

Incident Assessment

Incident ID	CIV0242A & CIV0242B
Location	524th Microdistrict, City of Kharkiv, Kharkiv Oblast
Coordinates	50.0257, 36.3415 ¹ 50.0258, 36.3416 ² (Incident CIV0242A - Fragment 2) 50.0255, 36.3415 ³ (Incident CIV0242B - Fragment 3)
Date	Likely 27/02/2022
Time	Unknown

Description of the Events

On 27/02/2022 at around midday, images were first posted showing 9M55K rocket motors, which likely dropped a payload of submunitions somewhere over northern Kharkiv. There was active fighting on the north edge of the city during this time, and multiple reports of damage along the likely flightpath of the rockets.

Key Findings

- Two 9M55K rocket motors were identified as having impacted in the 524th Microdistrict in Kharkiv. A third motor could not be geolocated.
- The direction of origin of these two rocket motors was assessed as being roughly north.
- According to news reports, open sources and satellite data, several areas to the north of these rocket motors appear to have sustained damage between 24/02/2022 and 27/02/2022.
- It was not possible to identify with certainty the location of impact of the submunitions.
- Although close in proximity and date, due to the different angle of origin, this incident appears to be separate from Incident CIV0450.

Description of Searches

Searches were conducted in English, Ukrainian and Russian, in order to identify content relevant to this incident. Searches took place on Google, Yandex, Twitter, Telegram channels, and conflict mapping sites. The primary keywords used were location names, with time limits to identify relevant content posted around the date of this incident. An example of this is below:

¹ <https://maps.app.goo.gl/rtRmn4jNpxWZ3pip7>

² <https://maps.app.goo.gl/6EW5LPnVugkPG64E8>

³ <https://maps.app.goo.gl/9gvszfe4bPKtCQ8u5>

Keywords: 524 Mikroraion/ 524 мікрорайон/ 524 микрорайон/ 524 Microdistrict.

Time-limited to: 25/02/2022 - 04/03/2022.

On: Twitter, Google, Yandex.

Relevant Telegram channels were also checked for this period of time for possibly relevant content.

Background Summary of Significant Descriptive Content

- [News report](#)⁴ on the explosion of a pipeline in northern Kharkiv, which may or may not be relevant to this incident.
- No other significant descriptive content directly pertinent to this incident could be identified.

Analysis of Examinable Content

[Source 1](#)⁵: Three images posted to the Труха ⚡ Україна (Trukha Ukraine) Telegram channel on 27/02/2022 at 12:25 EET showing what appear to be munition fragments impacted into or next to tarmac. The images show what appear to be two different rocket motors. Image 1 (S1I1) shows a fragment impacted directly into tarmac which will be referred to as Fragment 1, while Image 2 (S1I2) and Image 3 (S1I3) appear to depict the same fragment in the same location, which shall be referred to as Fragment 2.

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https://konkurent.ua/publication/89809/u-harkovi-okupanti-pidirvali-gazoprovod-zdiynyalas-velika-poz-hezha-video/?utm_source=twitter_novapress&utm_medium=social

⁵ <https://t.me/truexanewsua/25031>



Source 1 showing S1I1, S1I2 and S1I3 in a clockwise order. Note that the source displays the timestamp as CET.

[Source 2](#)⁶: Two images posted to the Труха ⚡ Украина (Trukha Ukraine) Telegram channel on 03/03/2022 at 14:58 EET showing what appear to be munition fragments impacted into or next to tarmac. Image 1 (S2I1) shows a fragment which will be referred to as Fragment 3 while Image 2 (S2I2) shows Fragment 2.

⁶ <https://t.me/truexanewsua/28689>



Source 2 showing S2I1 and S2I2. Note that the image displays the timestamp as CET.

[Source 3](#)⁷: A single image (S3I1) which appears to show a munition fragment embedded in a road, posted to Twitter on 27/02/2022 at 14:10 EET by a user “Conflict In Kharkiv” @2022Kharkiv. The investigator identified this as Fragment 3. The user notes that the original source of this image has been “withheld”.

⁷ <https://twitter.com/2022Kharkiv/status/1497906951732318208>



Conflict In Kharkiv
@2022Kharkiv

9M55K in Saltivka 524 Microdistrict district of Kharkiv

(Source withheld)



1:10 PM · Feb 27, 2022

Source 3, Image 1 (S3I1). Note that the image displays the timestamp as CET.

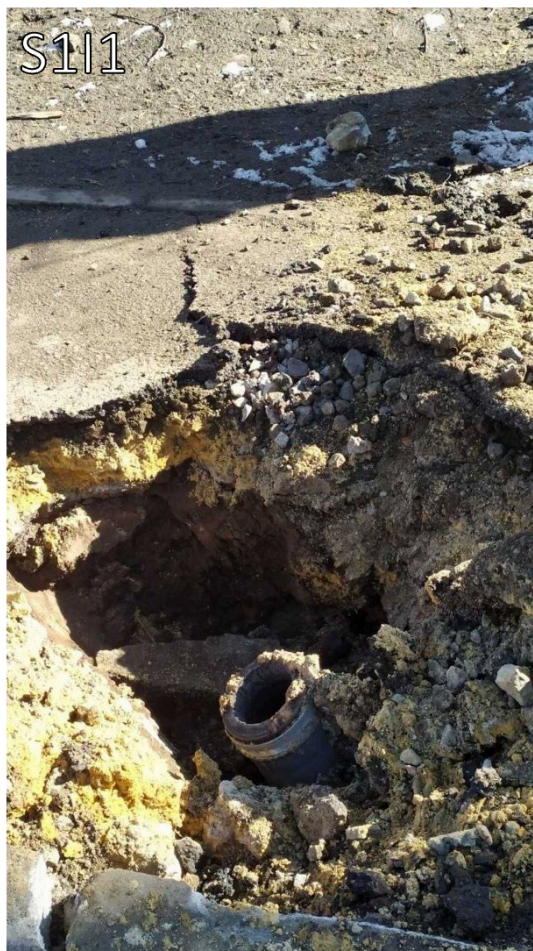
[Source 4](#)⁸: Three images showing what appear to be munition fragments impacted into or next to tarmac posted to the Труха ⚡ Україна (Trukha Ukraine) Telegram channel on 02/03/2022 at 12:45 EET. This post contains three images. Image 1 (S4I1) depicts Fragment 3, Image 2 (S4I2) depicts Fragment 2, while Image 3 (S4I3) depicts Fragment 1.

⁸ <https://t.me/truexanewsua/27647>



Source 4 showing Image 1, Image 2 and Image 3. Note that the image displays the timestamp as CET.

In order to more clearly show the fragments, images showing the same fragment from different sources have been grouped together. Establishing that these sources showed the same fragments was conducted either by: identifying that the craters or fragments had identical shapes or marks; by geolocating them to the same place; or by a combination of both methods.



Fragment 1.



Fragment 2.



S2I1



S3I1



S4I1

Fragment 3.

Questions to Investigate

Where Was the Incident?

Of the three fragments, Fragment 2 and Fragment 3 were geolocated. However, Fragment 1 could not be geolocated due to the limited geographical information available in the images. Due to Fragment 2 and 3 being very close to each other and the inclusion of Fragment 1 with two image sets showing Fragment 2 and 3, the investigator considered it more likely than not that Fragment 1 was located near to the identified location.

Fragment 2 (Incident A) was geolocated to [50.0258, 36.3416](#)⁹. Three of the four images of this impact site show a building in the background with a distinctive aquamarine and grey colour scheme. These images also contain the names of stores at this location. The locations given in the CIVHARM database were checked to assess if they were accurate.

