>

⁹⁸ <https://web.archive.org/web/20151103203632/https://twitter.com/tombreadley/status/503871368417792000>

⁹⁹ <https://www.youtube.com/watch?v=pW0MJ7cSgYs> backup:
<https://www.youtube.com/watch?v=8KTJewGKCNO>



Figure 23. Geolocation of the artillery crater from @tombreadley on Twitter¹⁰⁰ (position: 47.124413, 38.069940). The trajectory of the artillery crater is identified on the map with a solid red line. Damage to a house on this street from this attack is shown in video 26-8¹⁰¹.

The consensus of witnesses to the scene and Ukrainian media sources are that sometime during the early morning of 25 August, armored forces crossed from Russia at a position between Markyne and Shcherbak in Ukraine. Once having crossed the border, the invading forces advanced towards Rozy Lyuksemburh and Novoazovs'k, firing at locations to the north and northeast of Novoazovs'k. These forces were pushed back, possibly with the aid of the Ukrainian air force¹⁰², and for the rest of the day the Russian-armed separatist forces were positioned in the area north of Markyne, reportedly as far as Rozy Lyuksemburh (47.205065, 38.133176).

The satellite imagery evidence supports this version of events (summarized in Figure 24); the route across the border has been saved in an online album as some of the Yandex maps satellite imagery was replaced during the production of this report¹⁰³. Vehicle tracks are visible that are not present in earlier satellite images from 2013 (Google Earth), or earlier in

¹⁰⁰ <https://twitter.com/tombreadley/status/503871368417792000>
<https://web.archive.org/web/20151103203632/https://twitter.com/tombreadley/status/503871368417792000>

¹⁰¹ <https://www.youtube.com/watch?v=pW0MJ7cSgYs> backup:
<https://www.youtube.com/watch?v=8KTJewGKCNQ>

¹⁰² <https://news.vice.com/video/russian-roulette-dispatch-72> <https://archive.is/z9blZ>

¹⁰³ <http://imgur.com/a/uaqdi>

2014 (TerraServer) crossing the border and advancing into Ukraine¹⁰⁴ (Figure 24). Vehicle tracks between two fields are clearly visible at (47.201334, 38.235991). Vehicle tracks are clearly visible on the route to Markyne (e.g. through a field here: 47.207845, 38.233703). In a field just southwest of Shcherbak (47.208460, 38.215091), south to Markyne, a large number of vehicle tracks are visible alongside small craters that indicate return fire from Ukrainian forces (but which were too small for a trajectory to be geolocated).

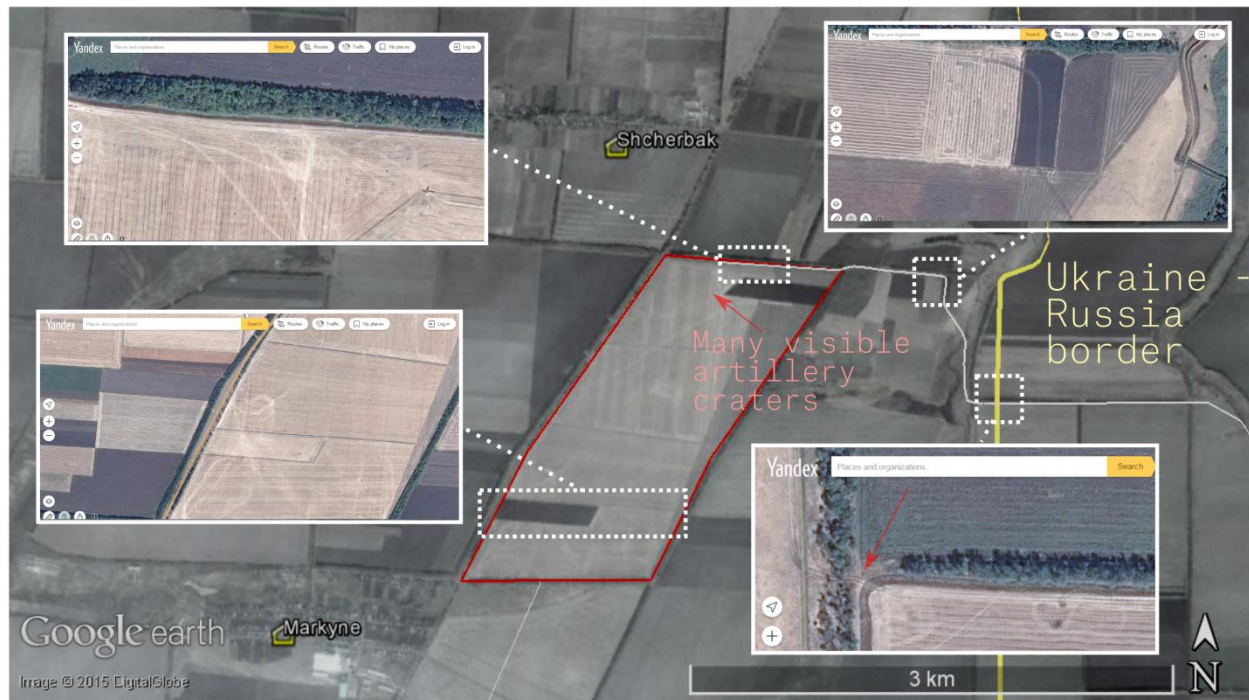


Figure 24. The proposed path of the Russian forces across the border 25 August 2014, based on evidence from multiple sources and visible satellite imagery evidence. Further satellite images of the suspected vehicle tracks are provided in an online album¹⁰⁵.

The advance to positions close to Rozy Lyuksemburh can also be identified by the presence of a large number of vehicle tracks and what could be temporary structures in a field just east of the town at 47.204002, 38.130701 (recently visible in Yandex maps a satellite image from 31 August, but since replaced, Google Earth shows some evidence of this in an 11 October 2014 image¹⁰⁶).

Russian media sources at the time suggested that 'separatist' forces attacked Novoazovs'k from the north¹⁰⁷. However, there is no open source evidence to support the idea that Russian-armed separatist forces attacked the area from further north than Shcherbak.

¹⁰⁴ <http://imgur.com/a/uaqdi> for the album of Yandex maps satellite images described in this paragraph

¹⁰⁵ <http://imgur.com/a/uaqdi> the Yandex maps satellite images described in this image and more showing areas around Markyne and Shcherbak where there is evidence of vehicle movement.

¹⁰⁶ <http://i.imgur.com/mijZGKb.jpg>

¹⁰⁷ <https://www.youtube.com/watch?v=6Q782gGjdmE>

Reuters journalists visited Telmanove twice on 24 August 2014 (the next major town to the north of Novoazovs'k) and did not see any evidence of the presence Russian-armed separatist armed forces¹⁰⁸ there, or on the way. On Yandex maps (image 31 August 2014), north of Shcherbak there is no visible evidence of vehicle tracks or battle for many kilometers. The only evidence of vehicle movement and visible signs of artillery fire occur close to the identified border crossing point between Markyne and Shcherbak considered above.

We found no evidence to support the Russian media and separatist narrative that the Russian-armed separatist forces were able to break through Ukrainian lines in the direction of Telmanove and attack Ukrainian positions near Novoazovs'k from the north on 25 August 2014. Instead, the available satellite imagery supports reports that armored forces entered Ukraine from Russia, crossed several fields, and then engaged Ukrainian forces from positions between the towns of Markyne and Rozy Lyuksemburh, northeast of Novoazovs'k.

Shelling of Novoazovs'k 26 August 2014

On 26 August 2014 a number of artillery strikes in the area of Novoazovs'k were recorded by journalists in the area (including VICE news Henry Langston and crew 26-1¹⁰⁹, Ricardo Marquina 26-2¹¹⁰, and Petr Shelomovskiy¹¹¹), as well as local residents. It is clear from the open source evidence that non-military targets were damaged by artillery fire on several occasions during the day, including a hospital, residential areas, a major road (still in public use at the time of the attacks), a cemetery and a bread factory.

These attacks can be shown to have come from the northeast of Novoazovs'k. However, due to the distance between Novoazovs'k and the Russian border (approximately 10 km) and the minimum range of MLRS artillery systems being lower than this (approximately 4 km for a BM-21 Grad system¹¹²), it is not possible to determine with certainty whether these attacks came from Ukraine or Russia. A summary of the attacks of 26 August 2014 considered in this section is shown in Figure 25.

