Incident Assessment

Incident ID	CIV0798
Location	HTZ district, Kharkiv
Coordinates	49.9487, 36.3802[1]
Date	15/04/2022
Time	Between 14:50 and 16:30 EET

Description of the Events

Between 14:50 and 16:30 EET on 15/04/2022, multiple posts with text, videos, and photos started to appear on various social media platforms, including Telegram, Twitter, and YouTube depicting the aftermath of a strike. At the scenes of some of the identified incidents, multiple fragments of what appear to be 9M27K-type Uragan cluster munition rockets were depicted. Submunitions and sections of the rockets appeared to cause multiple deaths and injuries among the local population and severe damage to civilian infrastructure, such as residential buildings, children playgrounds, and civilian vehicles.

The accompanying captions to the visual materials identified in social media indicate the geographical area of depicted incidents in the "HTZ" district of Kharkiv. According to information reported by the local authorities, over 32 people were injured and killed as a result of the strike. Based on the reported date of events, their geographical proximity, type of identified fragmentation, the nature of damage caused by the strike, and estimated direction of origin, these incidents likely occurred as a result of a single strike using the Uragan cluster munition rockets.

Key Findings

- On 15/04/2022 at approximately 16:15 EET, multiple posts started to appear on major social media platforms, such as Twitter and Telegram. These posts contained images and videos depicting the moments and aftermath of strikes which impacted residential areas of the HTZ microdistrict of Kharkiv, affecting the civilian population and causing damage to civilian objects.
- The fragments of munition, damage, and injuries sustained by civilians depicted at the scenes of CIV0798 appear to be consistent with those associated with 220 mm 9M27K rockets.

[1] https://maps.app.goo.gl/d8xKNWzp3U5rfdTs5

- Based on the reported range of 9M27K rockets and the estimated direction of origin of rockets which impacted the scenes of CIV0798, the munitions were assessed to have originated from the west, in territories located 10-40 km away from CIV0798. Open sources indicate that this area was controlled by the Ukrainian government at this time.
- Based on the results of the shadow analysis, it was established that the incidents forming CIV0798 likely occurred on 15/04/2022 between 14:50 and 16:45 EET.
- At least eight interrelated incidents were identified in open sources.
- No information indicating the presence of objects of military nature or armed forces in the impacted areas was identified in open sources.

Description of Searches

All visual materials depicting events forming the CIV0798 incident that were used for this assessment were identified in open sources by:

- Conducting search queries in major search engines (Google, Yandex, Bing) containing various combinations of words and phrases such as: "*strike*", *"shelling"*, "*kharkiv*", *"9M27K"*, "*htz*", *"playground"*, "*wounded*", "*killed*", "*casualties*", "*uragan*", "*cluster munition*", and "*rocket*" in English, Russian, and/or Ukrainian languages;
- Examining visual materials (videos, photos) posted on major social media platforms (Telegram, Twitter, YouTube, Facebook), which depicted events occurring around 15/04/2022, and using them for reverse image search;
- Identifying and analysing media reports and footage describing and depicting events that occurred in Kharkiv on 15/04/2022 and have reasonable grounds to be linked to the CIV0798 incident, such as type of weapons, number of casualties, impacted areas, etc.

Background Summary of Significant Descriptive Content

Media Reports

- **CNN**.[2] "*Death toll in Kharkiv shelling rises to 10, prosecutor says*"
- **Kyiv Independent**.[3] "*Update: Death toll in Kharkiv shelling rises to 10.*"

NGO Reports

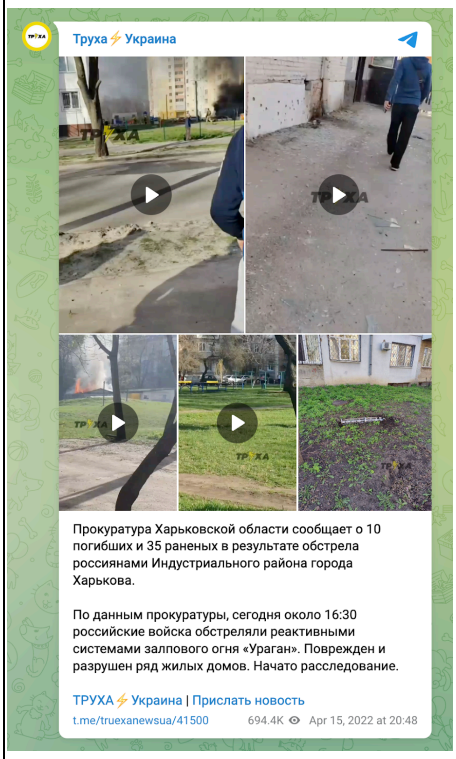
- **Amnesty International**.[4] "*Ukraine: "Anyone can die at any time": Indiscriminate attacks by Russian forces in Kharkiv, Ukraine*", 13/06/2022.

[2] https://www.cnn.com/europe/live-news/ukraine-russia-putin-news-04-15-22/h_3b4ece1402b594a4041040ea5a7f0f56
[3] https://twitter.com/KyivIndependent/status/1515094744313085956
[4] https://www.amnesty.org/en/latest/research/2022/06/anyone-can-die-at-any-time-kharkiv/

Other

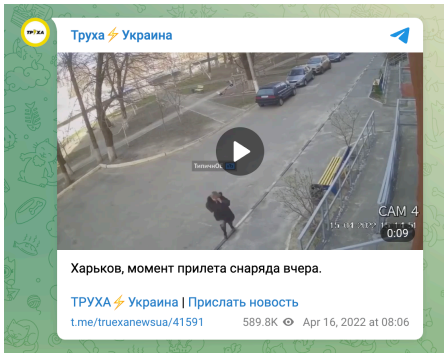
- N/A

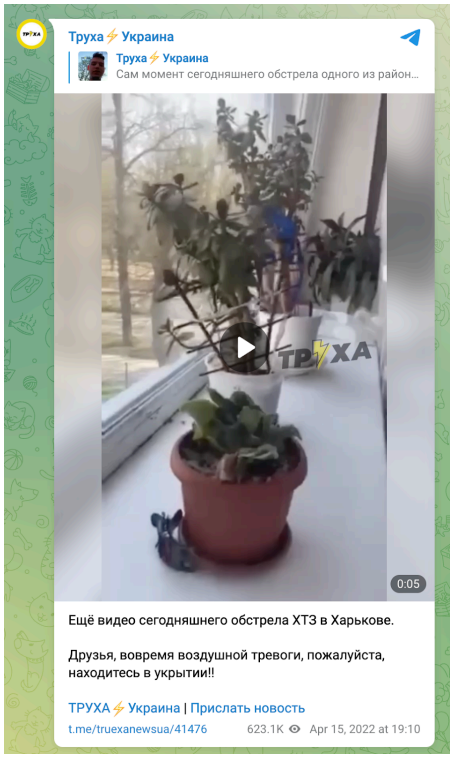
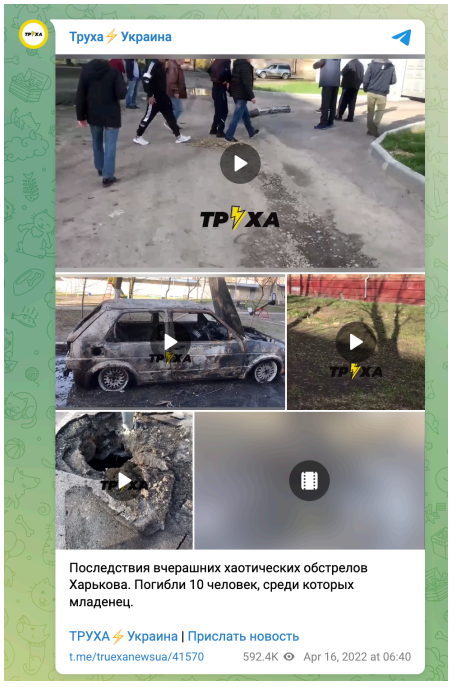
Analysis of Examinable Content

SOURCE	DATE/ TIME	CAPTION	DESCRIPTION	VISUAL CONTENT / ASSOCIATED INCIDENT(S)
Source 1 https://t.me/truexanewsua/41500	15/04/2022 20:48 EET	**Original caption:** *In Russian*: “Прокуратура Харьковской области сообщает о 10 погибших и 35 раненых в результате обстрела россиянами Индустриального района города Харькова. По данным прокуратуры, сегодня около 16:30 российские войска обстреляли реактивными системами залпового огня «Ураган». Поврежден и разрушен ряд жилых домов. Начато расследование.” **Translation**: “The Prosecutor's Office of Kharkiv Oblast reports 10 dead and 35 injured as a result of Russian shelling of the Industrialnyi district of Kharkiv. According to the prosecutor's office, today around 16:30, Russian forces shelled using “Uragan” multiple rocket launcher systems. A number of residential buildings were damaged and destroyed. An investigation has been launched.”	The post contains 4 videos and 1 photo reportedly depicting the aftermath of the strike of Russian armed forces using the Uragan MLRS in a residential area of the Industrialnyi district of Kharkiv, Ukraine, on 15/04/2022 around 16:30 EET. Several objects visually identified as the cargo sections of Uragan cluster munition rockets are visible on the ground in different locations.	

Source 1 Video 1 (S1V1)			The video depicts thick black smoke coming from the inner court of the tall multicoloured residential building. On the corner of the building, a sign that appears to be “ОБЛІК КАНЦТОВАРИ” in Ukrainian is visible, indicating it is an office supply store.	 *49.9487, 36.3802* ***Associated incident(s):*** CIV0798A1
Source 1 Video 2 (S1V2)			The video depicts marks on the wall of a building and what visually appears to be an impact crater on the sidewalk pointing towards the multicoloured building visible in the background, which appears to be similar to the one depicted on S1V1	 ***Associated incident(s):*** CIV0798A2

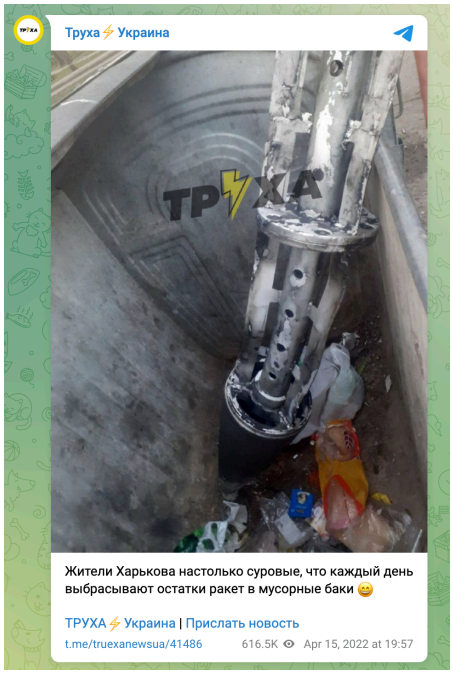
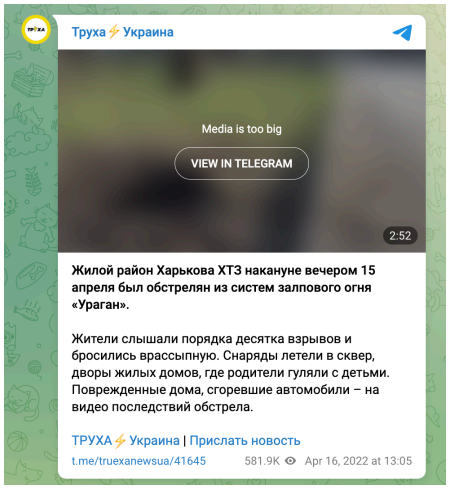
Source 1 Video 3 (S1V3)			The video is a compilation of three video clips stitched together. The first two videos depict an actively burning building near the children's playground. The last videoclip depicts a damaged car.	
Source 1 Video 4 (S1V4)			The video depicts an object visually identified as the cargo section of an Uragan cluster munition rocket embedded in the ground of the inner court of a residential building.	 ***Associated incident(s):*** CIV0798G3

Source 1 Image 1 (S1I1)			The image depicts an object visually identified as the cargo section of an Uragan cluster munition rocket on the ground near the building	
Source 2 Video 1 (S2V1) https://t.me/truexanewsua/41591	16/04/2022 08:06 EET	**Original caption:** *In Russian:* "Харьков, момент прилета снаряда вчера" **Translation:** "Kharkiv, the moment of the shell impact yesterday"	The CCTV footage depicts a moment of impact and explosion of munition in the inner court of a residential area with the road affecting the civilian car parked nearby. The timestamp indicates the time and date of depicted incident as 15/04/2022 at 15:14 EET	 ***Associated incident(s):*** CIV0798I2

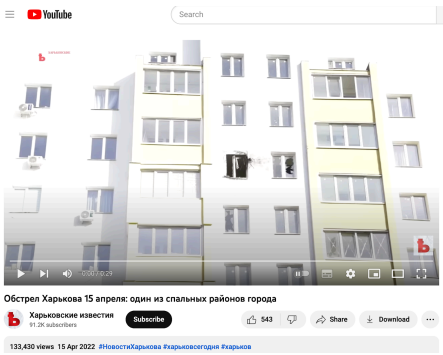
Source 3 Video 1 (S3V1) https://t.me/truexanewsua/41476	15/04/2022 19:10 EET	**Original caption:** *In Russian:* "Ещё видео сегодняшнего обстрела ХТЗ в Харькове. Друзья, вовремя воздушной тревоги, пожалуйста, находитесь в укрытии!!" **Translation:** "More video of today's shelling of HTZ in Kharkiv. Friends, during air raid alerts, please stay in shelters!!"	The video is made from inside one of the nearby buildings and depicts the moment of the impact in the inner court	 ***Associated incident(s):*** CIV0798E
Source 4 https://t.me/truexanewsua/41570	16/04/2022 06:40 EET	**Original caption:** *In Russian:* "Последствия вчерашних хаотических обстрелов Харькова. Погибли 10 человек, среди которых младенец." **Translation:** "The aftermath of yesterday's chaotic shelling of Kharkiv. 10 people were killed, including an infant."	The post contains 5 videos reportedly depicting the aftermath of strikes that occurred in Kharkiv on 15/04/2022.	