One of the names of the stores is “Французская Пекарня” - “French bakery”. There is indeed a store with this name at the location noted in the CIVHARM database . Although there are no street view images of this location in Google or Yandex, there are many pictures associated with the stores at this location which can be used to compare against the row of stores seen behind Fragment 2



Left: S4I2, Right: a Google Maps [image](#)¹⁰ for “Французская Пекарня” - “French bakery”. Note that the green writing for another store is partially visible on the left side of the Google Maps image which matches that seen in S4I2.

⁹ <https://maps.app.goo.gl/6EW5LPnVugkPG64E8>

¹⁰ <https://maps.app.goo.gl/rw5fGydtKoYnpbXV9>



Comparison of S2I2 with satellite imagery of the identified location (Credit: Google/Maxar Technologies).

Fragment 3 (Incident B) can be geolocated to [50.0255, 36.3415](https://maps.app.goo.gl/9gvszfe4bPKtCQ8u5)¹¹. The locations given by the CIVHARM database did not appear to match the images showing this fragment, and so a visual search of the vicinity was conducted. All the images of this fragment appeared to show a junction of a paved road, which narrowed down the search area. Each of the images showed a different aspect of this fragment, and, although it was assessed as likely that the fragment seen in all the images was indeed the same, it was not until these fragments were geolocated that it could be confirmed that they were.

All three images (S2I1, S3I1 and S4I1) were matched to a junction which was identified approximately 40 m south of where Fragment 2 was identified - at [50.0255, 36.3415](https://maps.app.goo.gl/9gvszfe4bPKtCQ8u5)¹².



Comparison of S3I1 with satellite imagery of the identified junction (Credit: Google/Maxar Technologies).

¹¹ <https://maps.app.goo.gl/9gvszfe4bPKtCQ8u5>

¹² <https://maps.app.goo.gl/9gvszfe4bPKtCQ8u5>



Comparison of S4I1 with satellite imagery of the identified junction (Credit: Google/Maxar Technologies).



Comparison of S2I1 with satellite imagery of the identified junction (Credit: Google/Maxar Technologies).



Location of the two fragments (Credit: Google/Maxar Technologies).

When Was the Incident?

Date

The earliest social media posts showing these fragments were made on 27/02/2022.

[Source 1](#)¹³, showing Fragments 1 and 2, was posted at 12:25 EET. [Source 3](#)¹⁴, showing Fragment 3, was posted at 14:10 EET on 27/02/2022.

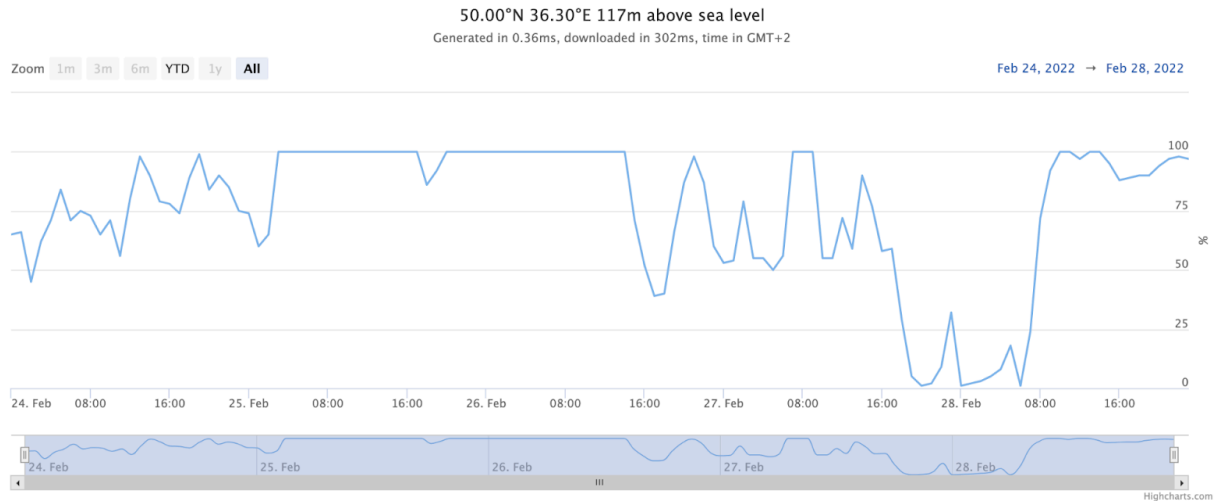
The investigator checked to assess if the weather in Kharkiv at the time was consistent with the sunlight seen in the images. Historical data from open-meteo.com¹⁵ shows that the weather

¹³ <https://t.me/truexanewsua/25031>

¹⁴ <https://twitter.com/2022Kharkiv/status/1497906951732318208>

¹⁵ <https://open-meteo.com/>

conditions on 24/02/2022 were mixed clouds and sun; 25/02/2022 had almost complete cloud cover throughout the day; and 26/02/2022 was cloudy in the morning and then became lighter in the afternoon.



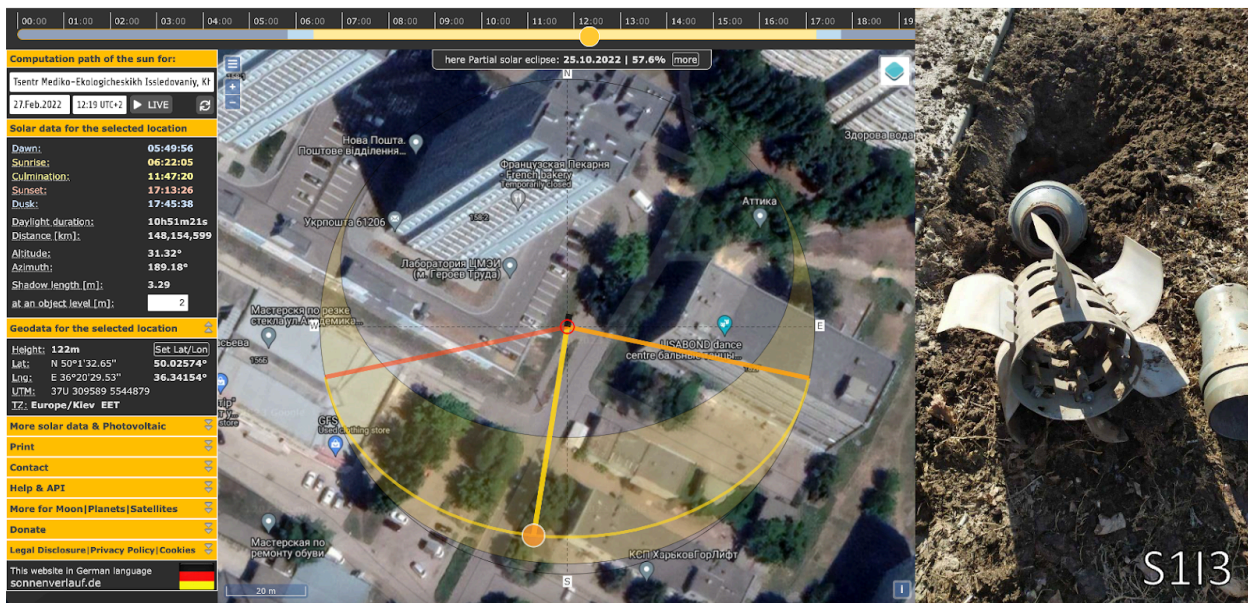
Graph showing cloud cover over Kharkiv 24/02/2022 - 28/02/2022 (Credit: open-meteo.com¹⁶)

[SunCalc.org](https://www.suncalc.org)¹⁷ was used to recreate the angle of shadows seen in the images of Source 1 and Source 3. If the time indicated by the shadows could be established to be after the time of the post, then that would suggest that the images were most likely taken on 26/02/2022, the day before they were first posted. For example, if a shadow within an image clearly indicated 16:00, but the image was first posted to social media at 11:00, then the image could not have been created on the same day the image was posted. In order to test this, the date of 27/02/2022 was used to assess the angle of shadows in this location.