¹⁰⁸ <http://www.reuters.com/article/2014/08/26/us-ukraine-crisis-novoazovsk-exclusive-idUSKBN0GQ19U20140826>
<https://web.archive.org/web/20151010120421/http://www.reuters.com/article/2014/08/26/us-ukraine-crisis-novoazovsk-exclusive-idUSKBN0GQ19U20140826>

¹⁰⁹ <https://www.youtube.com/watch?v=hgrSb8G57cI>

¹¹⁰ <https://www.youtube.com/watch?v=v-fVDadSaI0>

¹¹¹ <https://twitter.com/shelomovskiy/status/504253642929864705>
<https://web.archive.org/web/20150112015520/https://twitter.com/shelomovskiy/status/504253642929864705>

¹¹² <http://fas.org/man/dod-101/sys/land/row/bm-21.htm>
<https://web.archive.org/web/20150630002841/http://fas.org/man/dod-101/sys/land/row/bm-21.htm>

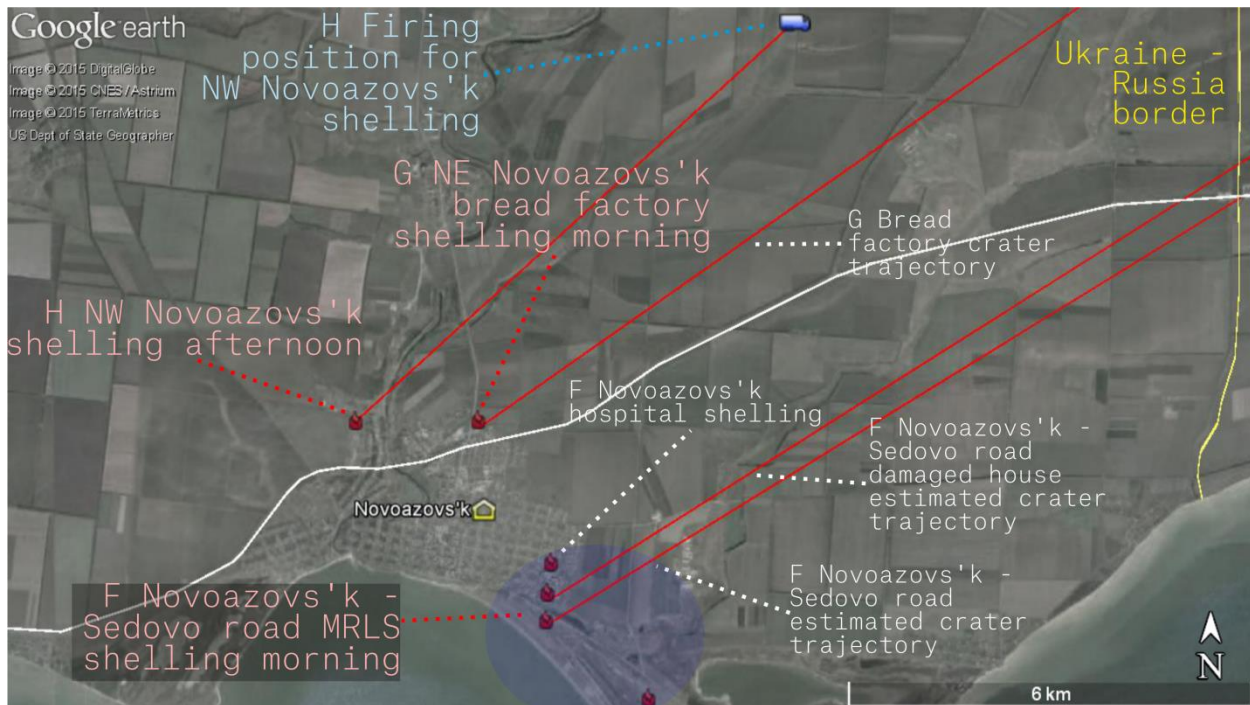


Figure 25. Summary of attacks F, G and H on 26 August 2014.

F. MLRS attack on Sedovo – Novoazovsk road and southeast Novoazovsk, morning of 26 August 2014

Several videos and photos show the aftermath of an MLRS attack on the road between Novoazovsk and Sedovo (Figure 26, Figure 27).



Figure 26. Photo of the MLRS attack on the morning of 26 August 2014 in the area of the Novoazovsk – Sedovo road, filmed from approximately 47.109798, 38.080783¹¹³.

¹¹³ http://vk.com/albums62016585?z=photo62016585_338541708%2Fphotos62016585
<https://archive.is/dRgOM>

Video 26-1¹¹⁴ and 26-2¹¹⁵ both show a large number of smoke plumes at multiple sites (Video 26-2 and 26-5¹¹⁶, filmed from approximately 47.109475, 38.032554, suggest at least three separate strike sites, Figure 27). Due to the large number of simultaneous smoke plumes visible in the videos showing the aftermath of the attack, it can be assumed that there were many explosions in close succession, suggesting that rapid-fire artillery systems were used, such as MLRS.

In the course of the attack, several non-military targets were struck. The Sedovo-Novozovsk road was directly struck by a shell or rocket (Figure 28), A house in southeast Novozovsk was struck by artillery (Figure 28), as well as a hospital in the area (video 26-7¹¹⁷, filmed in the area of 47.110326, 38.103550).

¹¹⁴ <https://www.youtube.com/watch?v=hgrSb8G57cl>

¹¹⁵ <https://www.youtube.com/watch?v=v-fVDadSal0>

¹¹⁶ https://www.youtube.com/watch?v=_w5BHIA37E0 backup:
https://www.youtube.com/watch?v=UxXveEVd_Ck

¹¹⁷ <https://www.youtube.com/watch?v=CC2XVa-atLs> backup:
https://www.youtube.com/watch?v=cz_I0XB_cJI



Figure 27. The positions of the attack sites of the artillery attack on the Sedovo-Novozovsk road on the morning of 26 August 2014, and the geolocation of videos 26-1¹¹⁸, 26-2¹¹⁹, 26-3¹²⁰, 26-5¹²¹, and 26-6¹²² that witnessed the attack. The videos were filmed at 47.105475, 38.105593, 47.104118, 38.104170, 47.106280, 38.102934, 47.085344, 38.140382 at the video times indicated in the figure. The bottom left corner image is from a The Ricardo Marquina tweet, and was taken from the area of 47.109475, 38.032554. Video 26-4¹²³ was also witness to the attack, but was not geolocated.

A tweet from the journalist Petr Shelomovskiy with a photo of the crater on the road between Novozovsk and Sedovo helps us to determine the trajectory of the MLRS fire that landed in this area (Figure 28). The 'arrowhead' shape of the crater, with the round impact area at the front and ground damage behind suggests high-angle fire¹²⁴ (i.e. fire greater than 45° angle) from the northeast. In video 26-3, the crater of the artillery fire also suggests that the rocket came from the northeast; the front of the crater undercuts the earth where the

¹¹⁸ <https://www.youtube.com/watch?v=hgrSb8G57cl>

¹¹⁹ <https://www.youtube.com/watch?v=v-fVDadSaI0>

¹²⁰ <https://www.youtube.com/watch?v=lg-GW-G6bOQ> backup:
<https://www.youtube.com/watch?v=FxOYJzObPCE>

¹²¹ <https://www.youtube.com/watch?v=w5BHIA37E0> backup:
https://www.youtube.com/watch?v=UxXveEvd_Ck

¹²² <https://www.youtube.com/watch?v=izyeyzkMjhc> backup:
<https://www.youtube.com/watch?v=NQx52XjcUA8>

¹²³ <https://www.youtube.com/watch?v=txonMvU3j2U> backup:
<https://www.youtube.com/watch?v=yTsd4MYQWGM>

¹²⁴ <https://www.bellingcat.com/news/uk-and-europe/2015/02/17/origin-of-artillery-attacks/>
<https://archive.is/g21SF>

shell impacted the ground and we can see a sharp rise of earth in front of the crater and a relatively shallow rise behind the crater¹²⁵.



Figure 28. The estimated trajectories of two artillery craters filmed (video 26-3¹²⁶) or photographed (Petr Shelomovskiy tweet¹²⁷) following the MLRS attack on the morning of 26 August 2014 in the area of southeast Novoazov'sk. The craters are positioned at 47.104108, 38.104228 (Petr Shelomovskiy tweet) and 47.106310, 38.102976 (video 26-3).

G. Bread factory northeast Novoazov'sk artillery strike, morning of 26 August 2014

In video 26-1¹²⁸ (at 10 minutes and 55 seconds into the video) the VICE news crew are filming towards the north from the roof of the Novoazov'sk town hall at 47.110717, 38.082114. They witness an explosion at the northeast side of the town. After travelling to the scene of

¹²⁵ <https://www.youtube.com/watch?v=lg-GW-G6bOOQ> backup: <https://www.youtube.com/watch?v=FxOYJzObPCE> 55 to 58 seconds into the video. The method described in the US Army Tactics, Techniques and Publications document ATTP 3-21.90 'Tactical Employment of Mortars', 2011 (available here: http://armypubs.army.mil/doctrine/7_Series_Collection_1.html) describes the occurrence of undercut earth from high-angle artillery fire.

¹²⁶ <https://www.youtube.com/watch?v=lg-GW-G6bOOQ> backup: <https://www.youtube.com/watch?v=FxOYJzObPCE>

¹²⁷ <https://twitter.com/shelomovskiy/status/504253642929864705>
<https://web.archive.org/web/20150112015520/https://twitter.com/shelomovskiy/status/504253642929864705>

¹²⁸ <https://www.youtube.com/watch?v=hgrSb8G57cl>

the shelling, they observe an artillery crater at the exterior of a bread factory in Novoazovs'k, positioned at approximately 47.129163, 38.089240 (Figure 29).