Source 4 Video 1 (S4V1)			The video depicts an object visually identified as the cargo section of an Uragan cluster munition rocket on the ground in the inner court of the residential building	 ***Associated incident(s):*** CIV0798I
Source 4 Video 2 (S4V2)			The video depicts an object visually identified as the cargo section of an Uragan cluster munition rocket halfway through embedded in the ground near residential building	 49.9490, 36.3704 ***Associated incident(s):*** CIV0798B1
Source 4 Video 3 (S4V3)			The video depicts a burnt car near the residential building. The moment of the impact is depicted in S2V1.	 49.9493, 36.3806 ***Associated incident(s):***

				CIV0798I2
Source 4 Video 4 (S4V4)			The video depicts a deep impact crater in the asphalt.	 49.9485, 36.3699 ***Associated incident(s):*** CIV0798B2
Source 4 Video 5 (S4V5)			The video depicts the same burnt car depicted on S2V1 and S4V3.	 49.9493, 36.3806 ***Associated incident(s):*** CIV0798I2

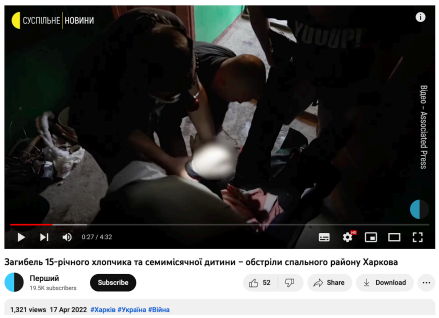
Source 5 Image 1 (S5I1) https://t.me/truexanewsua/41486	15/04/2022 19:57 EET	**Original caption:** *In Russian:* "Жители Харькова настолько суровые, что каждый день выбрасывают остатки ракет в мусорные баки 😄 " **Translation:** "The residents of Kharkiv are so tough that they throw rocket remains into trash bins every day 😄 "	The image depicts the same object visually identified as the cargo section of an Uragan cluster munition rocket in the trash bin, both depicted on S4V1.	 ***Associated incident(s):*** **CIV0798I**
Source 6 Video 1 (S6V1) https://www.youtube.com/watch?v=E2MommH5rFA		**Original caption:** *In Russian:* "Жилой район Харькова ХТЗ накануне вечером 15 апреля был обстрелян из систем залпового огня «Ураган». Жители слышали порядка десятка взрывов и бросились врассыпную. Снаряды летели в сквер, дворы жилых домов, где родители гуляли с детьми. Поврежденные дома, сгоревшие автомобили – на видео последствий обстрела." **Translation:** "The residential area of Kharkiv, HTZ, was shelled with "Uragan" multiple launch rocket systems on the evening of April 15. Residents heard around a	The footage produced by Suspilne Media depicts several locations reportedly impacted by the strike on 15/04/2022 in Kharkiv.	 ***Associated incident(s):*** CIV0798E **[00.00-00.35]** CIV0798B2 **[00.35–00.48]** CIV0798B1 **[00.59–01.11]**[5] CIV0798B3 **[01.13–01.18]** CIV0798A1 **[01.19–01.56]** CIV0798C **[01.57-02.04]**[6] CIV0798D2 **[02.05–02.11]** *49.9431, 36.3847* CIV0798D1 **[02.12–02.23]**

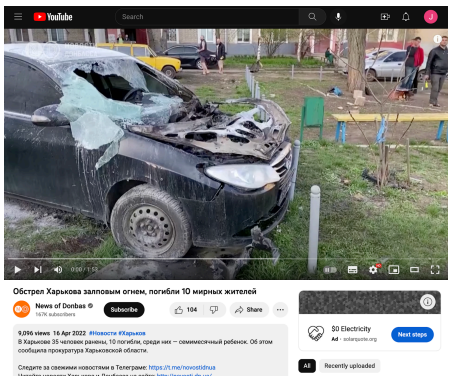
[5] https://maps.app.goo.gl/jGfedN3DwjNVJKaa9
[6] https://maps.app.goo.gl/rUQi49kEg2GyBy2h6

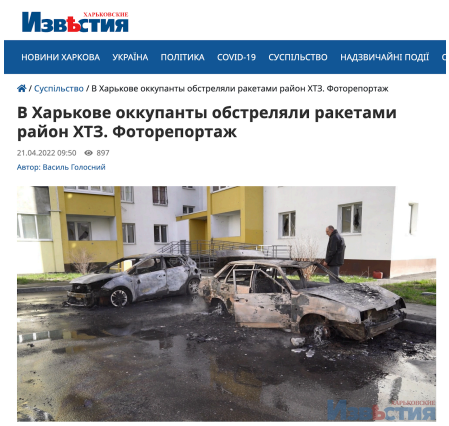
		dozen explosions and scattered in panic. Shells landed in a park and residential courtyards where parents were walking with their children. Damaged houses and burned-out cars can be seen in the footage of the aftermath"		[49.9430, 36.3833](#) CIV0798E2 [**02.24-02.52**][7]
Source 7 Video 1 (S7V1) https://www.youtube.com/watch?v=SoWLV_bYKCM	15/04/2022 22:15 EET	**Original caption:** *In Russian:* "Обстрел Харькова 15 апреля: один из спальных районов города" **Translation:** "Shelling of Kharkiv on April 15: one of the city's residential districts."	The footage produced by Kharkovskiye Izvestiya Media reportedly depicts the aftermath of the strike that occurred in the courtyard of the residential building on 15/04/2022 in Kharkiv	 [49.9487, 36.3802](#) ***Associated incident(s):*** CIV0798A1
Source 8 https://www.amnesty.org/en/latest/research/2022/06/anyone-can-die-at-any-time-kharkiv/	06/2022		Amnesty report provides several images of fragmentation collected at the location, images of wounded individuals and testimonies from the witnesses and victims of the strike in Kharkiv on 15/04/02022.	
Source 8 Image 1 (S8I1)		**Original caption:** "A doctor shows cluster munitions fragments which were removed from the body of one of the people injured in the cluster bomb attack on Myru Street on 15 April."		

[7] https://maps.app.goo.gl/ZKU3uafjPZDcfCB17

Source 8 Image 2 (S8I2)		**Original caption:** "Burnt cars where cluster munitions exploded, killing and injuring several residents in the playground of this housing complex in Myru Street on 15 April."	S8I2 depicts two burnt-down cars in the courtyard of residential buildings.	
Source 8 Image 3 (S8I3)		**Original caption:** "One of the 100s of lethal metal pellets contained in the cluster munitions that exploded in Myru St."	S8I3 depicts a metal fragment of ~0.5 cm.	
Source 8 Image 4 (S8I4)		**Original caption:** "Ilham Agayev, injured in the Cluster bomb strike on Myru St."	S8I4 depicts a young man on the bed with a medical tape on his stomach.	
Source 8 Image 5 (S8I5)		**Original caption:** "Bohdan Burlutskyi, injured in the cluster bomb strike on Myru St."	A young man sitting on the hospital bed with a wrapped up leg.	

Source 9 Video 1 (S9V1) https://www.youtube.com/watch?v=sc7h4TtOn20	17/04/2022 17:22 EET	**Original caption:** *In Ukrainian:* "Загибель 15-річного хлопчика та семимісячної дитини – обстріли спального району Харкова. У п'ятницю, 15 квітня, російські війська обстріляли один із житлових районів Харкова. 10 людей загинуло, 35 – поранені. Серед загиблих – семимісячна дитина та 15-річний хлопець. Кароліна Фурсова зі сльозами пригадує, як врятувалась, бо її накрила собою незнайома жінка. Дівчинці вдалося вийти з-під обстрілів неушкодженою. Репортаж – Мстислав Чернов, Associated Press." **Translation:** "The death of a 15-year-old boy and a seven-month-old baby – shelling of a residential district in Kharkiv. On Friday, April 15, Russian forces shelled one of Kharkiv's residential areas. Ten people were killed, and 35 were injured. Among the dead were a seven-month-old baby and a 15-year-old boy. Karolina Fursova tearfully recalls how she survived because a stranger covered her with their body. The girl managed to escape the shelling unharmed. Report by Mstyslav Chernov, Associated Press."	The footage depicts the first reaction of relatives when they see wounded and killed individuals as a result of the strike in Kharkiv on 15/04/2022, testimonies of witnesses (including minors), and the work of emergency services and an object visually identified as the cargo section of an Uragan cluster munition rocket on the ground. One injured person claimed the use of Grad rockets. Also includes footage made at the location of the multicoloured building.	 *49.9511, 36.3757* ***Associated incident(s):*** CIV0978F [01.15-02.23]

Source 10 Video 1 (S10V1) https://www.youtube.com/watch?v=OoUXfrrAqKo	16/04/2022 10:00 EET	**Original caption:** *In Russian:* “Обстрел Харькова залповым огнем, погибли 10 мирных жителей. Взрыв в Харькове был от системы залпового огня «Ураган». Повреждены несколько жилых домов. На месте работали пожарные. Некоторые автомобили местных сгорели полностью. Медики оказывают пострадавшим экстренную помощь. Жители Харькова в шоке от случившегося. В связи с обстрелами в городе губернатор Харьковской области призвал местных жителей не покидать свои дома без острой необходимости.” **Translation:** “Kharkiv shelled with multiple launch rocket systems, 10 civilians killed. The explosion in Kharkiv was caused by the "Uragan" multiple launch rocket system. Several residential buildings were damaged. Firefighters worked at the scene, and some local vehicles were completely burnt. Medics provided emergency aid to the wounded. Kharkiv residents are in shock over what happened. Due to the shelling, the governor of the Kharkiv region urged locals not to leave their homes unless absolutely necessary.”	Video containing multiple clips from various CIV0798 locations	 ***Associated incident(s):*** CIV0798D2 [00.00–00.04] CIV0798B1 [00.05–00.11] CIV0798D3 [00.12–00.17] CIV0798E2 [00.18–00.26] CIV0798B2 [00.28–00.31] CIV0798A1 [00.32–00.34] CIV0798B [00.35–00.47] CIV0798B2/CIV0798B1 related CIV0798B1 [00.48–00.50] CIV0978E [00.51-00.54] CIV0798B2 [00.55-01.04] CIV0798A1 [01.05-01.23] CIV0798B4 [01.24-01.33] CIV0798D1 [01.33–01.40] CIV0798B2 [01.41-01.44] CIV0798B1 [01.45-01.47] CIV0798B3 [01.48-01.54]

Source 11 https://izvestia.kharkov.ua/obshchestvo/v-harkove-okkupanty-obstreljali-raketami-rajon-htz-fotoreportazh/	21/04/2022 09:50 EET	**Original caption:** *In Russian: "В Харькове оккупанты обстреляли ракетами район ХТЗ. Фоторепортаж."* **Translation:** "In Kharkiv, the occupiers launched a rocket attack on the HTZ district. Photo report."	The article contains photos depicting multiple destroyed objects of civilian infrastructure, including residential buildings and playgrounds, in Kharkiv after the reported strike indicated by the presence of munition remnants. The article attributes the strike to Russian armed forces.	
Source 11 Image 1 (S11I1)			S11I1 depicts a man standing near two burnt-down cars in the courtyard of the residential building.	 ***Associated incident(s):*** **CIV0798A1**
Source 11 Image 2 (S11I2)			S11I2 depicts an impact crater and marks on the wall of a residential building.	
Source 11 Image 3 (S11I3)			S11I3 depicts a woman on the ground in the vicinity of a children's playground receiving first aid.	 ***Associated incident(s):*** CIV0798F