The shadows in Source 1 appear to indicate that the image was taken around 13:20-14:29 EET.

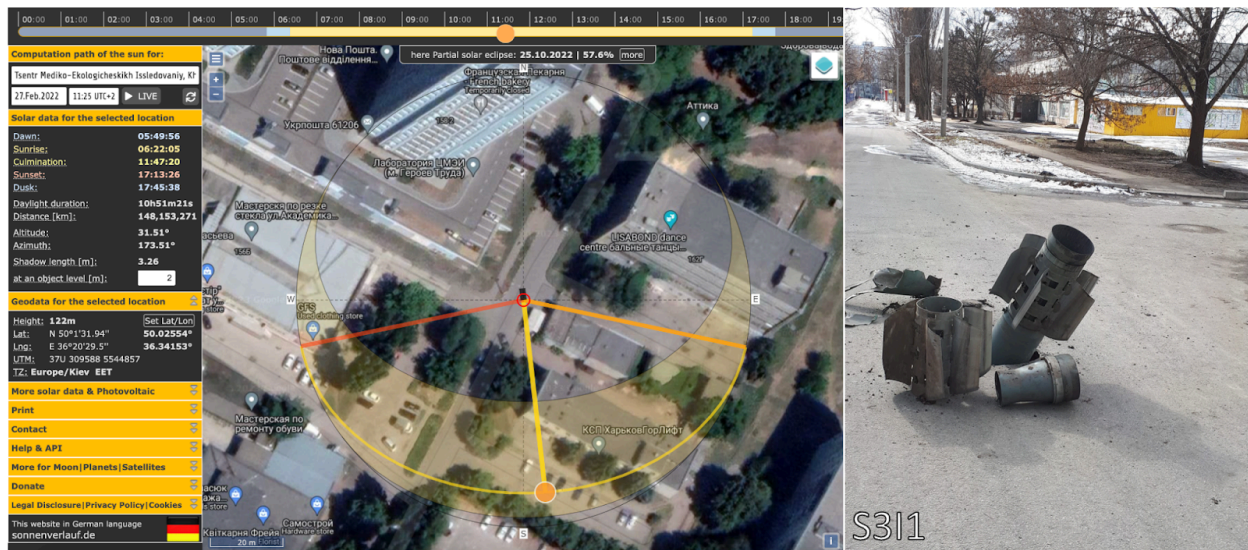
¹⁶ <https://open-meteo.com/>

¹⁷ <https://www.suncalc.org>



Left: [SunCalc.org](http://Suncalc.org)¹⁸ assessment of shadows at location of Fragment 2 on 27/02/2022. Right: S1I3.

The shadows in Source 3 appear to indicate it was taken around 10:25 - 12:25 EET.



Left: [SunCalc.org](http://Suncalc.org)¹⁹ assessment of shadows at location of Fragment 3 on 27/02/2022. Right: S3I1.

The shadow assessments for Sources 1 and 2 indicate that they were likely not taken on 26/02/2022 as at these time periods on this date the weather was still very cloudy. Therefore, they are not inconsistent with these pictures having been taken on the 27/02/2022 and then posted to social media shortly after.

¹⁸ <http://Suncalc.org>

¹⁹ <http://Suncalc.org>

Considering the Invasion of Ukraine began on 24/02/2022, this event must have taken place between 24/02/2022 and 27/02/2022, but most likely occurred on 27/02/2022, when images of these rocket motors were first posted to social media, and when the weather appears to have been most consistent with that seen in the images.

Time

No further information was discovered which could narrow down the time of the event. As such, if the event did occur on 27/02/2022, it must have occurred in the morning, as the shadow in Source 3 appears to indicate the image was taken before midday. However, if the event occurred between 24/02/2022 and 26/02/2022, it could have occurred at any time of the day.

What Kind of Munition Was Used?

The fragments clearly match the rocket motors for 9M55K rockets, fired by the BM-30 Smerch system.



Left: [Recognition card](https://twitter.com/MarkHiznay/status/1496719886009126912?s=20) created by Human Rights Watch associate director of the Arms Division, Mark Hiznay²⁰. Right: S2I1 depicting Fragment 3. Note the even spacing between the three hinges of the tail section.

Fragment 2 no longer has its tail section attached. However, in Source 1 a recognisable 9M55K tail section has been placed next to the Fragment. Although this does not confirm this tail came from this Fragment, it does allow us to compare the size of the Fragment to the tail section. It can therefore be assessed that the size of Fragment 2 is consistent with the size of a 9M55K

²⁰ <https://twitter.com/MarkHiznay/status/1496719886009126912?s=20>

rocket. Considering the unique, large size of the 9M55K rockets it is almost certain that Fragment 2 is a 9M55K rocket.



Left: S1I2 depicting Fragment 2. Right: [recognition card](#) created by Human Rights Watch associate director of the Arms Division, Mark Hiznay²¹.

Fragment 1 could not be geolocated and there are few indications of scale within the images that depict it. However, the base of the nozzle appears to match with that of a 9M55K.