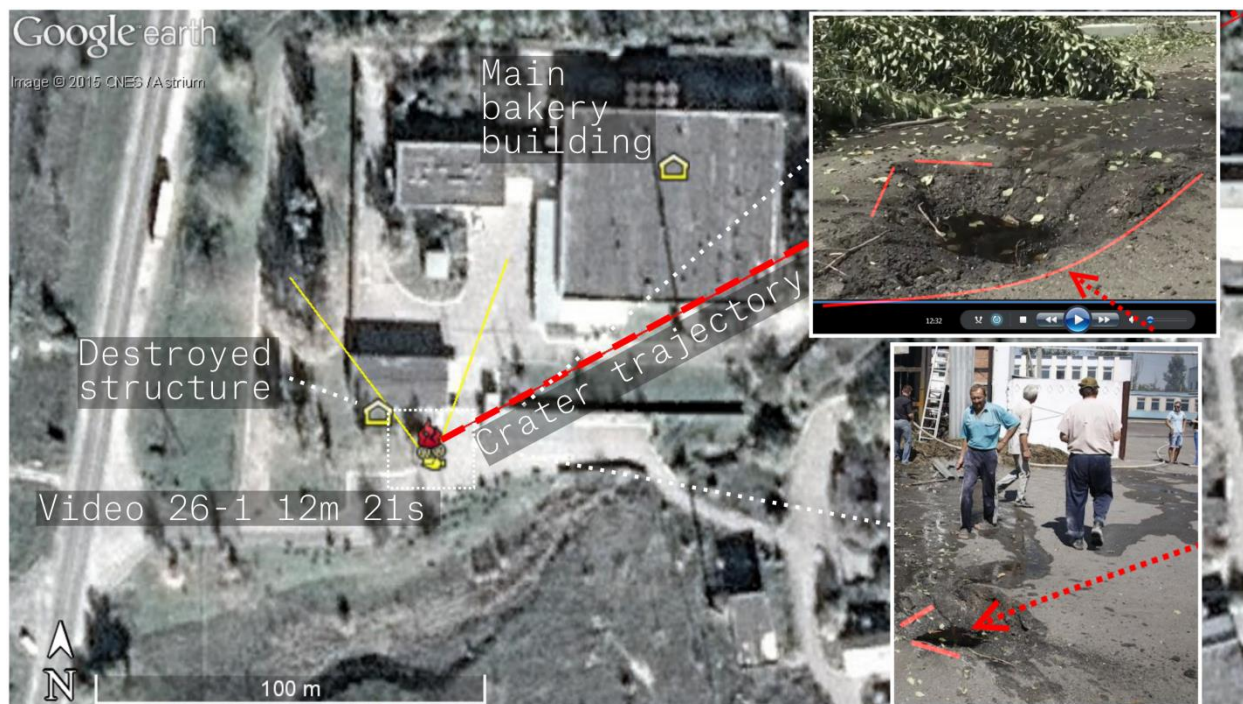


Figure 29. The geolocation and trajectory estimate of the artillery crater at the bread factory in northeast Novoazovs'k, featured in video 26-1¹²⁹ at 12 minutes and 5 seconds, filmed from 47.129163, 38.089240. The artillery crater is seen at 12m 32s, and also in a photo (bottom right) from a VICE news article from 28 August 2014 by Harriet Salem¹³⁰, photo taken by Henry Langston.

The crater shows characteristics of a low-angle artillery shell (roughly V-shaped with a pointed front, and ground damage to each side of the crater from the side spray). Crater analysis of this artillery crater suggested that the fire came from the northeast (see Figure 31 for the position of this trajectory on the area map).

H. Northwest Novoazovs'k artillery strike, afternoon of 26 August 2014

In the afternoon of 26 August 2014, several videos showed the aftermath of an artillery attack on the outskirts of northwest Novoazovs'k (video 26-8¹³¹, 26-9¹³², 26-10¹³³, 26-11¹³⁴, Figure 30). The attack caused multiple fires and also hit a cemetery.

¹²⁹ <https://www.youtube.com/watch?v=hgrSb8G57cl>

¹³⁰ <https://news.vice.com/article/pro-russia-forces-gain-ground-as-ukraines-volunteer-battalions-decry-kiev-leaders>
<https://web.archive.org/web/20150416032759/https://news.vice.com/article/pro-russia-forces-gain-ground-as-ukraines-volunteer-battalions-decry-kiev-leaders>

¹³¹ <https://www.youtube.com/watch?v=pW0MJ7cSgYs> backup:
<https://www.youtube.com/watch?v=8KTJewGKCNO>



Figure 30. The area of northwest Novoazovsk attacked by artillery in the afternoon of 26 August 2014 (47.127111, 38.062966). The red fire symbols indicate the location of artillery craters identified from Yandex maps imagery. Images of these artillery craters are available in an online album¹³⁵, as the original Yandex maps layer was replaced during the preparation of this report. The camera symbols indicate the positions from which videos were filmed, and the solid same-colored lines coming from them indicate the left and right extent of the camera view at specified times in the video.

Satellite imagery from 31 August 2014 on Yandex maps showed until recently clear photos of the craters at this attack site which was analyzed with crater analysis techniques to determine the trajectory of fire¹³⁶. However, during the preparation of this report, the satellite imagery covering most of Novoazovsk was replaced by a newer image. The original satellite imagery of the crater area was saved in an online album for this report¹³⁷.

Table 5 shows a summary of the crater analysis performed at the attack site in northwest Novoazovsk. Fourteen craters were determined to come from the northeast, and two were

¹³² <https://www.youtube.com/watch?v=cXrxH9lbE2o> backup:
<https://www.youtube.com/watch?v=9snK2yHM0Oc>

¹³³ <https://www.youtube.com/watch?v=tfSEcmE1qMU> backup:
<https://www.youtube.com/watch?v=39KW-HGwu0>

¹³⁴ <https://www.youtube.com/watch?v=UCEJGjwwsHc> backup:
<https://www.youtube.com/watch?v=tk33DxylfeM>

¹³⁵ <http://imgur.com/a/ke5EX>

¹³⁶ <http://www.bellingcat.com/news/uk-and-europe/2015/02/17/origin-of-artillery-attacks/>
<https://archive.is/rgUqf>

¹³⁷ <http://imgur.com/a/ke5EX>

determined to come from the east / northeast. A number of craters were analyzed; the final average trajectories of the two attack directions are shown in Figure 31.

Table 5. Artillery craters identified at the artillery attack site in Northwest Novoazov'sk 26 August 2014 (47.127111, 38.062966) and their estimated trajectory from crater analysis of satellite imagery.

Area	Number of craters identified	Number of craters clear enough to determine trajectory	Results	Reference
Northwest Novoazov'sk	20	16	14 from Northeast 2 from East/Northeast	Figure 31

Figure 31 is a summary of the artillery crater trajectories determined over the three attacks considered in this report on 26 August 2014. By overlaying the average trajectories of the artillery attack on northwest Novoazov'sk (attack H, Table 5, Figure 31), we found a possible firing point for this attack at 47.181629, 38.151538, in between Rozy Lyuksemburh and Markyne. The burn marks visible at this position were visible on now-replaced Yandex maps; a copy of the satellite image at this position was saved online¹³⁸. The firing positions for the other attacks (F and G) could not be determined; although the estimated trajectory for the attack G crater passes close by the firing position for attack D (previously discussed in section MLRS attacks and artillery shelling of Ukrainian army checkpoints on road to Novoazov'sk from the border area: 21 July 2014 or 23 – 26 August 2014, page 24).

¹³⁸ <http://i.imgur.com/q2Lld8p.png>



Figure 31. Summary of the attack sites identified on 26 August 2014 in the Novoazovsk area and the estimated artillery trajectories determined from photo evidence or satellite imagery crater analysis (northwest Novoazovsk). The solid green and yellow lines are the trajectories of the craters at the attack site in Northwest Novoazovsk, while the solid red lines are the crater trajectories of craters from photo and video evidence from 26 August 2014. The suggested firing position for the attack on northwest Novoazovsk on the afternoon of 26 August 2014 shown in the top left corner was 47.181629, 38.151538. Firing positions for Attack F and G were not determined.

The capture of Novoazovsk and aftermath

In the morning of 27 August 2014, continued shelling to the east of Novoazovsk (as shown in videos 27-1¹³⁹ and 27-2¹⁴⁰). It became clear during the day that Ukrainian forces had pulled back, and Russian-armed separatist forces had taken over Novoazovsk¹⁴¹. By the evening, official Ukrainian sources, due to this battle and others, were officially reporting

¹³⁹ <https://www.youtube.com/watch?v=eC1RFhbfk-c> backup: <https://www.youtube.com/watch?v=TLxXIZxuh3o>

¹⁴⁰ <https://www.youtube.com/watch?v=y2XeT3YljnA> backup: <https://www.youtube.com/watch?v=3A0iFhS-9tY>

¹⁴¹ <http://ru.tsn.ua/politika/boyky-batalona-dnepr-1-videli-sobstvennymi-glazami-kolonnu-tehniki-rf-i-gotovyatsya-k-boyu-383507.html> <https://archive.is/Omqo3>

that a Russian invasion of Ukraine had begun¹⁴². On the morning of 28 August 2014, the mayor of Novoazovs'k confirmed that the city had been taken¹⁴³.