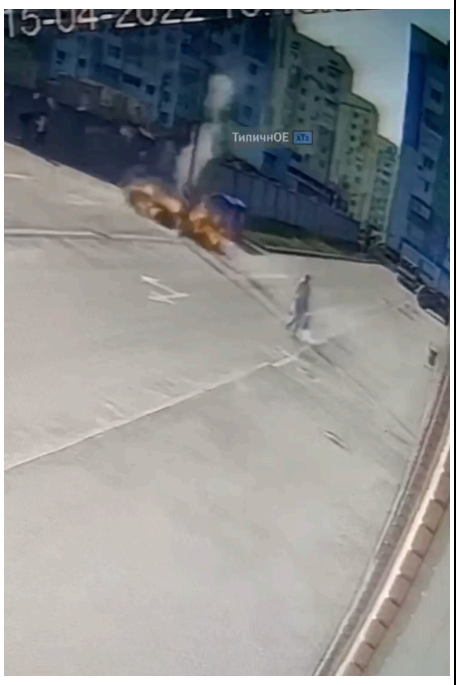
Source 11 Image 4 (S11I4)			S11I4 depicts a woman on the ground in the vicinity of a children's playground receiving first aid.	 ***Associated incident(s):*** CIV0798F
Source 11 Image 5 (S11I5)			S11I3 depicts a woman taken away from the scene on the stretcher.	 ***Associated incident(s):*** CIV0798F
Source 11 Image 6 (S11I6)			Plush toy near the ambulance.	 ***Associated incident(s):*** CIV0798F
Source 11 Image 7 (S11I7)			Two severely damaged cars in the inner court of a residential building.	 ***Associated incident(s):*** CIV0798A1

Source 11 Image 8 (S11I8)			Rubble on the inner stairs.	 ***Associated incident(s):*** CIV0798G2
Source 11 Image 9 (S11I9)			Two windows.	 ***Associated incident(s):*** CIV0798G2
Source 11 Image 10 (S11I10)			Damaged roof of a residential building.	 ***Associated incident(s):*** CIV0798G2
Source 11 Image 11 (S11I11)			Two men holding a foil sheet.	 ***Associated incident(s):*** CIV0798G2

Source 11 Image 12 (S11I12)			Two men are stitching a foil sheet to the windowpane	 ***Associated incident(s):*** CIV0798G2
Source 11 Image 13 (S11I13)			Shattered window of a brick building.	 ***Associated incident(s):*** CIV0798G1
Source 11 Image 14 (S11I14)			Oshadbank office branch.	 ***Associated incident(s):*** CIV0798G1
Source 11 Image 15 (S11I15)				 ***Associated incident(s):*** CIV0798G2

Source 11 Image 16 (S11I16)			Impact crater in the courtyard of the residential building.	 ***Associated incident(s):*** CIV0798H1
Source 11 Image 17 (S11I17)			Damaged tree.	 ***Associated incident(s):*** CIV0798H1
Source 11 Image 18 (S11I18)			A damaged red WV Golf.	 ***Associated incident(s):*** CIV0798H1
Source 11 Image 19 (S11I19)			Damaged facade of a brick residential building.	 ***Associated incident(s):*** CIV0798H1

Source 11 Image 20 (S11I20)			Impact in the courtyard of residential buildings.	 ***Associated incident(s):*** CIV0798H2
Source 11 Image 21 (S11I21)			Entrance of a building.	
Source 11 Image 22 (S11I22)			Impact marking on a metal door.	
Source 11 Image 23 (S11I23)			Impact marking on a metal door.	

Source 11 Image 24 (S11I24)			Impact marking on the wall of a building.	
Source 12 Video 1 (S12V1) https://t.me/tipichnoe_xtz/31818	17/04/2022 07:43 EET	**Original caption:** *In Russian:* "Момент прилета на Пролёте. На видео можно чётко увидеть, как едет колонна военной техники и идёт войско солдат, правда это нужно представить в уме, что тупоголовые орки и делают." **Translation:** "The moment of impact in Prolyot. In the video, you can clearly see a column of military equipment moving and a troop of soldiers advancing—though you have to imagine it in your mind, just like the brainless orcs do."	The video of a CCTV footage depicting a person crossing the road when the location was impacted. The person survived the impact. The timestamp on the upper left corner reads as "15-04-2022 16.18.47".	 ***Associated incident(s):*** CIV0798J

Verification of Identified Visual Materials

No traces of manipulation, tampering, or reuse of the publicly available visual materials were identified.

An ample amount of textual and visual materials associated with the incidents forming CIV0798 were identified in open sources. These materials, provided by diverse unrelated sources, include both user-generated content ("UGC"), such as photos and videos, and footage produced and reported by national media organisations. Identified visual materials were taken at the scenes of CIV0798 incidents by different sources from a variety of angles and distances and therefore served as material for cross-reference and verification. The scenes of all CIV0798 incidents have been identified using publicly accessible mapping and satellite imagery services (Google Maps, Yandex Maps, Google Earth Pro) and pinned using the built-in tools of Google Earth Pro.

No indications of possible manipulation were identified in the course of the present assessment. In addition, no information was identified in public sources indicating that all or some of the depicted events forming CIV0798 have not occurred, have been staged, and/or have occurred elsewhere or at a different time.

Questions to Investigate

Where Was the Incident?

CIV0798 is formed by at least eight interrelated incidents identified in open sources, some of which are separated into several sub-incidents for the purposes of this investigation:

	Reference number	Coordinates	Short description of depicted events	Depicted on/ timecode
1.	CIV0798A1	49.9487, 36.3802[8]	Destructed civilian cars parked in the inner court of a multicoloured residential building	**S1V1** **S6V1** [01.19–01.56] **S7V1** **S10V1** [00.32–00.34] [01.05–01.23] **S11I1** **S11I7**
2.	CIV0798A2	49.9484, 36.3801[9]	Fragmentation crater on the pavement in the inner court of a residential building	**S1V2**
3.	CIV0798B1	49.9485, 36.3698[10]	Craters on the asphalt surface at an intersection	**S4V4** **S6V1** [00.35–00.48] **S10V1** [00.28–00.31] [00.55–01.04] [01.41–01.44]
4.	CIV0798B2	49.9488, 36.3705[11]	Two cargo sections of Uragan rockets embedded in the grass near a residential building	**S4V2** **S6V1** [00.59–01.11] **S10V1** [00.05–00.11] [00.48–00.50] [01.02–01.04] [01.45–01.47]

[8] https://maps.app.goo.gl/5YiXjub9Uc2DAfBX9
[9] https://maps.app.goo.gl/k2aehUTWnPWDR9fR6
[10] https://maps.app.goo.gl/UXJ5ngHsKiuA2ryn9
[11] https://maps.app.goo.gl/JC3ZUSbdhQxyhsyj8

	Reference number	Coordinates	Short description of depicted events	Depicted on/ timecode
5.	CIV0798B3	49.9487, 36.3709[12]	Damaged civilian car parked in the inner court of a residential building	**S6V1** [01.13–01.18] **S10V1** [01.48–01.54]
6.	CIV0798C	49.9437, 36.3942[13]	The motor and tail sections of an Uragan rocket lying near a crater in front of a commercial building (bar)	**S6V1** [01.57–02.04]
7.	CIV0798D1	49.9429, 36.3833[14]	The cargo sections of an Uragan rocket embedded inside the inner court of a residential building	**S6V1** [02.12–02.22] **S10V1** [01.33–01.40]
8.	CIV0798D2	49.9429, 36.3847[15]	Damaged civilian car in the inner court of a residential building	**S6V1** [02.05–02.11] **S10V1** [00.00–00.04]
9.	CIV0798D3	49.9430, 36.3838[16]	Damaged civilian car parked near a residential building	**S10V1** [00.12–00.17]
10.	CIV0798E	49.9515, 36.3663[17]	A moment of strike and a pool of what appears to be blood near a street bench in a park where a woman was reportedly hit by a strike	**S3V1** **S6V1** [00.00–00.35]
11.	CIV0798F	49.9516, 36.3754[18]	Civilian casualties near a children's playground	**S9V1** [01.15–02.23] **S11I3** **S11I4** **S11I5** **S11I6**
12.	CIV0798G1	49.9459, 36.3762[19]	Damaged residential building	**S11I13** **S11I14**
13.	CIV0798G2	49.9458, 36.3765[20]	Damaged residential building	**S11I8** **S11I9** **S11I10** **S11I11** **S11I12** **S11I15**

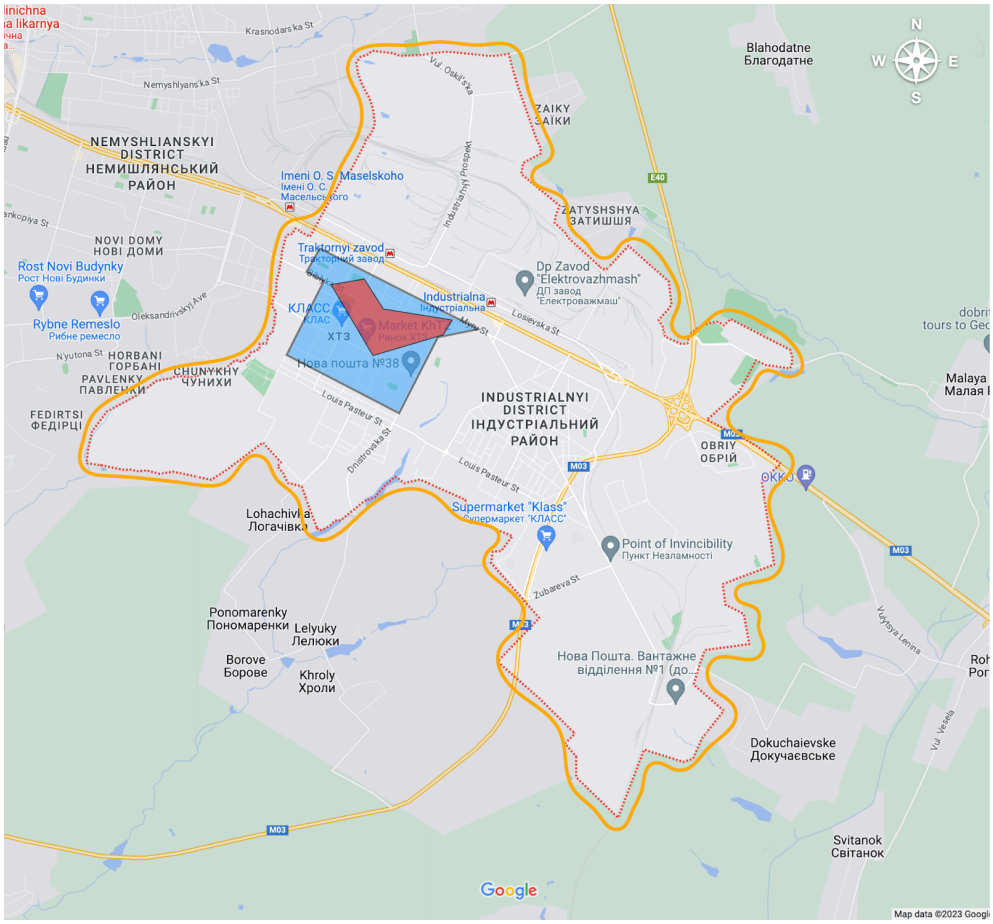
[12] https://maps.app.goo.gl/BrYgpp39E6MWbcSt5
[13] https://maps.app.goo.gl/t3M6Wwpsjqzkdnwc7
[14] https://maps.app.goo.gl/KCpatEjFCMSETgAx8
[15] https://maps.app.goo.gl/c9csAJsg1HCpHm9G9
[16] https://maps.app.goo.gl/6kMSqpqvHFPhX2de8
[17] https://maps.app.goo.gl/yrCswt5VZ31Byd6e6
[18] https://maps.app.goo.gl/VnB5A11A84xUjr38A
[19] https://maps.app.goo.gl/84zXJJjnpepZ64YZ8
[20] https://maps.app.goo.gl/UwtTx2J9czGbkky36

	Reference number	Coordinates	Short description of depicted events	Depicted on/ timecode
14.	CIV0798H1	49.9426, 36.3776[21]	Damaged residential building and a civilian car parked in the inner court	**S11I16** **S11I17** **S11I18** **S11I19**
15.	CIV0798H2	49.9430, 36.3772[22]	Damaged children's playground and facade of a residential building	**S11I20**
16.	CIV0798I1	49.9483, 36.3769[23]	The cargo section of a motor section on the ground in a residential section	**S4V1** **S5I1**
17.	CIV0798I2	49.9475, 36.3768[24]	Damaged civilian cars in the inner court of a residential building with a footage depicting the moment of strike	**S2V1** **S4V3** **S4V5**
18.	CIV0798J	49.9452, 36.3954[25]	The moment of rocket impacting a residential area with civilians	**S12V1**

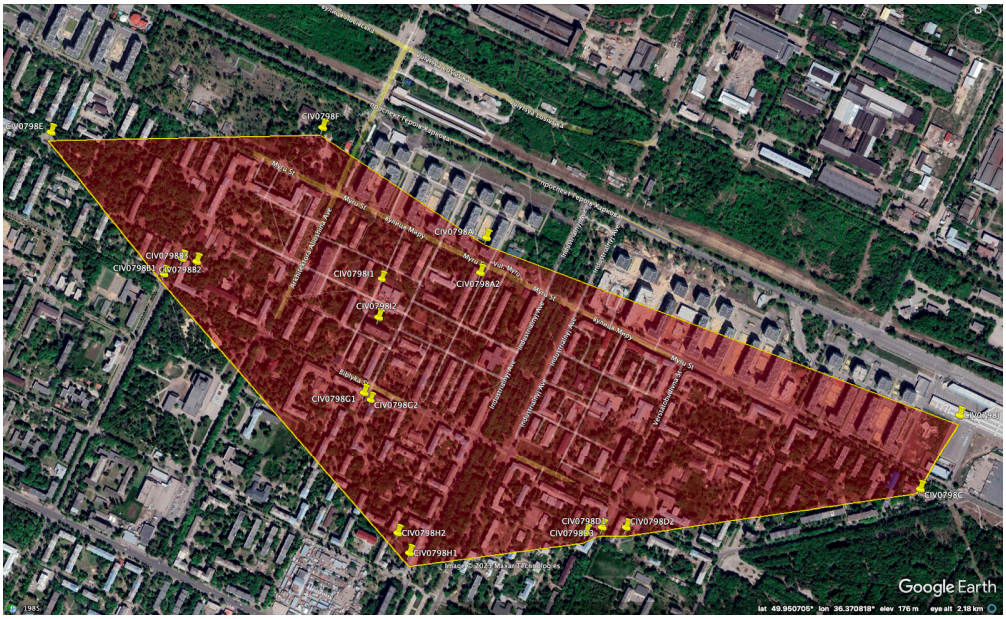
General Description of the Impacted Area

HTZ microdistrict is located within the Industrialnyi District of Kharkiv, Ukraine. No other rocket strikes linked to Industrialnyi District outside of the HTZ microdistrict on 15/04/2022 were identified in open sources.