²¹ <https://twitter.com/MarkHiznay/status/1496719886009126912?s=20>

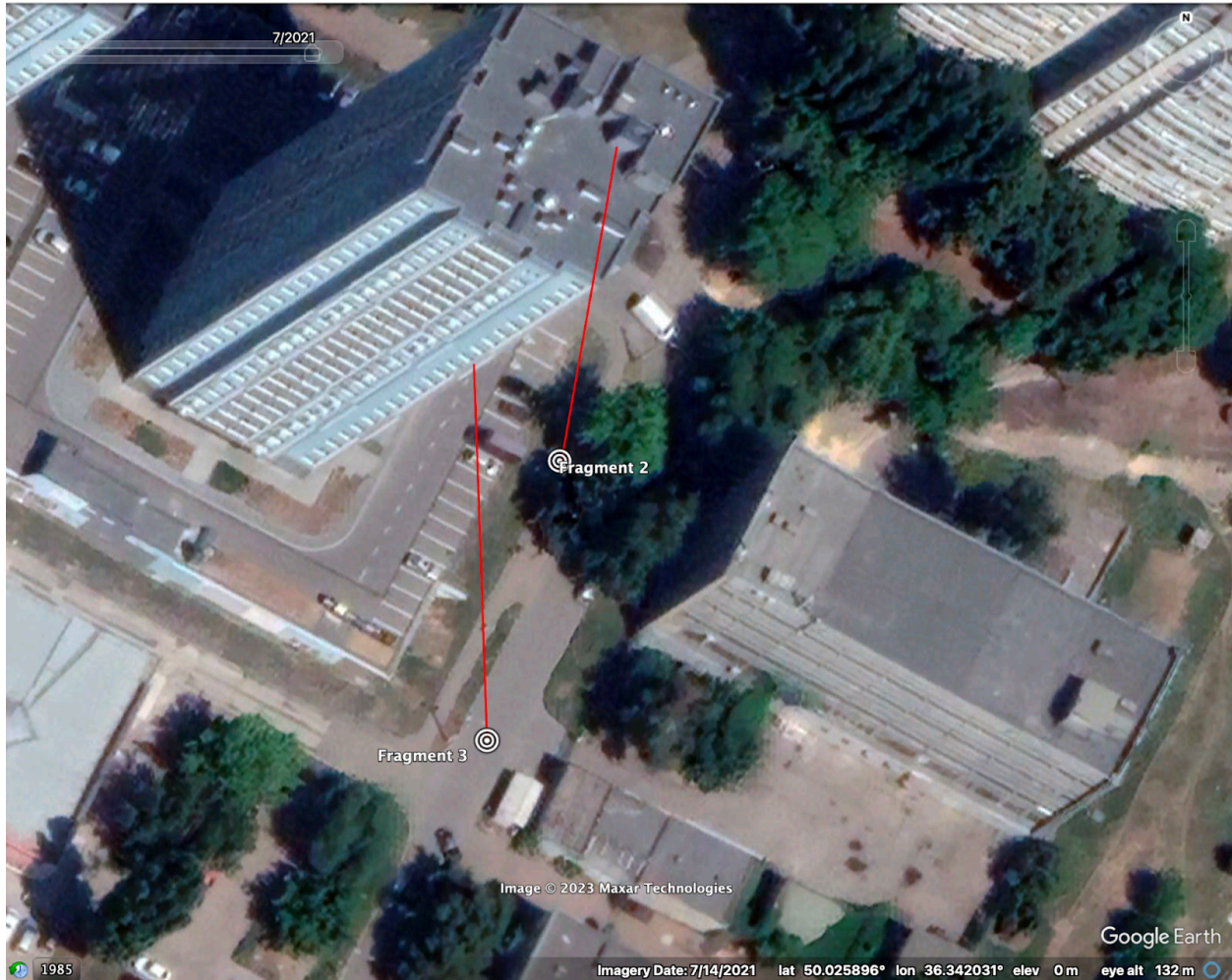


Left: Fragment 1 as seen in S1I1, Right: Fragment 2 as seen in S1I2.

Is There Any Evidence of the Direction the Munition Came from?

By examining the different aspects of the motors as seen in the various sources it is possible to assess the general angle of the rocket motors and so their rough direction of origin:

- Fragment 1: Could not be assessed as it could not be geolocated;
- Fragment 2: 10 degrees from north;
- Fragment 3: 358 from north.



Satellite imagery showing the assessed angles of origin for Fragment 2 and Fragment 3 (Credit: Google/Maxar Technologies).

A standardised template using the maximum (70km) and minimum (20 km) ranges of a [BM-30](https://www.armyrecognition.com/russia_russian_army_vehicles_system_artillery_uk/bm-30_smerch_9k58_300mm_multiple_rocket_launcher_system_technical_data_sheet_information_description.html)²², which fires the 9M55K rocket, was applied to these angles of origin to identify the likely area of origin.

²²

https://www.armyrecognition.com/russia_russian_army_vehicles_system_artillery_uk/bm-30_smerch_9k58_300mm_multiple_rocket_launcher_system_technical_data_sheet_information_description.html

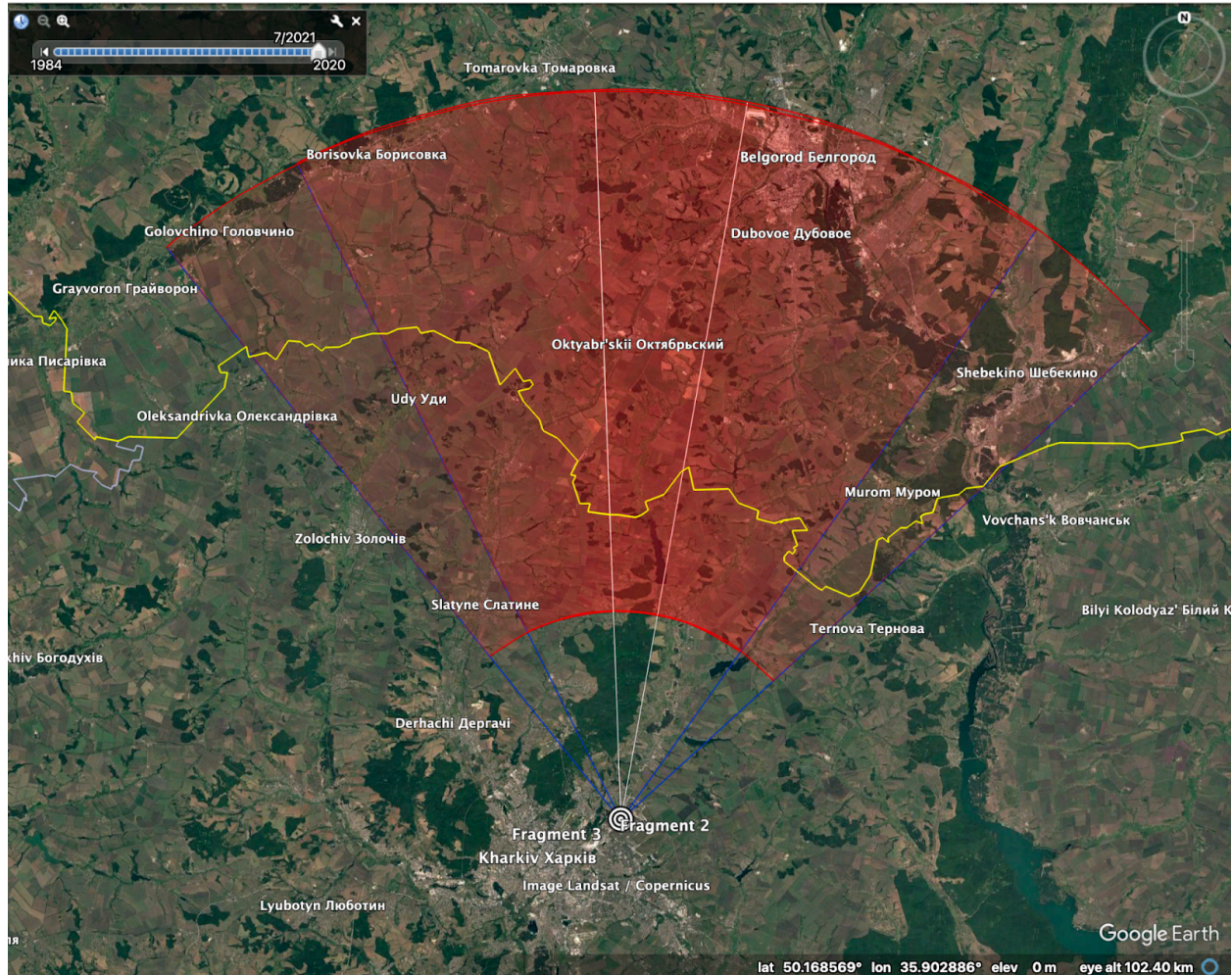


Image showing the assessed area of origin with the minimum and maximum ranges of a BM-30 (red), assessed directions of origin (white) and extreme left and right of arcs (blue).