On 27 August onwards, tanks belonging to Russian-armed separatists were sighted inside Novoazovs'k. In the following days, several tanks and artillery pieces were filmed or photographed by local residents or journalists. Of these, two T-72B tanks, and one 2s19 Msta-S self-propelled artillery system have been proven to come from Russia, as described in the following section.

I. T-72 sightings and 2s19 Msta-S sightings from Russia in Novoazovs'k, 27 August 2014 – November 2014

Videos and photos from the 27 August show the presence of tanks belonging to the Russian-armed separatists within Novoazovs'k (Figure 32). From several distinctive features such as the shape of the tank treads (wide center of track instead of split), inward-facing wheel hubs, and systems placed on top of the turret, it was possible to identify the presence of T-72B variant tanks inside Novoazovs'k, which were most likely the T-72B1^{144 145}.

¹⁴² https://twitter.com/MFA_Ukraine/status/504734047030239232
https://web.archive.org/web/20150528111001/https://twitter.com/MFA_Ukraine/status/504734047030239232

¹⁴³ <http://mariupolnews.com.ua/descr/48502>
<https://web.archive.org/web/20141018094737/http://www.mariupolnews.com.ua/descr/48502>

¹⁴⁴ <https://www.bellingcat.com/resources/2015/05/28/tankspotting-how-to-identify-the-t-72b3/>
<https://archive.is/JzwLM>

¹⁴⁵ <http://www.iiss.org/en/militarybalanceblog/blogsections/2014-3bea/august-ca01/pro-russia-separatist-tank-variant-supports-russian-source-4c62>
<https://web.archive.org/web/20150707214633/http://www.iiss.org/en/militarybalanceblog/blogsections/2014-3bea/august-ca01/pro-russia-separatist-tank-variant-supports-russian-source-4c62>



Figure 32. T-72B tanks sighted in Novoazovsk on 27 August 2014. a) and b) from photos on VKontakte¹⁴⁶. Photo a) taken from 47.12416, 38.085972 facing north; the tank was too far from the camera to confirm as a T-72B. Photo b) taken from 47.125564, 38.084526 facing north, and c) from video 27-3¹⁴⁷ published on 27 August 2014, likely also filmed from just north of 47.125564, 38.084526.

T-72 tanks were not in active front line service in the Ukrainian armed forces during the conflict of summer 2014 (until that point Ukraine kept them in long-term storage or produced / upgraded them for export)¹⁴⁸. Nevertheless, although it was highly unlikely that the T-72B tanks considered in Figure 38 were captured from Ukrainian forces by separatists, the presence of T-72B variant tanks inside Novoazovsk is not conclusive proof that these are Russian tanks. To determine the origin of these tanks it is necessary to compare features of the vehicles seen in Ukraine with those seen in Russia during the conflict.

In late July / August, a number of convoys including trucks carrying T-72B tanks were sighted in Russia close to the Ukrainian border in the area of Kamensk-Shakhtinsky, Rostov-on-Don, and Taganrog^{149 150 151 152 153 154 155} (a number of convoys of other types of

¹⁴⁶ https://vk.com/wall-55653790?day=27082014&owners_only=1&q=НОВОАЗОВСК
https://web.archive.org/web/20151103204840/https://vk.com/wall-55653790?day=27082014&owners_only=1&q=НОВОАЗОВСК

¹⁴⁷ <https://www.youtube.com/watch?v=l8uSgoWlaR4> backup:
<https://www.youtube.com/watch?v=LdQYNJ3fpbs>

¹⁴⁸ <http://www.martenscentre.eu/publications/caught-act-proof-russian-military-intervention-ukraine>
<https://web.archive.org/web/20150910194443/http://www.martenscentre.eu/publications/caught-act-proof-russian-military-intervention-ukraine>

¹⁴⁹ <https://bellingcat-vehicles.silk.co/page/1222-Rostov-Oblast%3A-Tanks-on-trailers>

¹⁵⁰ <https://bellingcat-vehicles.silk.co/page/1223-Rostov-on-Don%3A-Tanks-on-trailers>

¹⁵¹ https://instagram.com/p/q_OTypgnXS/ <https://archive.is/9uW38>

¹⁵² <https://instagram.com/p/rFFt34QXWU/> backup:
<https://www.youtube.com/watch?v=lpfWHo0J7Wk> <https://archive.is/0Y4RU>

¹⁵³ <https://bellingcat-vehicles.silk.co/page/1217-M4-Lenina%3A-T-72B-tanks>

¹⁵⁴ <https://www.youtube.com/watch?v=nvS5Axqecso> backup:
https://www.youtube.com/watch?v=_1ber8sRvUc

vehicles, such as BMPs or trucks, were also filmed^{156 157 158 159 160 161}). Building on the work of other investigative bloggers (Surpher¹⁶² and Askai¹⁶³) we compared photos and videos of T-72B tanks in the Novoazov'sk area following its capture by Russian-armed separatists with the tanks earlier sighted in Russia. In at least two cases (and unconfirmed in a third case), T-72B tanks were sighted in Russia in July / August 2014 and subsequently inside Ukraine in the Novoazov'sk area. These case studies are considered below.

T-72B number 127 / 005

On 30 July 2014 a T-72B tank convoy was filmed in the area of Kamensk-Shakhtinsky¹⁶⁴, east of the Ukrainian-Russian border (Figure 33c). One of these tanks was numbered 127¹⁶⁵.

On 21 August 2014, in the area of Rostov-on-Don, tank 127 was photographed again (Figure 33b). On 29 -31 August^{166 167}, tank 127 was photographed in Novoazov'sk by journalists visiting the town following its takeover by Russian-armed separatists (Figure 33). Distinctive Explosive Reactive Armor (ERA) block arrangements, paint colors, and a white tactical markings (Figure 33e) remaining on the turret match those of tank 127 seen previously in

¹⁵⁵ <https://www.youtube.com/watch?v=8UtgUVwFH9k>

¹⁵⁶ <https://bellingcat-vehicles.silk.co/page/1133-Taganrog%3A-tanks-%26-BMDs-on-trailers>

¹⁵⁷ https://www.youtube.com/watch?v=3O7FWwuX_gl

¹⁵⁸ <https://www.youtube.com/watch?v=qdeKeZQYfFQ>

¹⁵⁹ https://www.youtube.com/watch?v=gVmrH3M_sXs

¹⁶⁰ <https://www.youtube.com/watch?v=64RhrFyWxBs>

¹⁶¹ <https://www.youtube.com/watch?v=U685o2vTQiA>

¹⁶² <http://surpher.livejournal.com/762.html> <https://archive.is/XedLS>

¹⁶³ <http://sled-vzayt.livejournal.com/1730.html?page=> <https://archive.is/GYQsL>

¹⁶⁴ Video CONVOY-1: <https://instagram.com/p/rFFt34QXWU/> backup: <https://www.youtube.com/watch?v=lpfWHo0J7Wk> <https://archive.is/0Y4RU>

¹⁶⁵ It is worth noting that two other tanks of this same convoy (tank numbers 138 and 245) were also subsequently geolocated in different areas of Ukraine <http://surpher.livejournal.com/762.html> <https://archive.is/XedLS>

¹⁶⁶ http://www.buzzfeed.com/miriamberger/21-photos-that-show-the-growing-conflict-in-east-ukraine?utm_term=.rvp7QoRvXR#.dcvZgLkEpk <https://archive.is/vwZgn>

¹⁶⁷ <https://twitter.com/shelomovskiy/status/506095547862618114> <https://web.archive.org/web/20151105201809/https://twitter.com/shelomovskiy/status/506095547862618114>

the Russian truck convoy. One photo even shows the tank still with the number 127 on one of the protective coverings on the top left of the vehicle¹⁶⁸.