[21] https://maps.app.goo.gl/RKYA7yzmEqVsi3bbA
[22] https://maps.app.goo.gl/AJg3pcCepjzgosQv6
[23] https://maps.app.goo.gl/VtJZAMTPomxJSuKP6
[24] https://maps.app.goo.gl/9AriaRmdUktUo4DL9
[25] https://maps.app.goo.gl/CCJ9R5njYYiPC4Pe7



The impacted area (Red) of the HTZ microdistrict (Blue) indicated within the borders of the Industrialnyi District (Orange) of Kharkiv (Credit: Google Maps).



All identified sub-incidents of CIV0798 pinned on satellite imagery. The area of impact is indicated with a red-filled polygon (Credit: Maxar Technologies/Google Earth Pro).

Geolocation of the Impacted Areas

CIV0798A

The CIV0798A incident is formed by the CIV0798A1 and CIV0798A2 sub-incidents grouped together due to their geographic proximity and the presence of similar fragmentation marks on damaged objects. The geolocation process for visual materials depicting each sub-incident is outlined below.



CIV0798A1 and CIV0798A2 mapped on the satellite imagery dated 02/08/2019 (Credit: Maxar Technologies/Google Earth Pro).

Geolocation of CIV0798A1

The scene of CIV0798A1 depicted in S1V1, S6V1, S7V1, and S10V1 was geolocated to HTZ microdistrict of Kharkiv at [49.9487, 36.3802](#)[26].

[26] https://maps.app.goo.gl/5YiXjub9Uc2DAfBX9

a) Visual Examination and Geolocation of S1V1

S1V1 taken at the scene of CIV0798A1 depicts a thick black smoke coming out of the inner court of a tall residential building with large, distinctive rectangular patterns of yellow and orange colours on its facade. The video depicts a commercial sign[27] that reads "ОБЛІК" and "КАНЦТОВАРИ". The commercial sign was identified using the Google Maps search query "*облик магазин харьков*" in Kharkiv area, which returned a list of commercial entities, with one of them[28] depicting a matching commercial sign of the "OBLIK" office supply store[29] and the multicoloured building located at Myru St, 31 in the HTZ microdistrict of Kharkiv, Ukraine, at *49.9490, 36.3803*[30].



A comparison of the public image depicting an "OBLIK" commercial sign (Black Arrow) and a residential building (Yellow Rectangle) confirms their visual similarity with those depicted in S1V1 (Red Frame) (Credit: Google Maps).

[27] S1V1 timecode: [00.18].
[28] https://maps.app.goo.gl/88QTJjwBXavcqJxW8
[29] In Ukrainian: *"Магазин канцелярських товарів "Облік""*
[30] https://maps.app.goo.gl/JpYTtiJJmEZ3sotm8



The direction of camera of S1V1 indicated on satellite imagery from 02/08/2021 (Credit: Maxar Technologies/Google Earth Pro).

b) Equivalence of Objects Depicted in S1V1, S6V1, S7V1, and S10V1

S6V1, S7V1, and S10V1 provided limited amounts of materials suitable for geolocation. These materials were geolocated by establishing their mutual equivalency with S1V1, which is indicated by the presence of objects matching those depicted at the scene of CIV0798A1 on S1V1. The visual examination and comparison of these objects and their spatial layout identified that S6V1, S7V1, and S10V1 also depict the CIV0798A1 scene.

S1V1 and S10V1

A burnt car and partly visible commercial sign of the "OBLIK" office supply store depicted in S1V1 are also visible on S10V1, thus confirming that S10V1 depicts the scene of CIV0798A1.



The commercial sign of the "OBLIK" office supply store (Blue Arrow) and a burnt car (White Arrow) are visible on both S10V1 (Red Frame) and S1V1 (Green Frame).



The residential building (Blue Rectangle) visible in the direction and angle of S10V1 indicated on the satellite imagery of the scene of CIV0798A1 (Credit: Maxar Technologies/Google Earth Pro).

S10V1, S6V1, and S7V1

The presence of matching objects depicted in S10V1, S6V1, and S7V1, namely burnt cars, the children's slide on the playground, and their spatial layout at the inner court of a residential building, confirms that these materials depict the scene of CIV0798A1, and, hence, are located in the coordinates previously identified for S1V1.



Two burnt cars (Yellow and Blue Rectangles) and the children's slide (White Rectangle) depicted in the courtyard of a residential building in S10V1 (Red Frame), S6V1 (Orange Frame), and S7V1 (Purple Frame).



The children's slide (White Rectangle) and a street light pole (Yellow Arrow) depicted in the courtyard of a residential building depicted in S6V1 (Orange Frame) and S7V1 (Yellow Frame) are visible on their respective satellite imagery. The direction of the camera depicting S6V1 and S7V1 is indicated below the corresponding image (Credit: Maxar Technologies/Google Earth Pro).

Therefore, based on the visual examination and comparison of S6V1, S7V1, and S10V1 with S1V1 and satellite imagery, it was confirmed that these materials were taken at the scene of CIV0798A1, which was previously geolocated at 49.9487, 36.3802[31].

Geolocation of CIV0798A2

The scene of CIV0798A2 depicted in S1V2 was identified in the HTZ microdistrict of Kharkiv at 49.9484, 36.3801[32].

S1V2 depicts what appears to be fragmentation marks visible on the wall of a brick building and on an object identified as a street soda machine. S1V1 also depicts a crater visible in the surface of the pavement in the vicinity of a damaged brick building. In the background, a building with a facade visually resembling the one previously geolocated at the scene of CIV0798A1 is briefly visible in S1V2.

[31] https://maps.app.goo.gl/5YiXjub9Uc2DAfBX9
[32] https://maps.app.goo.gl/k2aehUTWnPWDR9fR6



Fragmentation marks on the brick-laid residential building (Yellow Ellipse) and a water vending machine (Green Ellipse), a crater on the pavement's surface (White Rectangle), and a partially visible facade of the building of white, yellow, and orange colours (Red Arrow) depicted in S1V2.

The geolocation of CIV0798A2 commenced with the visual examination of public imagery and satellite imagery depicting the area of the HTZ microdistrict of Kharkiv, in the vicinity of the scene of CIV0798A1. This was due to the sources depicting this event being posted on the same day as the sources depicting CIV0798A1, the presence of a residential building visually matching the one depicted in S1V1, and the general context.

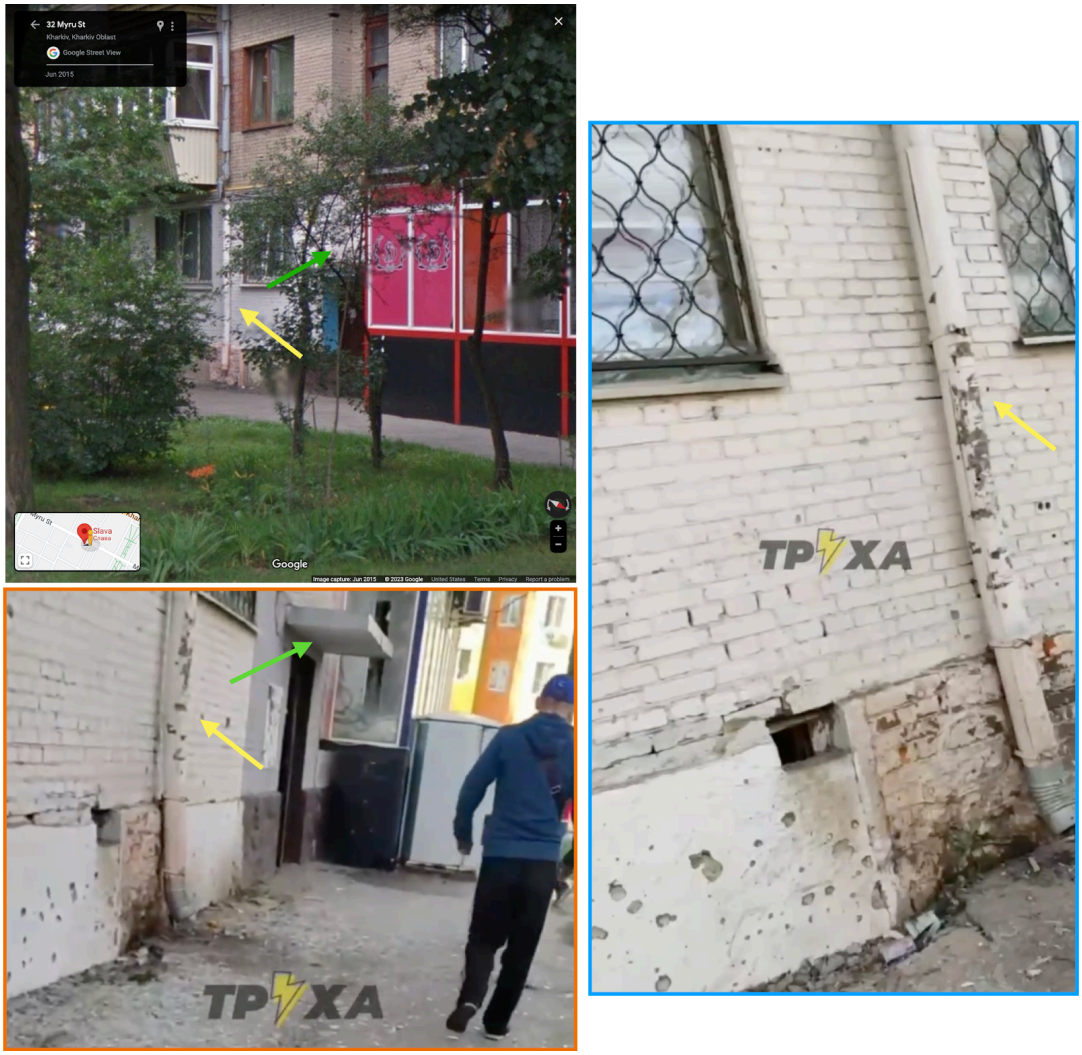
The facade of the building painted with white, yellow, and orange colours depicted in S1V2 matches the building's facade geolocated at the scene of CIV0798A1. This is based on the same colours changing from bright to pale yellow on the second floor, the shape of window frames, and the general architectural style of the building, as demonstrated in the comparison graphic below.



Visual examination indicates a match between the colours (White Arrow) and shade of window depicted in S1V1 (Blue Frame) and S1V2 (Green Frame).

A visual comparison between S1V1 and S1V2 established that the building with a white, yellow, and orange facade depicted in S1V2 has the matching features and architectural design to the one depicted in S1V1 at the scene of CIV0798A1. This indicates that the scene of CIV0798A2 is located nearby.

An examination of public imagery and satellite imagery over the location of the scene of CIV0798A1 identified a residential building. Its spatial layout and external features match the features of the building with the fragmentation marks depicted in S1V2. In particular, the building was identified by the position of a rainwater pipe placed between two windows with round-shaped security bars, a canopy above the entrance, and the external features of the shopfront at its corner. The damaged residential building was subsequently identified on the opposite side of the road from the building at the scene of CIV0798A1.



The rainwater pipe (Yellow Arrow), and a canopy over the entrance (Green Arrow) depicted in S1V2 (Blue and Orange Frames) are visible on Google Street View dated June 2015 (Credit: Google Street View)



The matching shopfront (White Rectangle) visible on S1V1 and Google Street View, dated June 2015 (Credit: Google Street View).