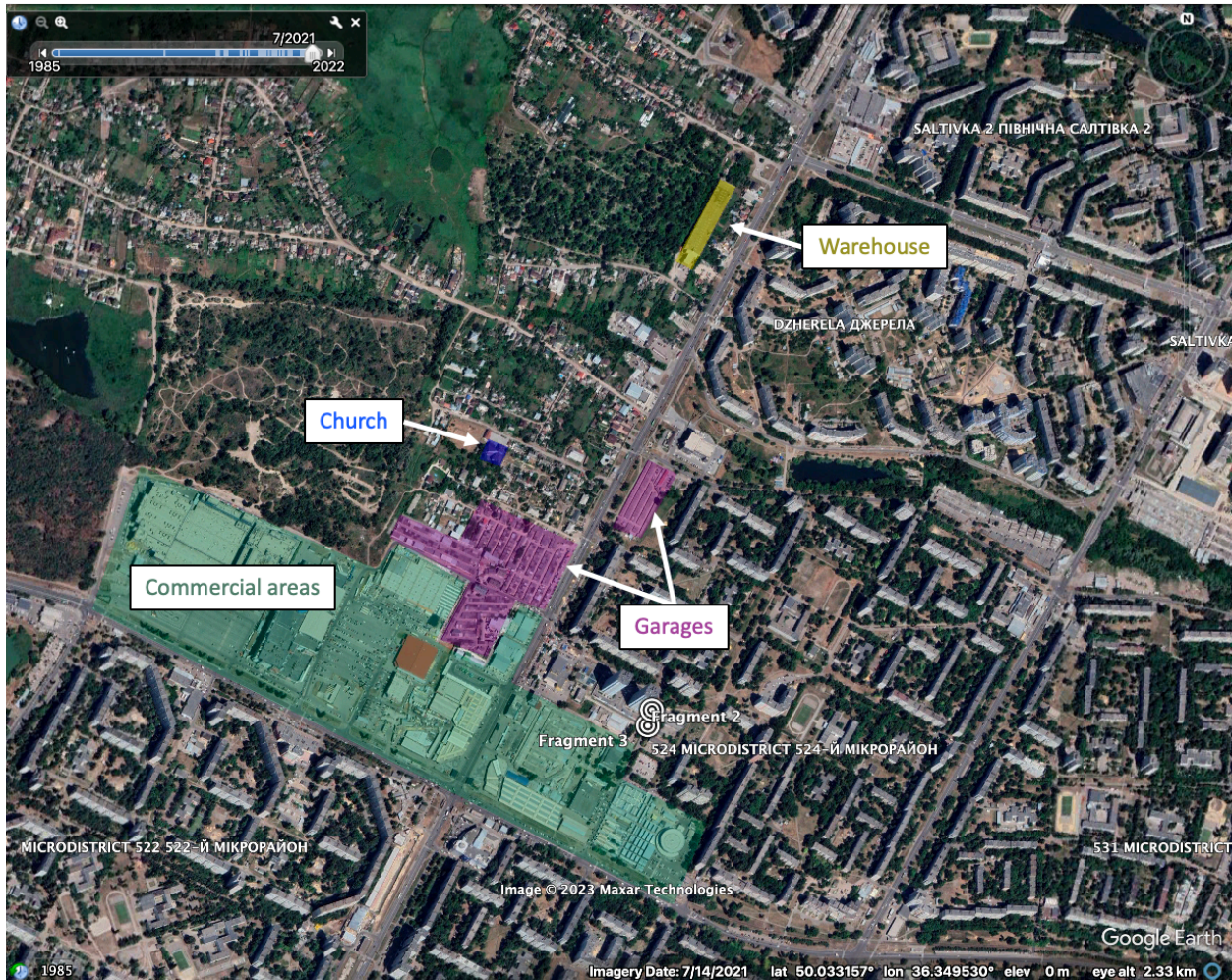
Are There Any Indications of What the Location Was Being Used for?

The 524th Microdistrict in Kharkiv is primarily a residential area, with a large commercial area with stores and markets to the immediate south and west. To the immediate north and north-west there are two sets of garages. Further to the north and north-west, along the assessed direction of origin, there is a large suburban neighbourhood, which includes the [St. Thomas Aquinas church](#)²³, as well as a warehouse-type building which is marked as a “garage co-operative” on [Wikimapia](#)²⁴. To the north-east is the neighbourhood of Saltivka.

²³ <https://maps.app.goo.gl/nst54AwMFmTvf3qW6>

²⁴

<http://wikimapia.org/#lang=en&lat=50.034416&lon=36.344082&z=16&m=w&show=/14195045/ru/%D0%93%D0%B0%D1%80%D0%B0%D0%B6%D0%BD%D1%8B%D0%B9-%D0%BA%D0%BE%D0%BE%D0%BF%D0%B5%D1%80%D0%B0%D1%82%D0%B8%D0%B2&search=kharkiv>



Satellite image of relevant locations in vicinity of Fragment 2 and 3. (Credit: Google/Maxar Technologies).

Were There Military Structures, Installations or Other Assets in the Area?

No military structures could be identified within open sources in this location. However, there was fighting across Kharkiv during the opening days of the war.

The north edge of Kharkiv city appears to have become the frontline of the confrontation between Russian and Ukrainian forces. On 24/02/2022, what was reported to be Russian armoured vehicles²⁵²⁶²⁷²⁸ were identified at a junction on the northern edge of the city at [50.0544.36.3607](https://maps.app.goo.gl/KRvkW9kNjsC5zouS8).²⁹ These vehicles appear to have been [destroyed](#)³⁰ later.

²⁵ <https://twitter.com/BeMilInterests/status/1496742901778427904>

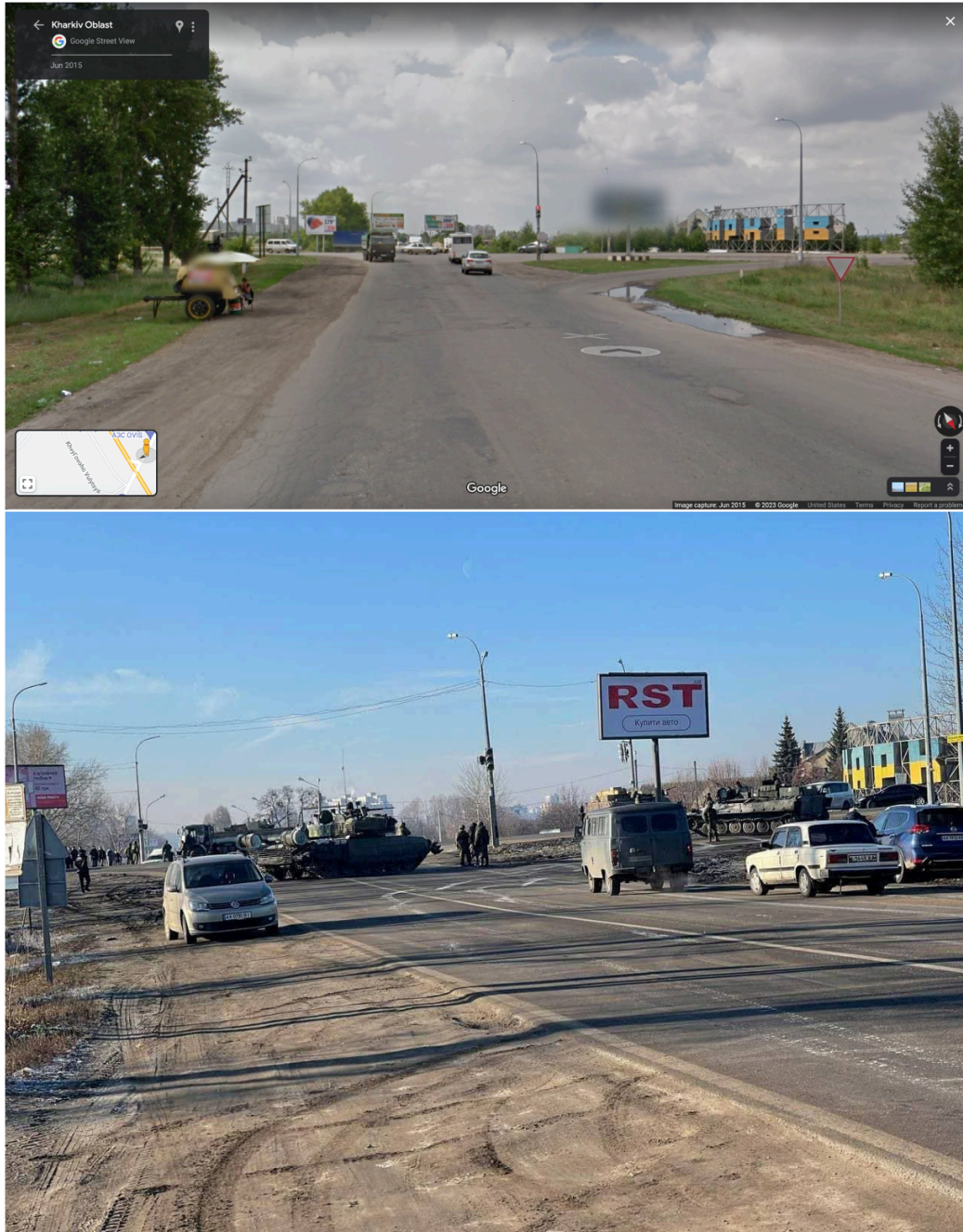
²⁶ <https://twitter.com/BeMilInterests/status/1496746036102336516>