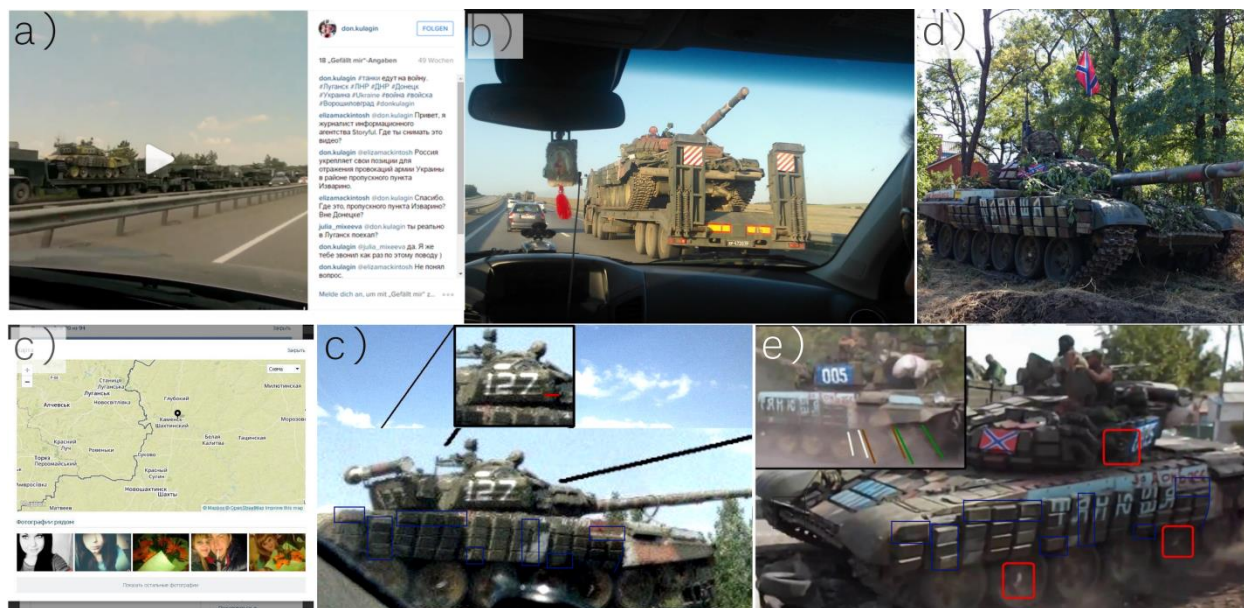


Figure 33. Sightings of tank number 127 / 005 in Russia and Ukraine during the summer of 2014. a), c) in a truck convoy 30 July 2014 close to Kamensk-Shakhtinsky^{169 170}. b) Another convoy carrying tank 127, photo uploaded on 21 August 2014 and taken in the area of Rostov-on-Don¹⁷¹. d) A photo of tank 127 in Novoazovsk taken by journalist Petr Shelomovskiy on 31 August 2014¹⁷². e) A photo of tank 127 in video CONVOY-2 uploaded 10 September 2014, filmed at 47.126085, 38.084023¹⁷³.

Tank 127 was again featured in video CONVOY-2 uploaded on 10 September 2014¹⁷⁴, filmed inside Novoazovsk (47.126085, 38.084023). By this time, much of the chassis of the tank had been painted over, and it had been renumbered as '005'.

¹⁶⁸ <http://www.buzzfeed.com/miriamberger/21-photos-that-show-the-growing-conflict-in-east-ukraine> (photo 12) <https://archive.is/vwZgn>

¹⁶⁹ Video CONVOY-1: <https://instagram.com/p/rFFt34QXWU/> backup: <https://www.youtube.com/watch?v=lpfWHo0J7Wk> <https://archive.is/OY4RU>

¹⁷⁰ https://pp.vk.me/c620518/v620518709/11017/wNaX9B_a4us.jpg <https://archive.is/Ztrv8> with geolocation at http://ic.pics.livejournal.com/sled_vzayt/73245930/57357/57357_original.jpg <https://archive.is/Jd4c1>

¹⁷¹ <https://bellingcat-vehicles.silk.co/page/1112-T-72B1-on-trailer>

¹⁷² <https://twitter.com/shelomovskiy/status/506095547862618114> <https://web.archive.org/web/20151105201809/https://twitter.com/shelomovskiy/status/506095547862618114>

¹⁷³ <https://www.youtube.com/watch?v=pZzsLMdz4C8> backup: <https://www.youtube.com/watch?v=K2yiiYfK9rk>

¹⁷⁴ <https://www.youtube.com/watch?v=pZzsLMdz4C8> backup: <https://www.youtube.com/watch?v=K2yiiYfK9rk>

Based on the unique visible features of T-72B1 tank number 127, we could confirm that it was transported within Russian territory from 30 July to 21 August, and was inside Novoazovs'k, Ukraine by 29 August 2014.

T-72B number 004

Another convoy of trucks carrying T-72B tanks was photographed on 5 August 2014 in Russia close to Kamensk-Shakhtinsky¹⁷⁵ (Figure 36a). The tank closest to the camera had distinctive yellow and green coloring in the wheel hubs, green ERA blocks on its side, a painted brown front and back to the turret and a distinctive notch on the side skirt (Figure 36).

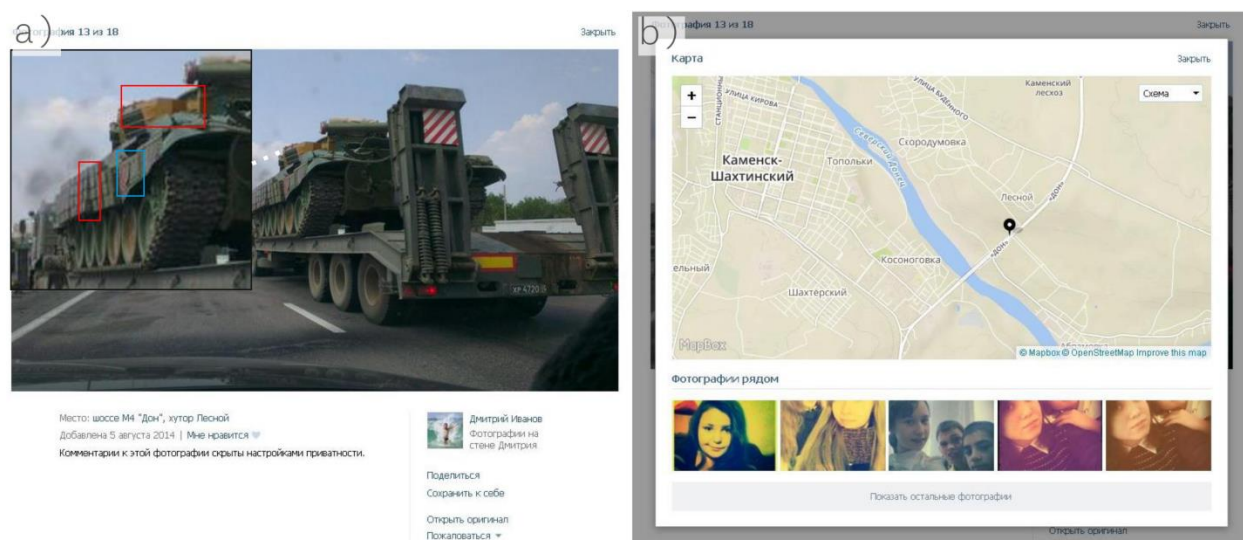


Figure 34. a) Sighting of tank 004 inside Russia on a convoy close to Kamensk-Shakhtinsky¹⁷⁶, b) position of geotag for photo a) on VKontakte.

Another photo of the tank was taken on 23 August 2014 and uploaded to Instagram at a location most likely between Rostov-on-Don and Taganrog in Russia (analysis of Google Street View images suggests the area of 47.2943725, 39.2856374, Figure 35). Once again, the visible tank had the distinctive green ERA blocks and wheel hub coloring.

¹⁷⁵ <https://bellingcat-vehicles.silk.co/page/1113-T-72-on-trailer>

¹⁷⁶ <https://bellingcat-vehicles.silk.co/page/1113-T-72-on-trailer>



Figure 35. Photos of tank 004 uploaded to Instagram on 23 August 2014¹⁷⁷. The top photo has been geolocated to a location in Russia close to 47.2943725, 39.2856374, visible on Google Street View here¹⁷⁸. The bottom left photo shows Tank 004 from the same Instagram pager, and the bottom right photo shows a photo of tank 004 inside Ukraine (also shown in Figure 36e). Note the green wheel hubs, the green front ERA brick (compare with), and the brown painted front of the turret.

Tank 004 was then sighted next to Novoazovs'k by Guardian journalist Alec Luhn on 30 August 2014¹⁷⁹ and it was seen again in video CONVOY-2 (Figure 36b, in which tank 127 also featured). In this video we can see the new '004' numbering on the side of the tank.

¹⁷⁷ https://instagram.com/p/sC_PFYu5S2/ <https://archive.is/X6hXZ>

¹⁷⁸

<https://www.google.de/maps/@47.2943725,39.2856374,3a,15y,100.96h,88.59t/data=!3m6!1e1!3m4!1sUomCAW2462ylLaCjxrT18gl2e0!7i13312!8i6656>

¹⁷⁹ <https://twitter.com/ASLuhn/status/505636613511450624>
<https://web.archive.org/web/20141018051654/https://twitter.com/ASLuhn/status/505636613511450624>



Figure 36. Sightings of tank 004 in Ukraine and Russia. a) in video CONVOY-2, uploaded on 10 September 2014 and filmed at 47.126085, 38.084023 in Novoazovs'k¹⁸⁰, b) a photo from journalist Alec Luhn on 30 August 2014 in Novoazovs'k¹⁸¹, c) tank 004 at a location in Russia on 31 July 2014¹⁸², located to a tank base at Boguchar, Russia (49.942101, 40.488264)¹⁸³, unconfirmed by our analysis d) tank 004 at an unconfirmed location and date, said to be in Ukraine¹⁸⁴.

Before entering Ukraine, tank T-72B1 004 was sighted in Russia in photos uploaded on 5 August 2014 and 23 August 2014. The same tank was then seen in Novoazovs'k on 30 August 2014 and in a video uploaded 10 September 2014. We can therefore confirm that this tank was transported from Russia to Ukraine during the conflict in late August 2014.