Based on the visual examination of objects at the scene of CIV0798A2 depicted in S1V2, its comparison with S1V1, and the Google Street View image of the location from June 2015, the scene of CIV0798A2 was geolocated at 49.9484, 36.3801[33], approximately 80 m from the scene of CIV0798A1.

CIV0798B

CIV0798B is formed by three sub-incidents, namely CIV0798B1, CIV0798B2, and CIV0798B3. These were grouped for the purposes of geolocation due to their proximity.

The geolocation of CIV0798B1 commenced with a visual examination of public imagery and satellite imagery depicting the area of the HTZ microdistrict of Kharkiv. This was due to the caption of S6V1 indicating that the depicted events occurred in a "*residential district of Kharkiv, HTZ*", the area where both sub-incidents of CIV0798A were previously geolocated, the date of the post, and the general context of the depicted events.

The geolocation process for each sub-incident forming CIV0798B depicted in S4V2, S6V1, and S10V1 is outlined below.

Geolocation of CIV0798B1

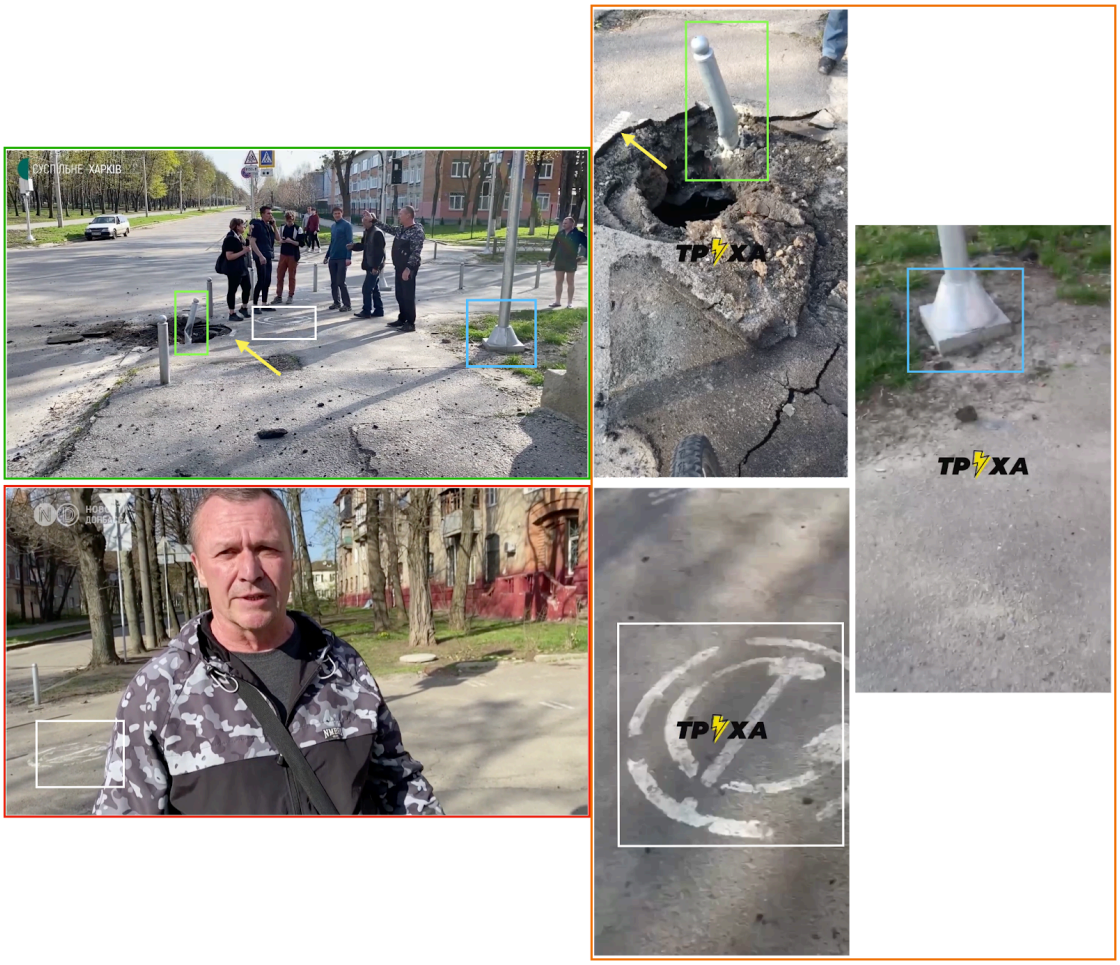
[33] https://maps.app.goo.gl/k2aehUTWnPWDR9fR6

CIV0798B1 was geolocated to the HTZ microdistrict of Kharkiv at [49.9485, 36.3698](#).[34]

S4V4, S6V1, and S10V1 were taken at the scene of CIV0798B1 and depict a crater at a street intersection with a damaged metal bar at the edge of the crater. Two white-coloured undefined signs are painted on the sidewalk near the crater. The fact that S4V4, S6V1, and S10V1 depict the same scene and can be used for geolocation simultaneously is confirmed by a visual examination and comparison outlined below.

a) Equivalence of objects depicted in S4V4, S6V1, and S10V1.

The equivalency of the objects depicted in S4V4, S6V1, and S10V1 and their location was established based on the shape and size of the crater and damaged metal bar, the presence of white signs painted on the sidewalk surface in their vicinity, and the shape and colour of the street pole base, as well as the spatial layout of the above-mentioned objects.



The metal bar at the edge of the crater (Green Rectangle), a round sign (White Rectangle), a textual sign painted on the sidewalk (Yellow Arrow), and the street pole base (Blue Square) depicted in S4V4 (Orange Frame), S6V1 (Green Frame), and S10V1 (Red Frame).

[34] https://maps.app.goo.gl/UXJ5ngHsKiuA2ryn9

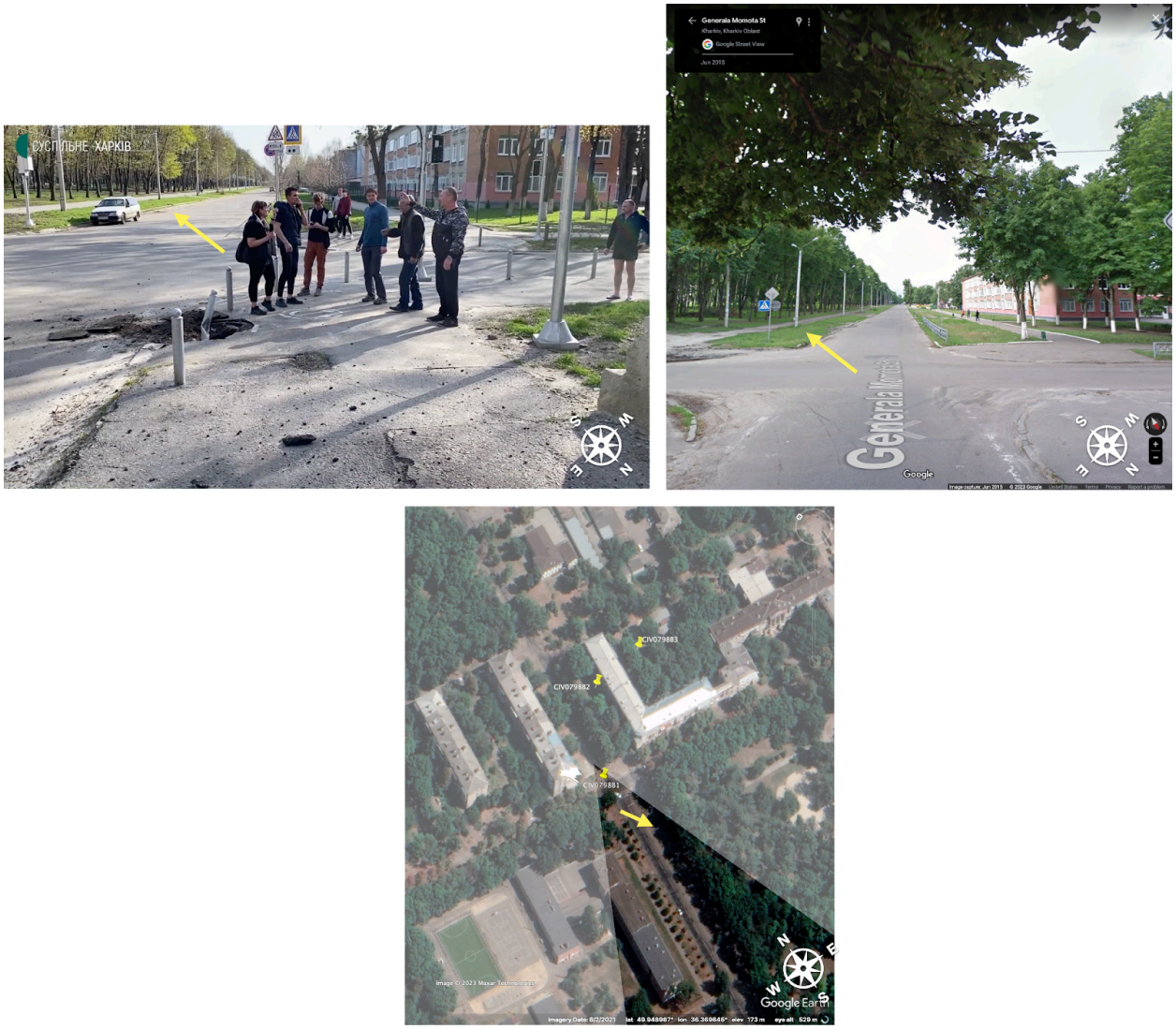
b) Geolocation of S4V4, S6V1, and S10V1

S6V1 depicts a crater on a street intersection with traffic lights and road signs. In the upper left corner of S6V1, a sidewalk, grass, and a row of tall trees are depicted stretching along the street, which indicates the presence of a large green space densely covered with trees, possibly a city park. In the upper right corner of S6V1, a three-story building is visible. The "Children" road sign on a pole at the intersection indicates that this building is possibly an educational facility, such as a school or kindergarten.

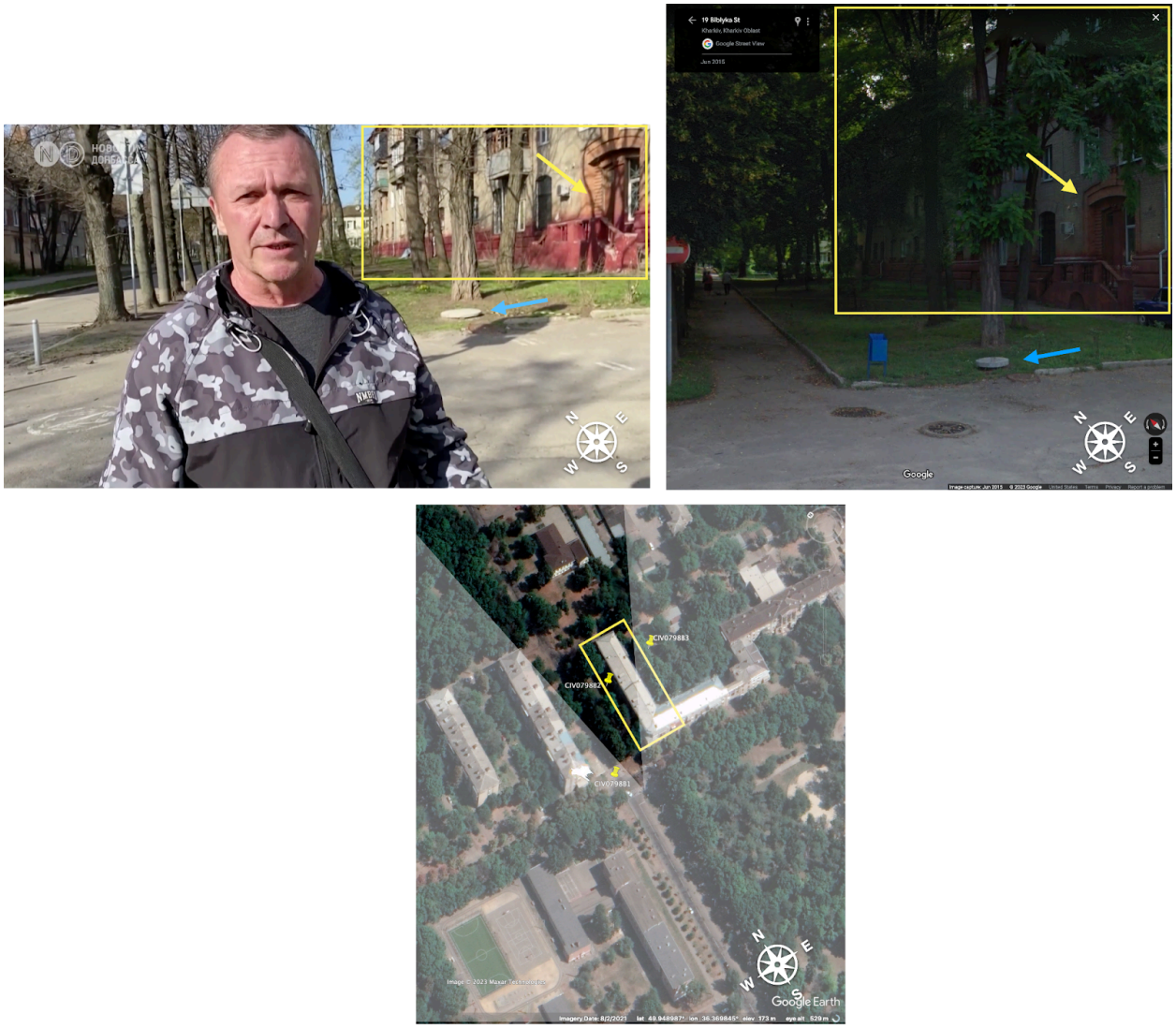
A yellow building with red footing on its bottom and what appears to be an arched entrance are visible on S10V1 behind the man who is also depicted in S6V1. A comparison of the direction of the white sign visible in S4V4 and S6V1 with S10V1 indicates that S10V1 depicts the area of the intersection on the same side of the street as the crater.