²⁷ <https://twitter.com/CourtenaySargon/status/1496997386446585865>

²⁸ <https://twitter.com/CourtenaySargon/status/1496997389185474563>

²⁹ <https://maps.app.goo.gl/KRvkW9kNjsC5zouS8>

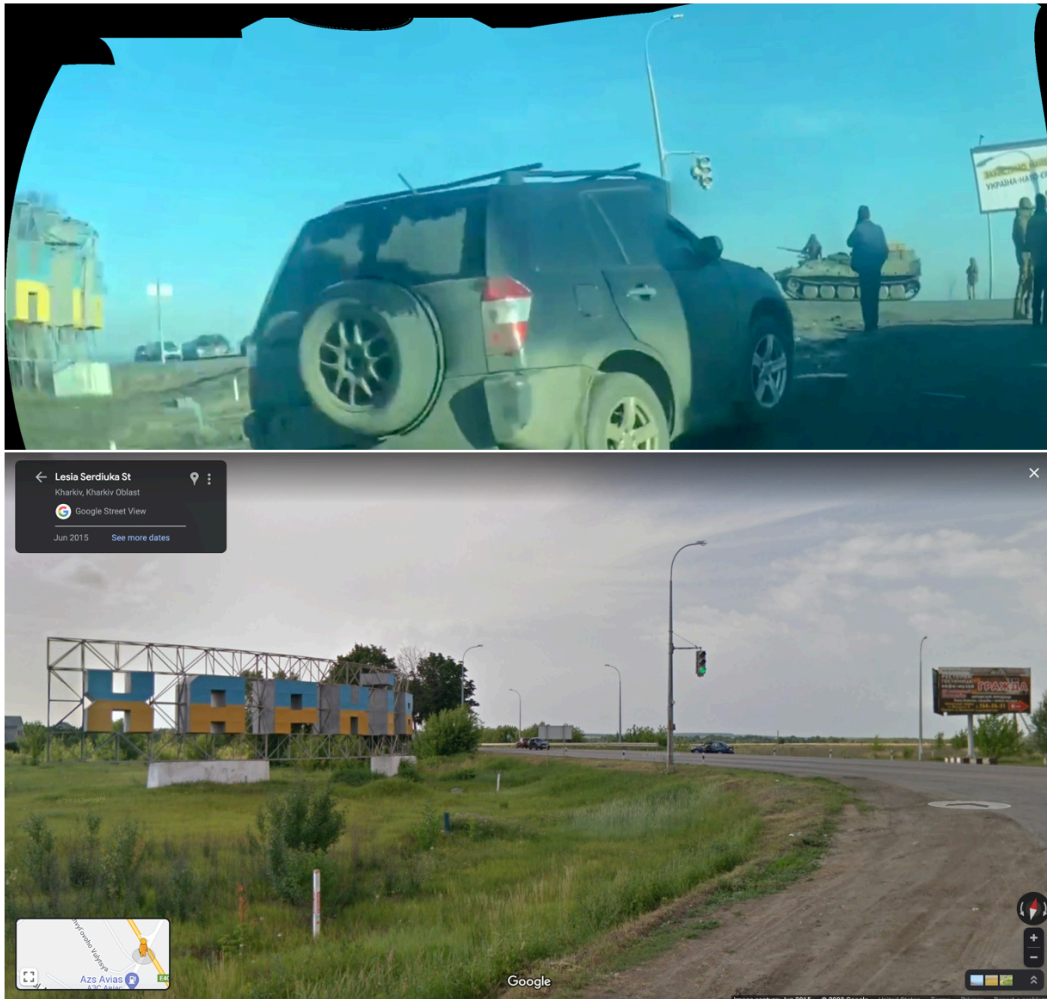
³⁰ <https://twitter.com/CourtenaySargon/status/1496997386446585865>



Geolocation of [image](#)³¹ showing what were reported to be Russian forces north of Kharkiv at [50.0545.36.3607](#)³².

³¹ <https://twitter.com/BeMilInterests/status/1496742901778427904>

³² <https://maps.app.goo.gl/hh5bJreVz7s4mtZg7>



Geolocation of [image](#)³³ showing what were reported to be the Russian forces north of Kharkiv at [50.0545, 36.3607](#)³⁴.

However, this junction is 3.5 km to the north of where the rocket motors impacted.

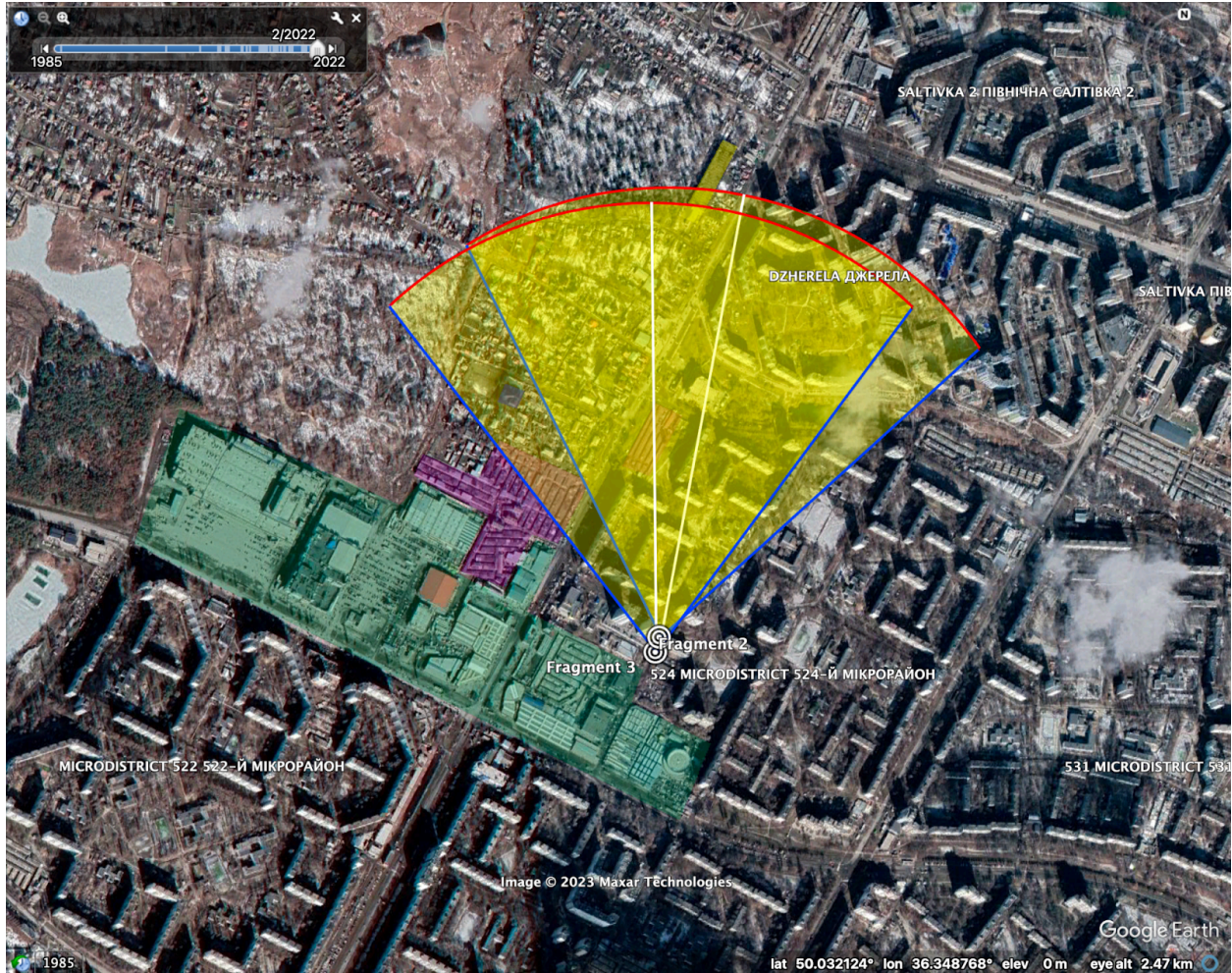
On 27/02/2022, a Russian column was reported in northern Kharkiv and later destroyed by the Ukrainian forces, although it appears to have been spotted on the west side of the Kharkiv river (See CIVO450).