¹⁸⁰ <https://www.youtube.com/watch?v=pZzsLMdz4C8> backup: <https://www.youtube.com/watch?v=K2yiiYfK9rk>

¹⁸¹ <https://twitter.com/ASLuhn/status/505636613511450624>
<https://web.archive.org/web/20141018051654/https://twitter.com/ASLuhn/status/505636613511450624>

¹⁸² http://vk.com/albums200578370?z=photo200578370_335228328/photos200578370
<https://archive.is/F5JnN>

¹⁸³ <http://surpher.livejournal.com/762.html> <https://archive.is/XedLS>

¹⁸⁴ <http://imgur.com/M6wFnLr> <https://archive.is/Vg10g>

T-72B number 002

On 10 August 2014 a video of four tanks being transported on another truck convoy was filmed close to Rostov-on-Don (video CONVOY-3¹⁸⁵). The second tank in this video has a few distinctive features in the ERA block placement, and coloring of the gun and wheel hubs that make it look very similar to a third tank in video CONVOY-2 of T-72Bs inside Novoazovs'k uploaded on 10 September 2014¹⁸⁶ (filmed at 47.126085, 38.084023). The tank is now painted with the number '002' (Figure 37).



Figure 37. A comparison of the T-72B tank shown in two videos: a) video CONVOY-3 of a truck convoy in Russia close to Rostov-on-Don on 10 August 2014¹⁸⁷, and b) video CONVOY-2 uploaded on 10 September 2014 showing T-72B tanks filmed at 47.126085, 38.084023 inside Novoazovs'k¹⁸⁸.

¹⁸⁵ <https://www.youtube.com/watch?v=nvS5Axqecso> backup:
https://www.youtube.com/watch?v=_1ber8sRvUc

¹⁸⁶ <https://www.youtube.com/watch?v=pZzsLMdz4C8> backup:
<https://www.youtube.com/watch?v=K2yiiYfK9rk>

¹⁸⁷ <https://www.youtube.com/watch?v=nvS5Axqecso> backup:
https://www.youtube.com/watch?v=_1ber8sRvUc

¹⁸⁸ <https://www.youtube.com/watch?v=pZzsLMdz4C8> backup:
<https://www.youtube.com/watch?v=K2yiiYfK9rk>

Many of the features of the tank photos reviewed in Figure 37 seem to suggest that we are looking at the same T-72B on 10 August 2014 in Russia and on 10 September 2014 in Ukraine. However, the resolution in both videos is relatively poor, and so we concluded that the evidence was not strong enough to say with certainty that the tank in each video is the same.

Further T-72B tanks sighted in the area of Novoazovs'k

There are many further photos and videos of T-72B tanks stationed in the Novoazovs'k area in late summer / autumn 2014 (Figure 38). These tanks were sighted in the Novoazovs'k area; however, the origins of these tanks are thus far unconfirmed.

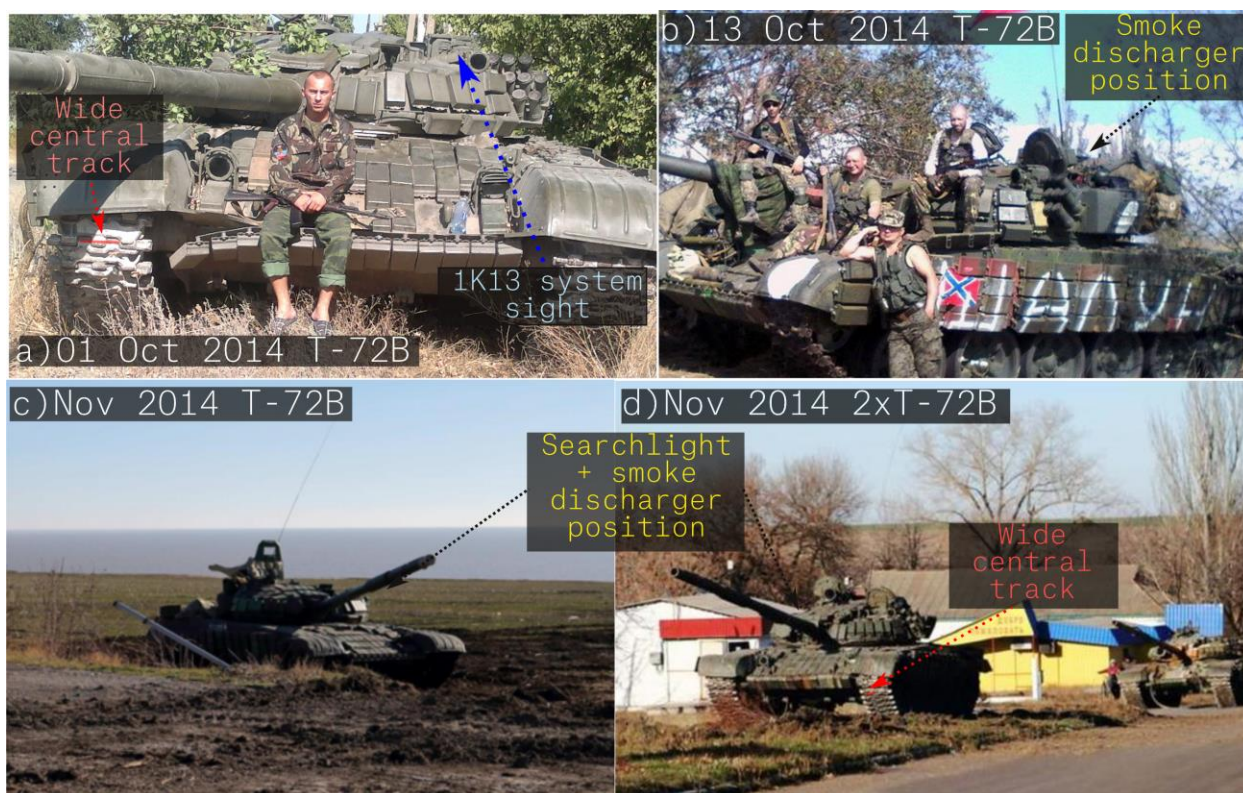


Figure 38. Evidence of the presence of T-72B tanks in the area of Novoazovs'k from 27 August 2014 to 01 October 2014. a) from geotagged VKontakte photos uploaded to twitter by user @BuTaJiu4ek on 01 October 2014¹⁸⁹, b) from an article 13 October 2014¹⁹⁰, and c), d) from user @raging545 on Twitter on 22 November 2015¹⁹¹.

¹⁸⁹ <https://twitter.com/BuTaJiu4eK/status/649836628182204416>
<https://web.archive.org/web/20151103205359/https://twitter.com/BuTaJiu4eK/status/649836628182204416>

¹⁹⁰ <http://news-mail.by/2014/10/13/svodka-boevyx-dejstvij-v-novorossii-za-13-oktyabrya-den-foto-video-18-doneck-aeroport-novorossiya-ukraina-2/13-10-14-novoazovsk-foto-ot-opolchenca-s-pozynym-fidel-2/> <https://archive.is/cxiQY>

¹⁹¹ <https://twitter.com/raging545/status/536227666320711680>
<https://web.archive.org/web/20150528141021/https://twitter.com/raging545/status/536227666320711680>

2s19 Msta-S sighted in Russia and in Ukraine

The case of the same 2s19 Msta-S self-propelled 152-mm howitzer (Msta-S) sighted first in Russia and then in Ukraine has been featured in a previous Bellingcat report¹⁹². This section just provides a brief summary of the evidence.

In a video uploaded on 30 July 2014, two Msta-S and several other armored vehicles were sighted on a truck convoy in Rostov-on-Don¹⁹³. One of the Msta-S has a distinctive camouflage pattern, and paint mark close to the rear of the turret (Figure 39a). It should be noted that this paint mark was different from the white circle which seems to be a feature of the other trucks and Msta-S in the video¹⁹⁴. Also note the writing 'H2200' on the side skirt just above the wheels (used as a code to designate oversized cargo for train transport in Russia¹⁹⁵),

The same Msta-S was sighted in Novoazov'sk in a video report by Al Jazeera uploaded on 5 September 2014¹⁹⁶. Note the same camouflage pattern and paint markings (Figure 39c).

¹⁹² <https://www.bellingcat.com/resources/case-studies/2015/05/29/confirming-the-location-of-the-same-msta-s-in-russia-and-ukraine/> <https://archive.is/jAL2X>

¹⁹³ https://www.youtube.com/watch?v=fqL_yZBMtAQ

¹⁹⁴ White tactical markings such as white painted circles seem to be a common feature of armored vehicles fighting in Ukraine in the side of the Russian-armed separatists, e.g. <https://www.bellingcat.com/news/uk-and-europe/2015/09/22/russias-6th-tank-brigade/> <https://archive.is/dN9pa>, <http://news.sky.com/story/1329691/sky-films-troops-in-russian-gear-in-ukraine> , or <https://www.youtube.com/watch?t=8&v=ocfxP-lerAY>

¹⁹⁵

https://ru.wikipedia.org/wiki/%D0%93%D0%B0%D0%B1%D0%B0%D1%80%D0%B8%D1%82_%D0%BF%D0%BE%D0%B3%D1%80%D1%83%D0%B7%D0%BA%D0%B8#.D0.98.D0.BD.D0.B4.D0.B5.D0.BA.D1.81_.D0.BD.D0.B5.D0.B3.D0.B0.D0.B1.D0.B0.D1.80.D0.B8.D1.82.D0.BD.D0.BE.D1.81.D1.82.D0.B8

¹⁹⁶ <https://www.youtube.com/watch?t=8&v=ocfxP-lerAY>



Figure 39. Summary of the geolocation of a 2s19 Msta-S self-propelled 152-mm howitzer system (Msta-S) in both Russia and Ukraine in July and September 2014, originally analyzed in another Bellingcat article¹⁹⁷. a) the Msta-S on a truck close to Rostov-on-Don in a video uploaded on 30 July 2014 (filmed at 47.262757, 39.660493), b) and c) the geolocation of the same Msta-S in Ukraine at the entrance to Novoazovsk in an Al Jazeera report uploaded to YouTube on 5 September 2014¹⁹⁸ (47.1275441, 38.0892229). Note the matching paint marks and writing on the vehicle in a) and c).