Search queries using the word "*school*" performed in Russian and Ukrainian in the HTZ microdistrict of Kharkiv using Google Maps identified several educational facilities in the area. Each of them was visually examined using Google Street View imagery from June 2015 and satellite imagery. The intersection depicted in S4V4, the three-story building and the green space depicted in S6V1, and the yellow building with a red footing depicted in 10V1 were geolocated to the HTZ microdistrict at 49.9485, 36.3698[35]. There were some differences between this location and the location depicted in Google Street View, such as the presence of poles lining the pavement. This is likely due to the Street View imagery being taken in June 2015, and the poles being added at a later date before this incident.

[35] https://maps.app.goo.gl/UXJ5ngHsKiuA2ryn9



A school and a park (Yellow Arrow) depicted in S6V1 indicated in Google Street View image from June 2015 and satellite imagery from 02/08/2021 (Credit: Maxar Technologies/Google Earth Pro).



The residential building (Yellow Rectangle), the arched-shaped window (Yellow Arrow), and the arched entrance (Blue Arrow) depicted in S10V1 are visible on the Google Street View image from June 2015 (Credit: Maxar Technologies/Google Earth Pro).

Geolocation of CIV0798B2

CIV0798B2 was geolocated in the HTZ microdistrict of Kharkiv at [49.9488, 36.3705](#)[36].

S4V2 and S6V1[37] depict two objects which appear to be cargo sections of Uragan cluster munition rockets embedded into the grass near a brick building with a red-painted footing and distinctive arched windows with security bars of various shapes and colours.

S4V2 depicts a residential brick-laid building with a red-painted footing and distinctive elements on its facade, namely arched windows with security bars of various shapes and colours

[36] https://maps.app.goo.gl/JC3ZUSbdhQxyhsyj8
[37] Timecode: [00.59–01.11]

and decorative corbels. Visual examination of other materials, comparison of visible elements, and their subsequent cross-reference with Google Street View imagery confirmed the building as being the same as the one depicted at the scene of CIV0798B1 in S10V1.



The facade of the residential building with matching elements, such as the window row (Blue and Yellow Rectangles) and the external part of the air conditioner (Yellow Arrow) depicted in S4V2 (Orange Frame) and S6V1 (Green Frame), is visible in the Google Street View image from June 2015 (Credit: Maxar Technologies/Google Earth Pro).

Based on the visual examination and comparison of S4V2 and S6V1 with S4V4, S6V1, and S10V1 previously geolocated at the scene of CIV0798B1, public street and satellite imagery, the location of what appear to be cargo sections of Uragan cluster munition rockets at the scene of CIV0798B was identified in the residential area of the HTZ microdistrict of Kharkiv at *49.9488, 36.3705,* approximately 50 meters from the scene of CIV0798B1.

Geolocation of CIV0798B3

CIV0798B3 was geolocated to the HTZ microdistrict of Kharkiv at [49.9487, 36.3709](https://maps.app.goo.gl/BrYgpp39E6MWbcSt5)[38].

[38] https://maps.app.goo.gl/BrYgpp39E6MWbcSt5

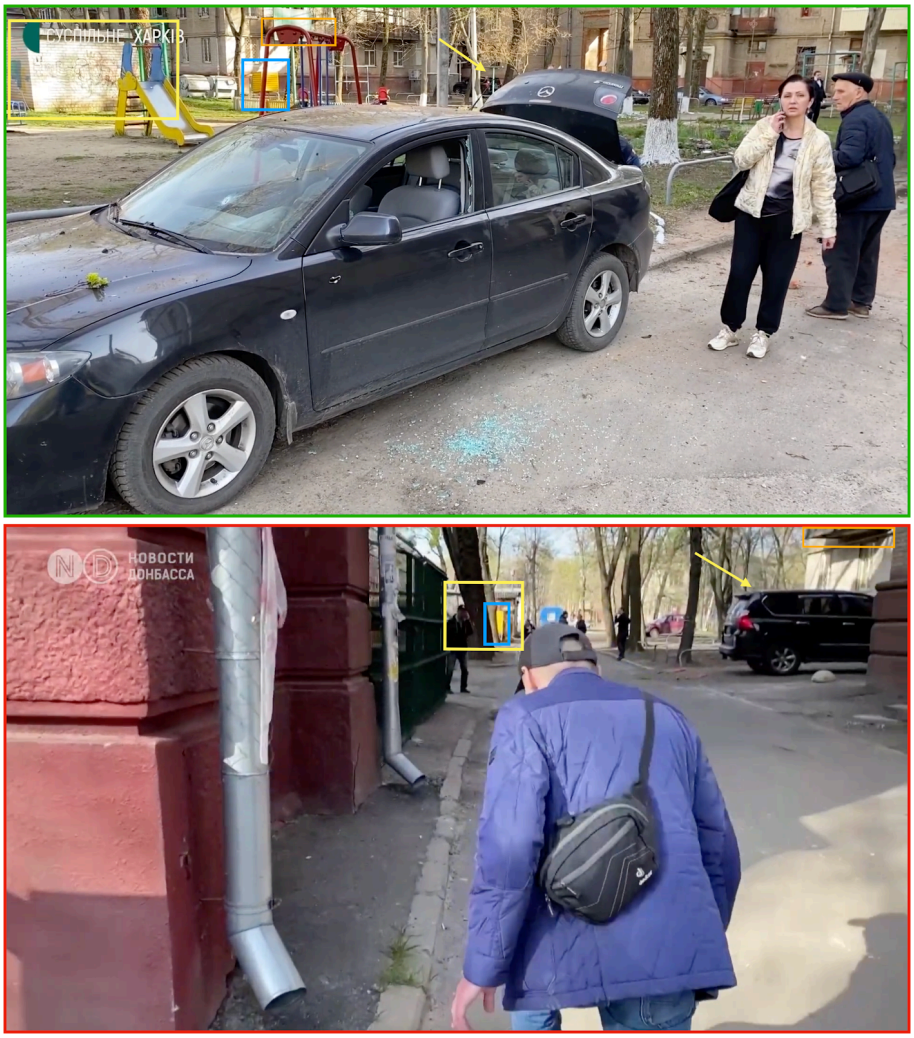
S6V1 and S10V1 depict a civilian car parked in the inner court of a residential building. The front left window is shattered, and a deep, oval-shaped mark is visible on its left front door. The children's playground, an undefined yellow object, a low white building, several cars, an arched entrance, and the facade's elements, including windows and balconies, are partially visible in the background.

S10V1[39] depicts an interview with a man standing in front of the building with a red-painted footing near the entrance. He describes the events he witnessed at a nearby location indicated by his hands. In the middle of the interview, after hearing loud noises similar to explosions, the man appears startled and runs towards the courtyard of the building.

a) Equivalency of S10V1 [01.23–01.33] and S6V1 [01.13–01.15]

Visual examination and comparison of S10V1[40] and S6V1[41] established that both these videos depict the scene of CIV0798B3 from two opposite sides. This finding is supported by the presence of matching objects depicted in the same spatial layout, all of which are visible on S10V1 and S6V1: a yellow undefined object in the middle of the inner court; a low elongated brick-laid building in its proximity; and the balcony behind an arch. Furthermore, a dark-coloured civilian car parked near the residential building under the balcony depicted in S6V1 is shown at the same spot in S10V1.

[39] Timecode: [01.13–01.15]
[40] Timecode: [01.23–01.33]
[41] Timecode: [01.13–01.15]



A low white building (Yellow Rectangle), a yellow undefined object (Blue Rectangle), a balcony (Orange Rectangle), and a car (Yellow Arrow) depicted in S6V1 (Green Frame), and S10V1 (Red Frame).

b) Geolocation of S10V1[42] and S6V1[43]

Visual examination, comparison, and cross-referencing of S4V2, S10V1, and S6V1 with Google Street View imagery from June 2015 identified that the man was standing next to the south-facing side of the building, which was previously geolocated at the scenes of CIV0798B1 and CIV0798B2. This further indicates the proximity of CIV0798B3 to the other two sub-incidents.

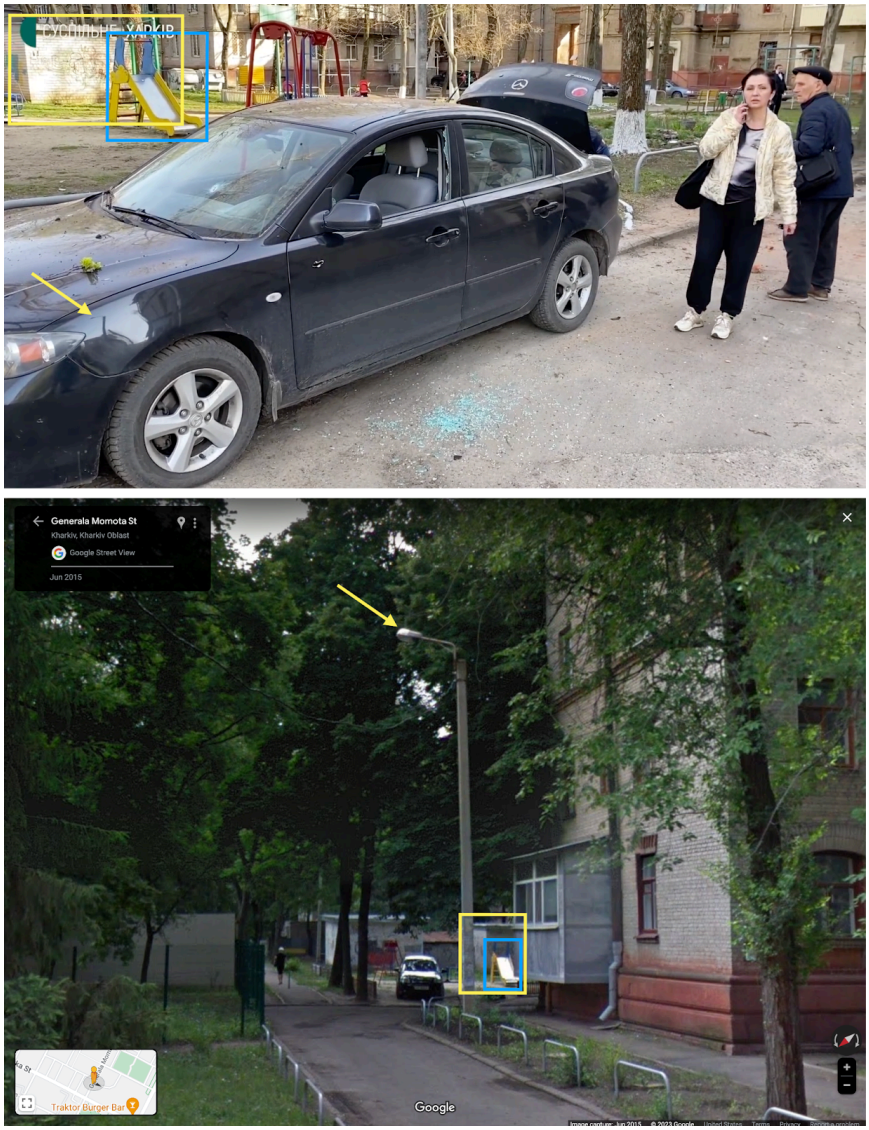
[42] Timecode: [01.23–01.33]
[43] Timecode: [01.13–01.15]



The red-painted footing of the building with stairs (Yellow Rectangle) and a low building in the distance visible through the entrance (Blue Square) depicted in S10V1 are also visible in Google Street View imagery from June 2015.

Furthermore, the objects depicted in S6V1 at the scene of CIV0798B3, including the streetlight pole reflected in the damaged car, are depicted in Google Street View image[44] from June 2015, further matching the spatial layout of objects at the scene of CIV0798B3.

[44] https://maps.app.goo.gl/3fdSJwELemir5k7A9



Children's slide (Blue Rectangle), low brick-laid elongated building (Yellow Rectangle), and street lamp pole (Arrow) depicted in S6V1 are visible on Google Street View image from June 2015.