What Was Damaged?

In order to assess the possible area of impact of submunitions, a standardised 1 km arc was applied from the point of impact along the assessed direction of origin.

³³<https://twitter.com/BeMilInterests/status/1496746036102336516>

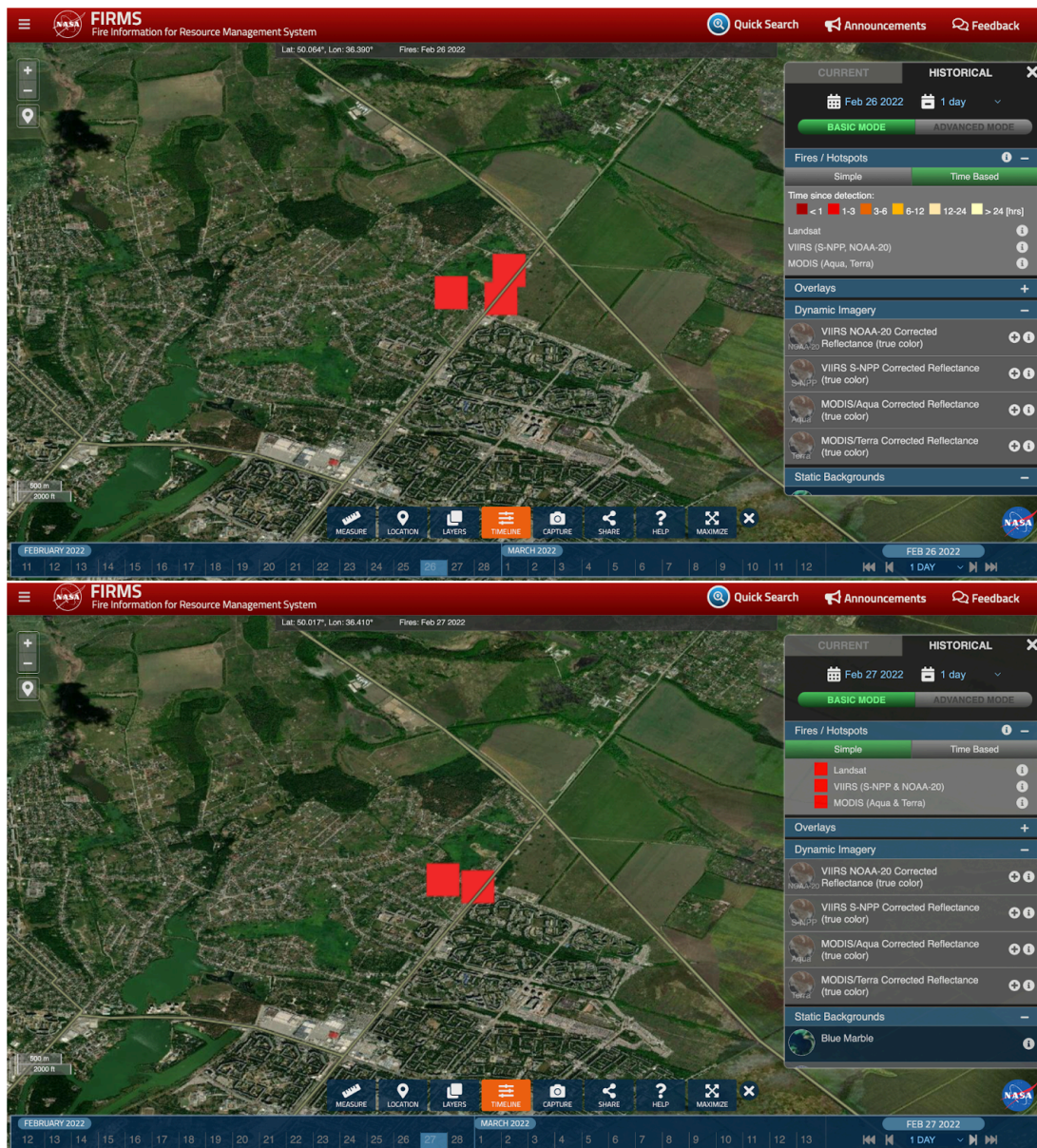
³⁴ <https://maps.app.goo.gl/hh5bJreVz7s4mtZg7>



Assessed possible impact area of submunitions, as indicated by the yellow arc.

Satellite data, including imagery and fire reporting services, were checked in the time period in question to assess if any large fires had occurred in this area. NASA [FIRMS](https://firms.modaps.eosdis.nasa.gov/map/)³⁵ data, which detects fires, noted fires approximately 2.3 km to the north of Fragments 2 and 3 on 26/02/2022 and 27/02/2022.

³⁵ <https://firms.modaps.eosdis.nasa.gov/map/>



Screenshots of NASA [FIRMS](https://firms.modaps.eosdis.nasa.gov/)³⁶ data, showing fires detected on 26-27/02/2022.

A Twitter [thread](https://twitter.com/Michael1Sheldon/status/1497711570956206088)³⁷ by the researcher Michael Sheldon identified a set of burning buildings reported on 26/02/2022 in the vicinity of [50.0502, 36.3415](https://maps.app.goo.gl/sbx5EX6u5EC1eR3Y8)³⁸, 2.7 km directly north of the impact points and under the assessed direction of origin. The investigator assessed Sheldon's method and agreed with his conclusions.

³⁶ <https://firms.modaps.eosdis.nasa.gov/map/>

³⁷ <https://twitter.com/Michael1Sheldon/status/1497711570956206088>

³⁸ <https://maps.app.goo.gl/sbx5EX6u5EC1eR3Y8>



Area of fire located by Michael Sheldon in relation to impact points, as well as areas of fire identified by NASA [FIRMS](#)³⁹ (Credit: Google/Maxar Technologies).

There were also multiple reports⁴⁰ and footage of what is claimed to have been a gas pipeline, which was [reportedly](#)⁴¹ destroyed in Danylivka, Kharkiv on the night of 26/02/2022-27/02/2022. Although there is a Danylivka in Kharkiv city directly north of the impact point, there are several other Danylivkas within Kharkiv Oblast. A [video](#)⁴² was later identified, which shows a damaged pipeline in the vicinity of the fires detected by NASA FIRMS, stating that it was damaged early on in the war. This could be geolocated to [50.0533, 36.3584](#)⁴³, a location which is also visible in [Google Street View](#)⁴⁴.