Further subsequent reports of Msta-S systems inside Ukraine close to Novoazovsk (and maybe even the same vehicle discussed in this section) have been reviewed by the investigative website Inform Napalm¹⁹⁹, but are not considered further in this report.

Summary

This section has shown that at least two T-72B tanks and one Msta-S self-propelled howitzer were transferred from Russia to Ukraine, arriving in Novoazovsk in Ukraine in late August / early September 2014. Further photo evidence demonstrated that a number of T-72B tanks were stationed in the Novoazovsk area in late summer / autumn 2014, but their origin could not be determined.

¹⁹⁷ <https://www.bellingcat.com/resources/case-studies/2015/05/29/confirming-the-location-of-the-same-msta-s-in-russia-and-ukraine/> <https://archive.is/jAL2X>

¹⁹⁸ <https://www.youtube.com/watch?t=8&v=ocfxP-lerAY>
<https://www.youtube.com/watch?v=RRprccyNmFI>

¹⁹⁹ <https://informnapalm.org/11391-sau-msta-s-novoazovskom> <https://archive.is/Bidwm>

Conclusions

Through analysis of open source videos, photos and satellite imagery from July / August 2014 between Novoazovs'k and the Ukraine-Russian border, we presented evidence of several instances of direct Russian involvement in the conflict in this area.

An MLRS attack (attack A) and a separate self-propelled artillery attack (attack B) were shown to have come from Russia on 23 August. Satellite imagery evidence of another MLRS attack on Ukrainian checkpoints coming within 1 km of the Russian-Ukraine border was presented, along with vehicle tracks leading back across the border (attack D). A potential firing position for mortar attacks on Novoazovs'k BCP was found on satellite imagery (attack C).

Satellite imagery of vehicle tracks through fields and the evidence of battle in the area of Markyne / Shcherbak (north of Novoazovs'k) support military and media reports that an armored force from Russia crossed the border between Markyne / Shcherbak on 25 August 2014 and engaged Ukrainian forces to the east of Novoazovs'k (attack E).

Open source evidence from 26 August shows that MLRS and artillery attacks were launched on targets on the outskirts of Novoazovs'k, striking roads, a hospital, residential areas and a cemetery (attacks F, G and H). It could not be determined whether these attacks came from Ukrainian or Russian territory.

Finally, it was shown that two T-72B tanks and one 2s19 Msta-S self-propelled howitzer was transported from Russia into Ukraine: videos and photos of vehicles in Novoazovs'k shortly after its capture were compared with truck convoys transporting armor within Russia in July / August 2014. Further photos from autumn / winter 2014 show the presence of several T-72B tanks in or close to Novoazovs'k.

Open source evidence has shown that attacks on Ukrainian forces around Novoazovs'k came from Russia, and that vehicles used in the conflict in the area were transported from Russia. This report adds to the growing body of evidence showing that Russia was directly involved in the Ukrainian conflict of 2014-2015^{200 201 202 203}.

²⁰⁰ <http://www.atlanticcouncil.org/publications/reports/hiding-in-plain-sight-putin-s-war-in-ukraine-and-boris-nemtsov-s-putin-war>
<https://web.archive.org/web/20150913042731/http://www.atlanticcouncil.org/publications/report/s/hiding-in-plain-sight-putin-s-war-in-ukraine-and-boris-nemtsov-s-putin-war>

²⁰¹ <http://www.interpretermag.com/an-invasion-by-any-other-name-the-kremlins-dirty-war-in-ukraine/> <https://web.archive.org/web/20150927210409/http://www.interpretermag.com/an-invasion-by-any-other-name-the-kremlins-dirty-war-in-ukraine/>

²⁰² <https://www.bellingcat.com/news/uk-and-europe/2015/02/17/origin-of-artillery-attacks/>
<https://archive.is/g21SF>

²⁰³ <http://www.martenscentre.eu/publications/caught-act-proof-russian-military-intervention-ukraine>

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Appendix

Table 6. Details of the videos considered in this report.

Num	Original video name	Translated video name	Uploader name	Upload date	Coordinates filmed	Video URL	Backup video URL
23-1	Новоазовск. Обстрел украинских пограничников из РСЗО ГРАД с территории России 23.08.2014	The Russians shelled Novoazovs'k area 08/23/2014	max maximov	08/23/2014	47.158348, 38.210027	https://www.youtube.com/watch?v=r7zabXxF_bE	https://www.youtube.com/watch?v=RulO66G8npA
23-2	Последствия обстрела украинских пограничников со стороны России 23 августа	Consequences of shelling Ukrainian border guards from Russia August 23	Сергей Ваганов (Sergei Vaganov)	08/23/2014	Part 1: 47.111433, 38.214382 . Part 2: 47.159586, 38.234528 . Part 3: 47.150653, 38.159087 .	https://www.youtube.com/watch?v=1hCA8LDWJPY	https://www.youtube.com/watch?v=bmqbu3IjpZw
23-3	Российско-украинская граница 23.08.14 Седово. Новоазовский район	Russian- Ukrainian border 23.08.14 Sedovo. Novoazovs'k area	lelbai	08/23/2014	47.101406, 38.180351	https://www.youtube.com/watch?v=SnRqBDoBz9s	https://www.youtube.com/watch?v=BqaHUVnVcJs
23-4	ШОК! Кто стреляет в спокойном СЕДОВО? 23.08.2014	SHOCK! Who shoots the quiet Sedovo ? 08/23/2014.	Ира Типичная	08/22/2014 (uploaded with incorrect time zone?)	Not geolocated	https://www.youtube.com/watch?v=NQdGQqgnJmw	https://www.youtube.com/watch?v=tato8DW7gis
23-5	Sedovo clashing	Sedovo clashing	znour0 .	08/23/2014	47.082537, 38.175397	https://www.youtube.com/watch?v=6yJN5lvW6DQ	https://www.youtube.com/watch?v=OTTSHu_jwIM
23-6a	Россияне обстреливают Новоазовский район 23.08.2014 - 2	The Russians shelled the Novoazovs'k area 23.08.2014 - 2	max maximov	08/23/2014	47.119943, 38.230202	https://www.youtube.com/watch?v=xc-EIPnEMSw	https://www.youtube.com/watch?v=CnrrA4Gj8w

Num	Original video name	Translated video name	Uploader name	Upload date	Coordinates filmed	Video URL	Backup video URL
23-6b	Россияне обстреливают Новоазовский район 23.08.2014 - 3	The Russians shelled the Novoazovs'k area 23.08.2014 - 3	max maximov	08/23/2014	47.119943, 38.230202	https://www.youtube.com/watch?v=ZYBBU7gJy8o	https://www.youtube.com/watch?v=zBxfgpVluQ0
23-7	Арт Обстрел Седово. Сегодня. 23.08.2014	Art shelling Sedovo. Today. 08/23/2014	Ира Типичная	08/22/2014	Not geolocated	https://www.youtube.com/watch?v=4-7DbcYtXVA	https://www.youtube.com/watch?v=U0aitW57M7k
25-1	В направлении Новоазовск Мариуполь идут бои между пограничниками и бронетехникой из РФ 25 08 2014	Towards Novoazovs'k Mariupol there are fights between guards and armored vehicles from Russia 25 08 2014	Новостной Портал (News Portal)	08/26/2014	47.118453, 38.105540	https://www.youtube.com/watch?v=DY-iN5o8J6E	https://www.youtube.com/watch?v=N8Bqfe4pWO8
26-1	The New Rebel Offensive: Russian Roulette (Dispatch 72)	The New Rebel Offensive: Russian Roulette (Dispatch 72)	VICE news	09/02/2014	5m 44s - 47.105475, 38.105593, 12m 21s - 47.128856, 38.089090	https://www.youtube.com/watch?v=hgrSb8G57cl	NA
26-2	Bombardeo de Novoazovs'k	Bombardment of Novoazovs'k	Ricardo Marquina Montaña	08/26/2014	33s: 47.104118, 38.104170 . NW 2m 54s: 47.126175, 38.068350	https://www.youtube.com/watch?v=v-fVDadSaI0	NA
26-3	Новоазовск обстрел из гаубиц 26.08.2014	Novoazovs'k fire from howitzers 08/26/2014	Петр Губка (Peter Sponge)	08/26/2014	47.106280, 38.102934	https://www.youtube.com/watch?v=lg-GW-G6bOQ	https://www.youtube.com/watch?v=FxOYJzObPCE
26-4	Новоазовск в городе горит больница, российские наемники продолжают обстреливать город 26 08 2014	Novoazovs'k Hospital in the city of lights, Russian mercenaries continue to bombard the city August 26, 2014	Новостной Портал (News Portal)	08/26/2014	Not geolocated.	https://www.youtube.com/watch?v=txonMvU3j2U	https://www.youtube.com/watch?v=yTsd4MYQWGM