Based on the analysis above, the location of the scene of CIV0798B3 was geolocated at [49.9487, 36.3709](https://maps.app.goo.gl/BrYgpp39E6MWbcSt5)[45].

CIV0798C

CIV0798C was geolocated in the HTZ microdistrict of Kharkiv at [49.9437, 36.3942](https://maps.app.goo.gl/t3M6Wwpsjqzkdnwc7)[46].

S6V1[47] depicts what appears to be the motor section of a 9M27K rocket and other fragments scattered on the ground in front of the two-story building at the scene of CIV0798C. The

[45] https://maps.app.goo.gl/BrYgpp39E6MWbcSt5
[46] https://maps.app.goo.gl/t3M6Wwpsjqzkdnwc7
[47] Timecode: [01.57–02.04]

building is apparently used as a bar, which is indicated by the "BAR" sign above the entrance to its terrace. An advertisement sticker "German Windows"[48] in Russian is visible on one of the second floor windows, indicating that other commercial entities might be using the building. The building's territory is surrounded by a metal net fence where footpaths and trees are visible. In the background, behind the two-story building, a tall residential building is partially visible through the trees.

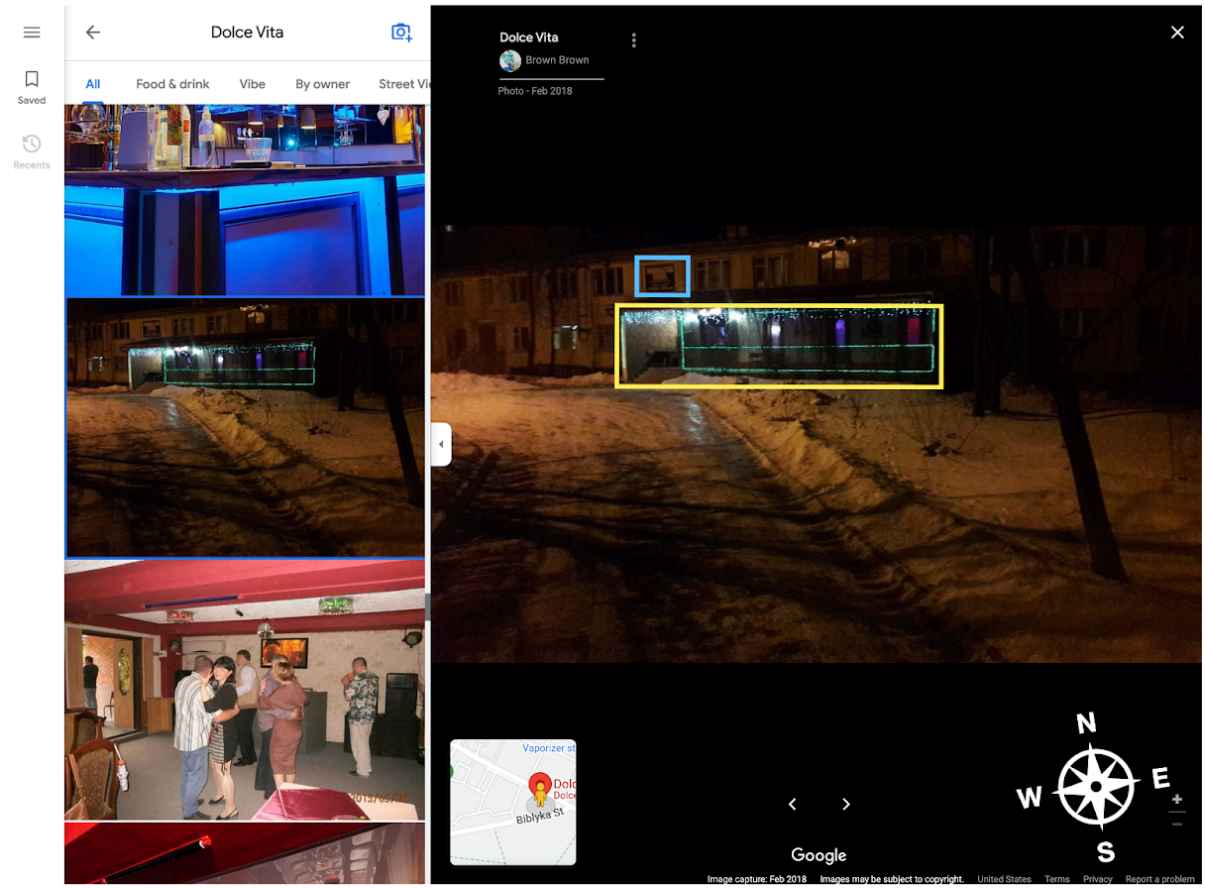
Taking into account that the caption of S6V1 indicates that depicted events occurred in a "*residential district of Kharkiv, HTZ",* the area where the scenes of CIV0798A and CIV0798B were previously geolocated, the date of the post, and the general context of the events, the geolocation of the scene of CIV0798C commenced with the visual examination of public imagery and satellite imagery depicting adjacent areas of HTZ microdistrict of Kharkiv.

Geolocation of the scene of CIV0798C

The search query using the word "bar" in Russian, Ukrainian, and English within the area of the HTZ microdistrict of Kharkiv identified several bars and restaurants. After visual examination of public imagery depicting these venues and their subsequent comparison with objects depicted at the scene of CIV0798C on S6V1, what appears to be a 9M27K rocket section was geolocated in front of the backyard of the "Dolce Vita" cafe at 49.9437, 36.3942[49].

[48] RU: "Немецкие Окна"
[49] https://maps.app.goo.gl/t3M6Wwpsjqzkdnwc7


СУСПІЛЬНЕ ХАРКІВ
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Dolce Vita
All
Food & drink
Vibe
By owner
Saved
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Dolce Vita
Brown Brown
Photo - Feb 2018
Vaporizer st
Biblyka St
Google
Image capture: Feb 2018
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Privacy
Report a problem
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The terrace of the two-storey building of "Dolce Vita" cafe (Yellow Rectangle) with the "German Windows" sign (Blue Rectangle) depicted in S6V1 (Top) and on Google Street View imagery from February 2016 (Middle). The tall residential building in the background (Orange Rectangle) depicted in S6V1 mapped on satellite imagery (Bottom) from 02/08/2021 (Credit: Maxar Technologies/Google Earth Pro).

CIV0798D

The incident of CIV0798D is formed by sub-incidents at the scenes of CIV0798D1, CIV0798D2, and CIV0798D3, which were grouped for the purposes of geolocation due to their proximity to one another

Taking into account that the caption of S6V1 indicates that depicted events occurred in a "*residential district of Kharkiv, HTZ",* the area where the scenes of CIV0798A, CIV0798B, and CIV0798C were previously geolocated, the date of the post, and the general context of the events, the geolocation of CIV0798D commenced with a visual examination of public imagery and satellite imagery depicting the area of HTZ microdistrict of Kharkiv.

The geolocation process for each sub-incident forming CIV0798D depicted in S6V1[50] and S10V1[51] is outlined below.

Geolocation of CIV0798D1

The location of the scene of CIV0798D1 was geolocated in the HTZ microdistrict of Kharkiv, Ukraine, at 49.9429, 36.3833[52].

S6V1[53] and S10V1[54] depict what appears to be the cargo section of a 9M27K Uragan cluster munition rocket embedded into the ground in the inner court of a residential building. The similarity of the objects visible on these materials indicates that they were likely taken in the same location. Hence, their geolocation was performed simultaneously after confirming their equivalency

a) Equivalence of S6V1 and S10V1

To confirm the equivalence of S6V1[55] and S10V1[56] and perform their geolocation simultaneously, these videos were visually examined and compared. Both videos depict what appears to be the cargo section of a 9M27K Uragan rocket embedded into the ground of an inner courtyard close to two street benches and one of the entrances of a residential building. The building's facade depicted in both videos has matching multicoloured features and shapes of windows and balconies and is of a matching L-shape layout.

[50] Timecode: [02.12-02.22]
[51] Timecode: [00.00-01.33], [01.33-01.40]
[52] https://maps.app.goo.gl/KCpatEjFCMSETgAx8
[53] Timecode: [02.12-02.22]
[54] Timecode: [01.33-01.40]
[55] Timecode: [02.12-02.22]
[56] Timecode: [01.33-01.40]



Two street benches (Yellow Rectangle) and a row of windows of matching shape and colour on the ground floor (White Rectangle) as depicted in S6V1 (Red Frame) and S10V1 (Green Frame).

Hence, both S6V1[57] and S10V1[58] depict the same scene of CIV0798D1 and shall be geolocated simultaneously.

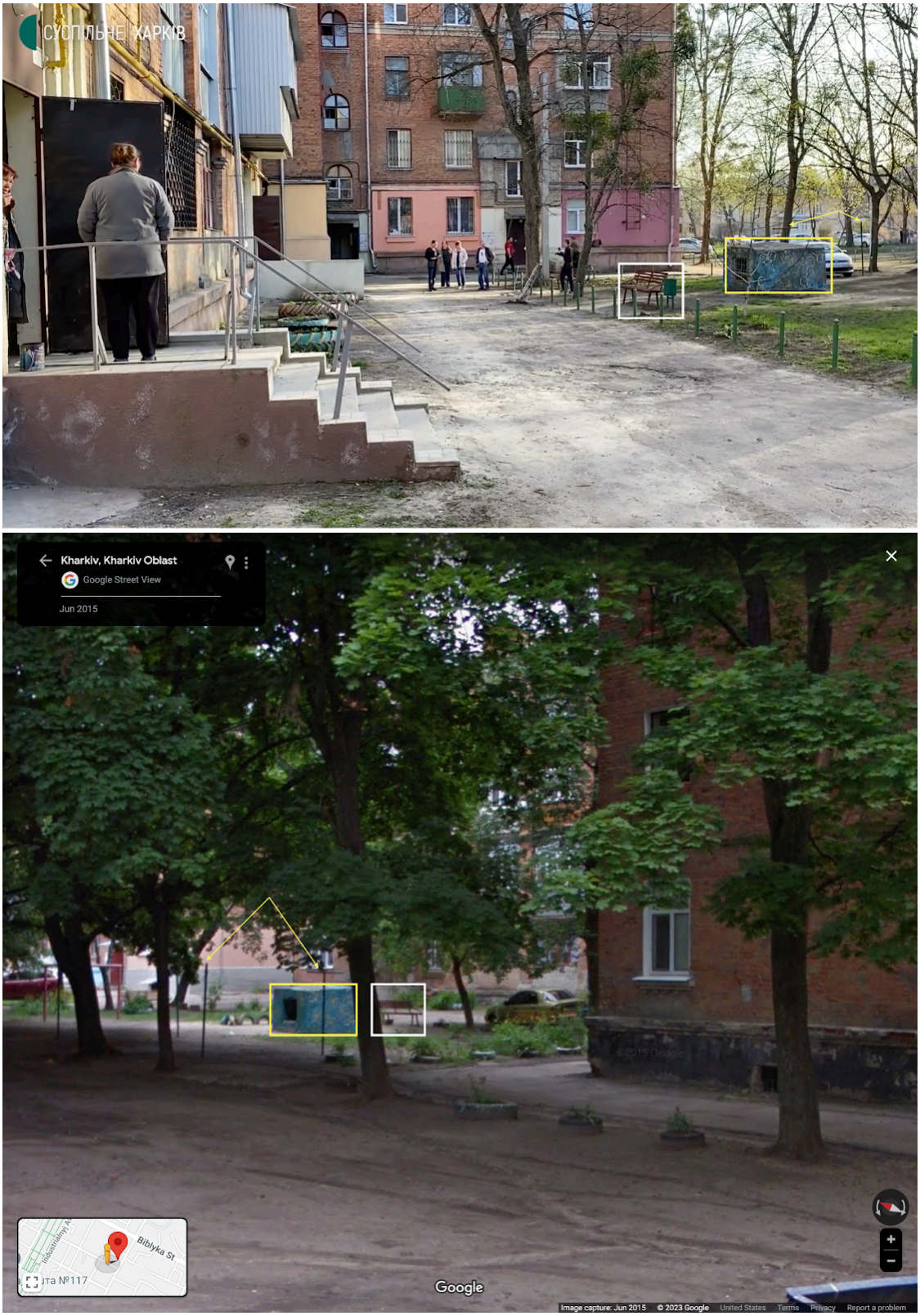
[57] Timecode: [02.12-02.22]
[58] Timecode: [01.33-01.40]

b) Geolocation of S6V1 and S10V1

In the courtyard of a residential building, a low, blue-coloured edifice of unidentified purpose is visible behind the street benches. Its exterior is embellished with what appear to be painted flowery patterns. Its window is protected by a metal net placed in its aperture. Behind the edifice, two narrow poles are visible: one T-shaped and the other I-shaped. The location of these objects formed a spatial layout sufficiently distinctive for the geolocation.