³⁹ <https://firms.modaps.eosdis.nasa.gov/map/>

⁴⁰ <https://twitter.com/DreamySancho/status/1497721380246364172>,
<https://twitter.com/valentinbboy/status/1497732843811872771>,
<https://twitter.com/piotr4913/status/1497725172543115264>

⁴¹

https://konkurent.ua/publication/89809/u-harkovi-okupanti-pidirvali-gazoprovod-zdiynyalas-velika-poz-hezha-video/?utm_source=twitter_novapress&utm_medium=social

⁴² <https://www.youtube.com/watch?v=XaVX1ZOUo6E>

⁴³ <https://maps.app.goo.gl/cdaD3UNmAfouFH6a8>

⁴⁴ <https://maps.app.goo.gl/jUe7ZH7dstgHfQLq7>



Top: Composite panorama of pipeline displayed in [video](#)⁴⁵. Bottom: Viewpoint in satellite imagery (Credit: Google/Maxar Technologies).

It was not possible to conclusively link this pipeline to the reports on the night of the 26/02/2022-27/02/2022 due to the videos of that event being taken at night. Nonetheless it is notable that the location identified above is near to a heat-spot indicated by NASA FIRMS data on 26/02/2022. In any case, due to the distance from the pipeline to the incident, which is over 3 km, it is considered unlikely, although still possible, that they are connected.

⁴⁵ <https://www.youtube.com/watch?v=XaVX1ZOUo6E>

Finally, satellite imagery and social media footage show that a warehouse-type building marked as a garage co-operative 1 km directly north of the point of impact at [50.0353, 36.3433](#)⁴⁶ suffered damage on or before 21/03/2022. Social media was checked and [two videos](#)⁴⁷ were identified from this location, posted on 12/03/2022. However, the damage seen in this footage appears to be more substantial than what could be expected from cluster submunitions. It is worth noting that this footage also appears to show this location was being used as a garage, as two vehicles can be seen in the video.



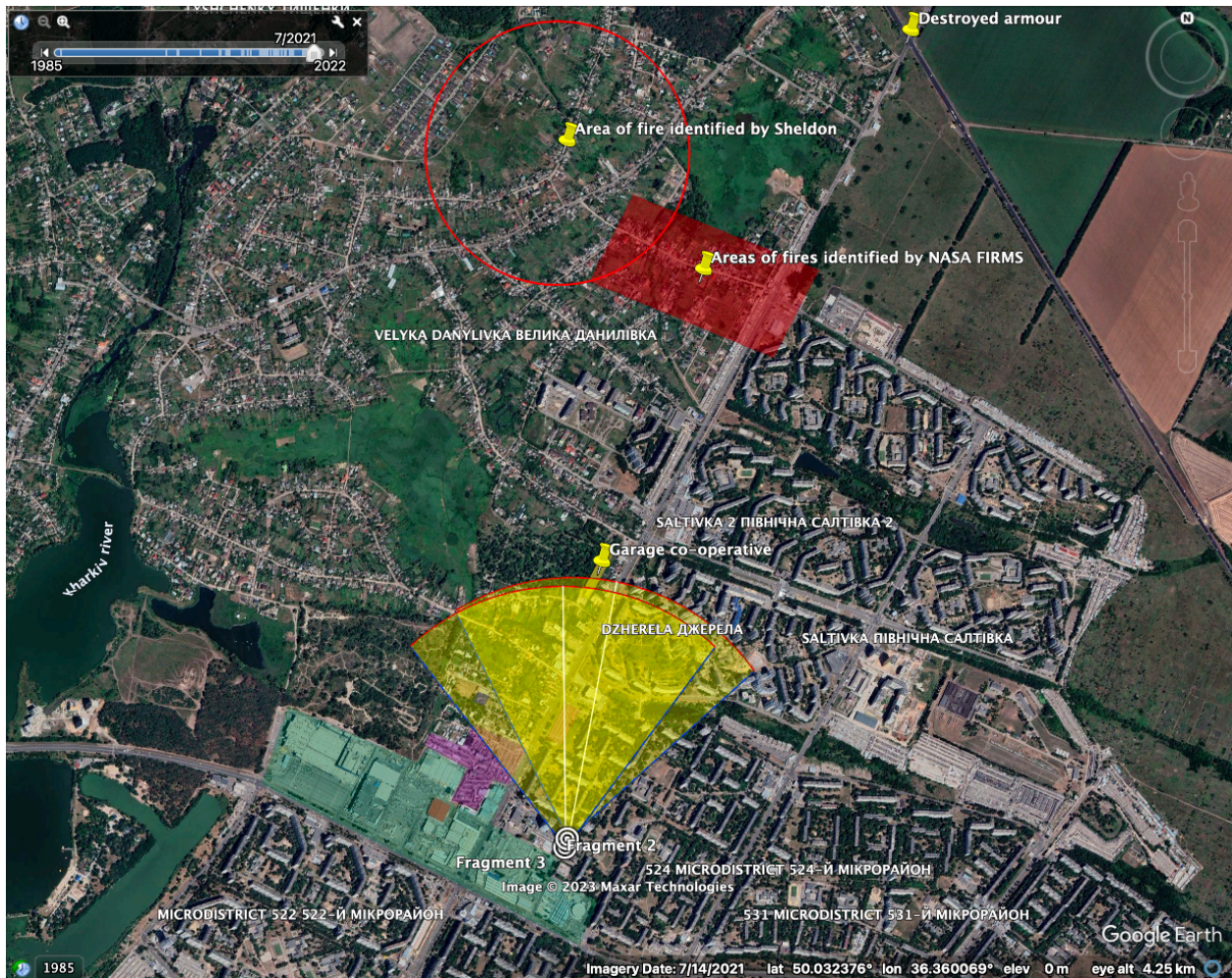
Vehicle as seen in [footage](#)⁴⁸ from the garage co-operative.

Due to the large number of reports of damage in this area at this time, it is not possible to confidently assert what damage could have been caused by the submunitions from these 9M55K rockets.

⁴⁶ <https://maps.app.goo.gl/Y7yMxKQoaRZiJ9mU7>

⁴⁷ <https://t.me/truexanewsua/32431>

⁴⁸ <https://t.me/truexanewsua/32431>



Map showing reports of damage along the direction of origin (Credit:Google/Maxar Technologies).

Timeline of the Incident

24/02/2022 - Russian forces attempt to enter Kharkiv from the north, but are later destroyed.

26/02/2022 - Multiple reports of damage and fires from various sources in the area to the north of the impact points.

Night of 26/02/2022-27/02/2022 - reports of a destroyed gas pipeline, which was possibly located in the neighbourhood north of the impact point.

12:25 EET on 27/02/2022 - Images of three 9M55K rocket motors first posted to social media.

Statements from Parties of the Conflict

Ukraine

It was not possible to identify any statement made by Ukraine specifically relating to this attack.

Russia

It was not possible to identify any statement made by Russia specifically relating to this attack.

Conclusion

On a date no later than 27/02/2022, two, possibly three 9M55K rocket motors impacted into the 524th Microdistrict in Kharkiv. During this period, there was fighting on the north edge of the city as the Russian forces attempted to break in. The direction of origin was assessed as coming from a generally northern direction. There are several examples of damage to the north of the impact point, however, none of them could be categorically tied to the rocket motors. As such, the exact impact point for the payload of these rockets could not be established with confidence.

Further Action

Geolocate Fragment 1.

Geolocate video of the burst gas pipe.