Num	Original video name	Translated video name	Uploader name	Upload date	Coordinates filmed	Video URL	Backup video URL
26-5	Россияне обстреливают Новоазовский район 26.08.2014 - 1	The Russians shelled Novoazovs'k area 08/26/2014 - 1	max maximov	08/26/2014	47.109475, 38.032554 (approximately)	https://www.youtube.com/watch?v=_w5BHIA37EQ	https://www.youtube.com/watch?v=UxXveEVd_Ck
26-6	выезд с седово!	check with Sedov!	Петр Губка (Peter Sponge)	08/26/2014	47.085344, 38.140382 (end of video)	https://www.youtube.com/watch?v=izyeyzkMjhc	https://www.youtube.com/watch?v=NQx52XjcUA8
26-7	обстрел Новоазовской больницы!!!26.08.2014	Novoazovs'k shelling hospitals 08/26/2014 !!!	Петр Губка (Peter Sponge)	08/26/2014	47.110514, 38.103689 (approximately)	https://www.youtube.com/watch?v=CC2XVa-atLs	https://www.youtube.com/watch?v=cz_I0XB_cJI
26-8	MOV05554	MOV05554	Петр Губка (Peter Sponge)	08/26/2014	47.124490, 38.070001	https://www.youtube.com/watch?v=pWOMJ7cSgYs	https://www.youtube.com/watch?v=8KTJewGKCNQ
26-9	Россияне обстреливают Новоазовский район 26.08.2014 - 2	The Russians shelled the Novoazovs'k area 08/26/2014 - 2	max maximov	08/26/2014	47.122517, 38.084772	https://www.youtube.com/watch?v=cXrxH9lbE2o	https://www.youtube.com/watch?v=9snK2yHM0Oc
26-10	Россияне обстреливают Новоазовский район 26.08.2014 - 3	The Russians shelled the Novoazovs'k area 08/26/2014 - 3	max maximov	08/26/2014	47.124186, 38.065466	https://www.youtube.com/watch?v=tfSEcmE1qMU	https://www.youtube.com/watch?v=39KW-HGewu0
26-11	Артобстрел г. Новоазовска район М. Седовка 26.08.2014	Shelling of Novoazovs'k district M. Sedovka 26.08.2014	Мюрей Ротбард (Murray Rothbard)	08/26/2014	47.144441, 38.082677	https://www.youtube.com/watch?v=UCEJGjwwsHc	https://www.youtube.com/watch?v=tk33DxylfeM

Num	Original video name	Translated video name	Uploader name	Upload date	Coordinates filmed	Video URL	Backup video URL
26-12	Донецк, Новоазовск. Артобстрел города, 26/08/14.	Donetsk, Novoazovs'k . Shelling of the city, 8/26/14 .	Kratkiy Obzor	08/26/2014	Not geolocated.	https://www.youtube.com/watch?v=rZfYESolS04	https://www.youtube.com/watch?v=n2-4jIMarqM
27-1	27.08.2014 Новоазовск	27.08.2014 Novoazovs'k	Alex Will	08/27/2014	47.119197, 38.100287	https://www.youtube.com/watch?v=eC1RFhbfk-c	https://www.youtube.com/watch?v=TIxXIZxuh3o
27-2	Новоазовск идут бои за город 27 08 2014	Novoazovs'k are fighting for the city August 27, 2014	News Online	08/27/2014	47.117982, 38.105428	https://www.youtube.com/watch?v=y2XeT3YljnA	https://www.youtube.com/watch?v=3A0iFhS-9tY
27-3	Танки російської армії у Новоазовську 27 08 2014	The tanks of the Russian army in 2014 Novoazovs'k 27.08	Golem Production	08/28/2014	Not geolocated.	https://www.youtube.com/watch?v=l8uSgoWlaR4	https://www.youtube.com/watch?v=LDqYJNJ3fpbs
CON VOY-1	NA	NA	don.kulagin	Early August 2014	Near Kamensk-Shakhtinsky	https://instagram.com/p/rFFt34QXWU/	https://www.youtube.com/watch?v=lpfWHo0J7Wk
CON VOY-2	Ukraine War • Novorussian Armed Forces started an offensive towards Novoazovs'k	Ukraine War • Novorussian Armed Forces started an offensive towards Novoazovs'k	Press TV News	09/10/2014	47.126085, 38.084023	https://www.youtube.com/watch?v=pZzslMdZ4C8	https://www.youtube.com/watch?v=K2yiiYfK9rk
CON VOY-3	Колонны бронетехники стягиваются в Ростов-на-Дону. 10.08.2014	Columns of armored vehicles pulled together in Rostov-on-Don. 08/10/2014	1Langolier	08/10/2014	Rostov-on-Don (unconfirmed)	https://www.youtube.com/watch?v=nvS5Axqecso	https://www.youtube.com/watch?v=_1ber8sRvUc

Table 7. Timeline of the events in the Novoazovs'k area between 21 July 2014 and 27 August 2014.

Date	Time	Incident	Evidence source in this document
07/21/2015	Night	Checkpoint near Novoazovs'k border crossing point shelled with Grad system, reportedly from Russia.	Photo of Grad rocket from social media, official government source, TV news report.
07/25/2015	1:15am - 2:10am	Novoazovs'k border crossing point attacked with mortars, allegedly from Russian territory.	Ukrainian media and social media, official government source.
07/25/2015	Night	Base near Kholodne attacked with Grad system, allegedly from Russian territory.	Ukrainian media and social media, official government source.
08/21/2014	11:30am - 12:10pm	Novoazovs'k border crossing point attacked with mortars.	Ukrainian media
08/23/2014	4:07am - 4:40am	Novoazovs'k border crossing point attacked with mortars.	Ukrainian media. Possible mortar attack site identified on satellite images. Photos from Novoazovs'k border crossing point confirm use of 82-mm mortars.
08/23/2014	4:40am	MLRS shelling of Kholodne Ukrainian army base.	Videos of MLRS fire in Russia and explosions at attack site, satellite images of artillery craters confirming trajectory and firing position
08/23/2014	5:00am - ?	Mortar / howitzer / self-propelled artillery shelling of Kholodne army base.	Video of artillery fire from beyond Russian border by the sea, video of artillery striking the Kholodne army base close to 5:00am
08/23/2014	5:00am - ?	MLRS attack on Kholodne base, followed by more mortar shelling.	Interview with soldier
08/23/2014	6:00am - 6:25am	Mortar attack on Novoazovs'k border crossing point.	Local media report
08/23/2014	11:10am	MLRS attack (three systems) attack on Ukrainian army checkpoint near Novoazovs'k border crossing point.	Photos from local media and Reuters journalist of craters confirming timing and trajectory. Satellite images of craters confirming trajectory. Satellite images of clear firing position next to border confirming trajectory.
08/24/2014	3:10am - 4:00am	Mortar attack on Novoazovs'k border crossing point. Border crossing point closed.	Ukrainian government report, media report.
08/24/2014	Night	Attempted attack on checkpoint 'near Mariupol'. Repelled and several attackers captured.	Ukrainian media
08/24/2014	Day	Separatist reports of taking Telmanove are officially denied. Reuters journalists see no armed forces in town.	Reuters article, official military report.

Date	Time	Incident	Evidence source in this document
08/25/2015	8:00am -	Armored column (at least seven tanks, others say up to 30) breaks through border between Markyne and Shcherbak. They attack checkpoints close to Novoazovs'k border crossing point. With air support, the attack is repelled. However, the Russian armor remains inside Ukraine close to Rozy Lyuksemburh and Markyne, other units turned north.	Satellite imagery shows route across border and craters from battle near Markyne. Video shows explosions and smoke in direction of Markyne. Reuters article, Ukrainian media, official military report.
08/25/2014	Morning	MLRS shelling of Ukrainian units near Bezimenne.	Official government reports, media reports.
08/26/2014	Morning	Social media claims that Russian-armed separatist artillery has been positioned in Sedovo.	Social media
08/26/2014	Morning	Novoazovs'k - Sedovo road shelled by MLRS. Some shells hit Novoazovs'k hospital and several nearby residences.	Videos shortly following attack, official government reports. Many simultaneous smoke plumes suggest MLRS shelling. High-angle artillery crater suggests long range MLRS fire.
08/26/2014	Morning	Area near Novoazovs'k bread factory hit by shelling. Crater suggests shelling from NE.	Video shortly following attack.
08/26/2014	Afternoon	Ukrainian base and adjacent cemetery in NW Novoazovs'k shelled from NNE (likely by MLRS), from site towards Rozy Lyuksemburh.	Video shortly following attack.
08/27/2014	Morning	Checkpoints to east of Novoazovs'k shelled	Video during attack. Satellite imagery of artillery craters confirm trajectory. Burn marks SE of Rozy Lyuksemburh show possible firing point (in Ukraine).
08/27/2014	Day	Russian/separatist forces take Novoazovs'k.	Videos and photos showing Russian-armed separatist T-72 tanks in Novoazovs'k. Media reports.