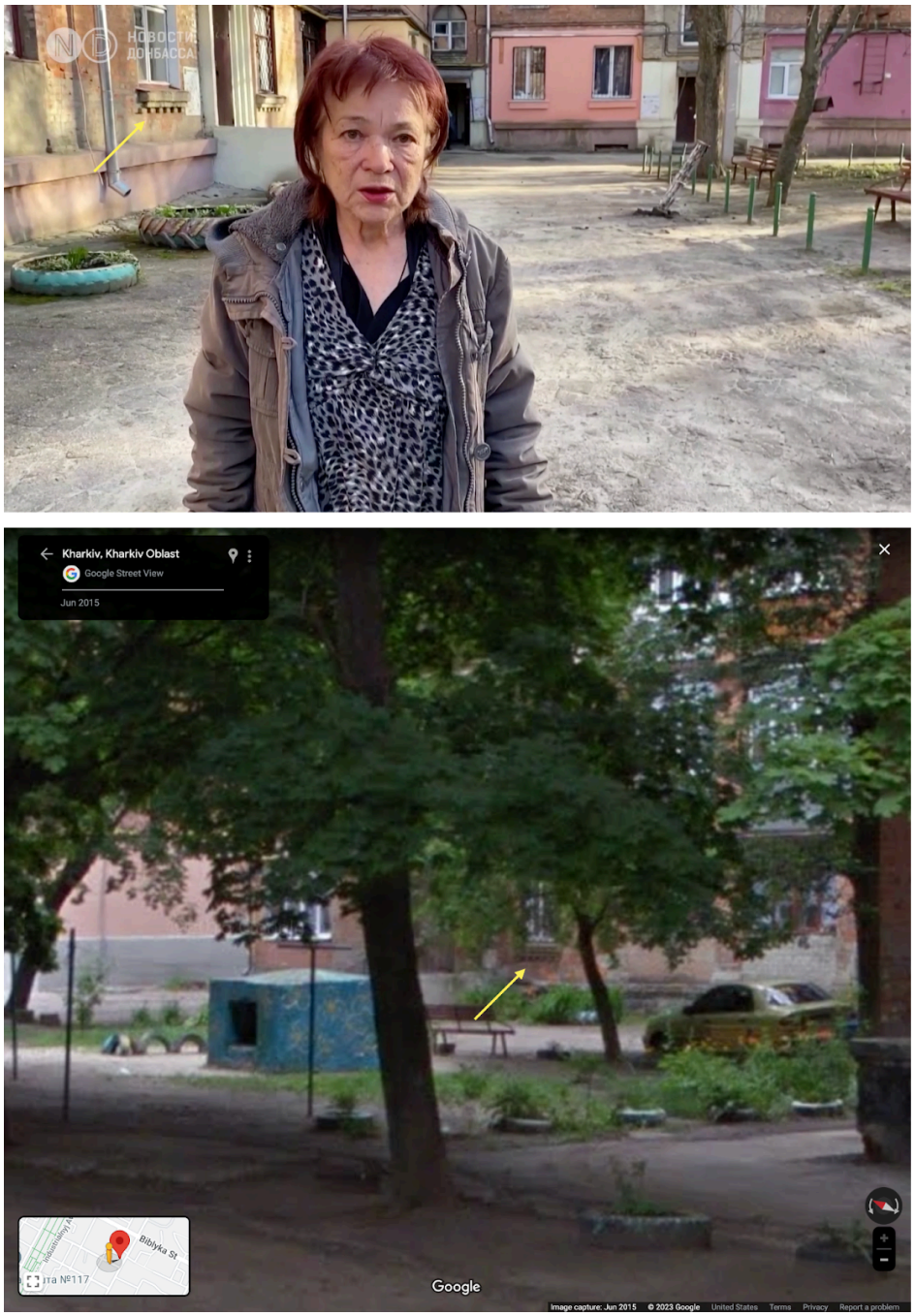
A visual examination of Google Street View imagery from June 2015 and satellite imagery from 02/08/2021 identified the above-mentioned objects in a matching spatial layout in the HTZ microdistrict of Kharkiv, at 49.9429, 36.3833[59].

[59] https://maps.app.goo.gl/KCpatEjFCMSETgAx8



The blue-coloured edifice (Yellow Rectangle), a street bench (White Rectangle), and two poles (Yellow Arrows) are depicted in S6V1 and Google Street View imagery from June 2015.

These coordinates are further confirmed by the visual match of the distinctive appearance of the window ledges depicted in the residential building's facade on S10V1 and Google Street View imagery from June 2015.



Matching window ledge (Yellow Arrow) depicted in S10V1 and Google Street View imagery from June 2015.



The direction of the cameras of S6V1 (Blue Frame) and S10V1 (Green Frame) indicated on satellite imagery from 08/02/2021 (Credit: Maxar Technologies/Google Earth Pro).



The direction of the camera in Google Street View imagery from June 2015 depicting the scene of CIV0798D1 indicated on satellite imagery from 08/02/2021 (Credit: Maxar Technologies/Google Earth Pro).

Hence, based on the visual examination and comparison of the objects at the location impacted by the apparent cargo section depicted in S6V1 and S10V1, the scene of CIV0798D1 was geolocated in the residential area of the HTZ microdistrict of Kharkiv at 49.9429, 36.3833[60].

Geolocation of CIV0798D2

CIV0798D2 was geolocated in the HTZ microdistrict of Kharkiv, Ukraine, at 49.9429, 36.3847[61].

S6V1[62] and S10V1[63] depict a burnt, severely damaged civilian car parked in the inner court of a brick-laid, likely residential, L-shaped building.

a) Equivalency of S6V1 and S10V1

To confirm the equivalence of S6V1[64] and S10V1[65] and perform their geolocation simultaneously, these materials were visually examined and compared. The visual examination of materials identified that the objects they depict and their spatial layout at the location match. Namely, the shape of windows and colour of the plasterwork, the matching parked cars, a yellow wood street bench, grey metal bars with round tips, a green trash bin, a concrete pole, and several trees. A visually matching street bench, parking metal bars with a round top, and features of a residential building are visible on both S6V1 and S10V1 and confirm that they were filmed at the scene of CIV0798D2.

[60] https://maps.app.goo.gl/KCpatEjFCMSETgAx8
[61] https://maps.app.goo.gl/c9csAJsg1HCpHm9G9
[62] Timecode: [02.05-02.11]
[63] Timecode: [01.33-01.40]
[64] Timecode: [02.05-02.11]
[65] Timecode: [01.33-01.40]



Matching layout of a street bench (White Rectangle), garbage bin (Yellow Rectangle), yellow wagon car (Yellow Arrow), and birch tree (White Arrow) depicted in S6V1 (Red Frame) and S10V1 (Yellow Frame).

Hence, both S6V1[66] and S10V1[67] depict the scene of CIV0798D1 and shall be geolocated simultaneously.

[66] **Timecode:** [02.05-02.11];
[67] **Timecode:** [01.33-01.40];

b) Geolocation of S6V1 and S10V1

S6V1[68] depicts a damaged civilian car parked in the inner court of a residential building, together with other civilian cars. In front of the damaged car, a yellow street bench is visible. One of the other cars depicted near the damaged car is a station wagon of a bright yellow colour near a narrow, tall concrete pole, which is likely a street light or an electric pole. Several balconies are visible on the facade of the building, creating a unique visual footprint of the residential building and the scene. S10V1 depicts the damaged car from a slightly different angle, providing an extra view over the scene of CIV0798D2, the courtyard and parked civilian cars.

Due to the absence of Google Street View for the identified location, the geolocation of CIV0798D2 was performed based solely on satellite imagery. A visual examination of available satellite imagery identified an area within the HTZ microdistrict of Kharkiv that appears to be the location of the scene of CIV0798D2. The geolocation is based on the following indicators: the shape of the building and the presence of what appears to be the yellow car, a concrete pole, and a street bench, all of which were depicted in a matching spatial layout on multiple satellite images at least since October 2018.



[68] Timecode: [02.05-02.11]



A bench (White Rectangle), a yellow car (Yellow Rectangle), and a street light pole (White Arrow) are depicted at the location identified as a likely scene of CIV0798D2 on S10V1 near the footpath (Dashed Yellow Lines) in a matching spatial layout depicted in the satellite imagery dated 02/08/2021 (Credit: Maxar Technologies/Google Earth Pro).

In satellite imagery taken on 20/05/2022, just over a month later, an object can be seen which appears to match the size and position of the damaged black car seen at CIV0798D2.





The orientation of the car (White Arrow) in relation to the other objects visible around it, such as the bench (Yellow Arrow), concrete pole, and parking area, matches the spatial layout of objects depicted in the satellite imagery from 20/05/2022 (Credit: Google/Maxar Technologies).

The presence of the yellow car parked in this courtyard also appears to be visible in historical Google Earth Pro satellite imagery from 09/10/2018, 01/03/2020, 07/04/2020, 08/10/2020, 02/08/2021, and 20/02/2022.



A yellow car (Yellow Arrow) is visible at the location identified as a likely scene of CIV0798D2 on the satellite imagery from 09/10/2018 (Yellow Frame), 01/03/2020 (Red Frame), 07/04/2020 (Orange Frame), 08/10/2020 (Blue Frame), 02/08/2021 (Purple Frame), and 20/02/2022 (Green Frame) (Credit: Maxar Technologies/Google Earth Pro).

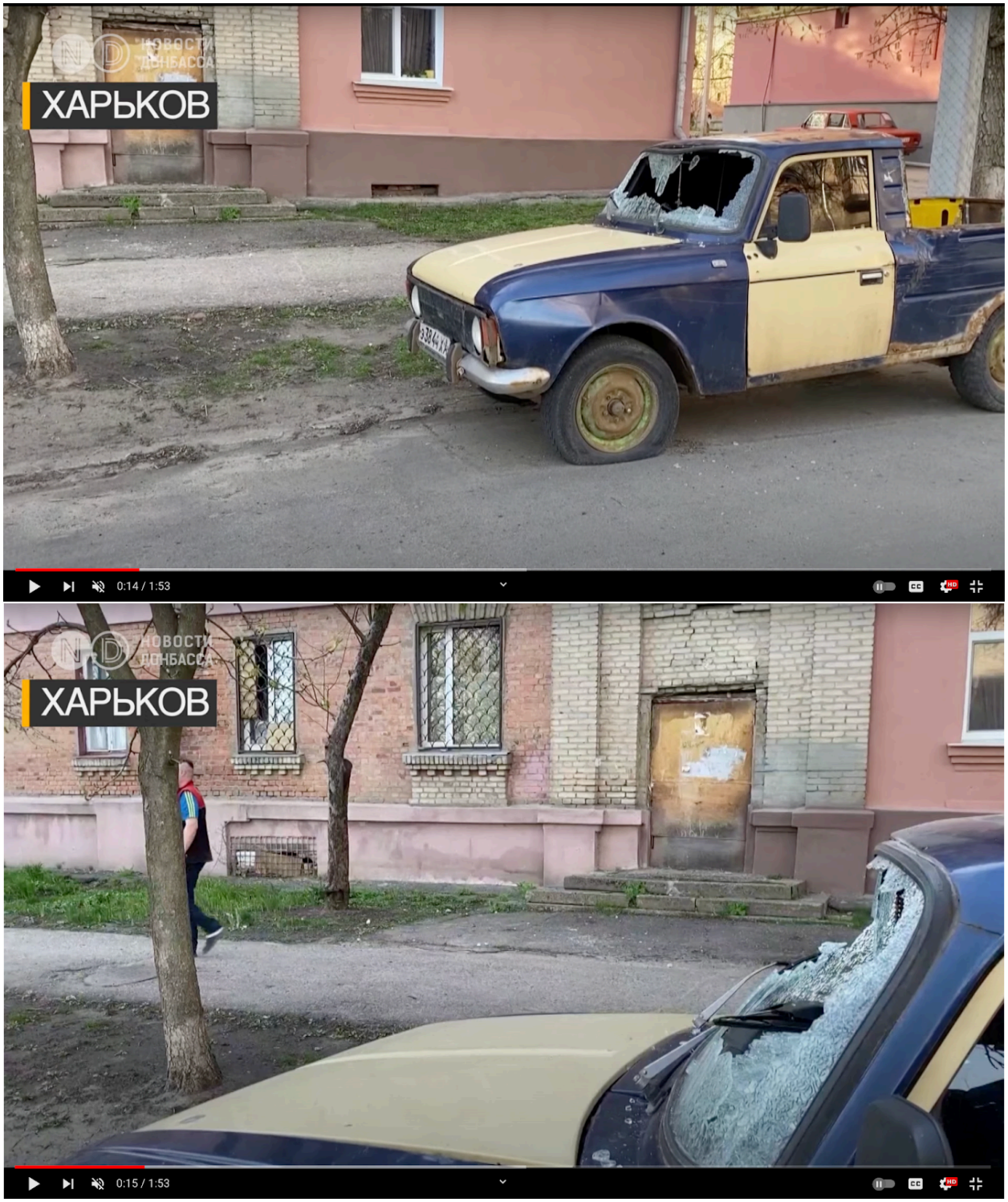
Based on the visual examination of the spatial layout of the above-mentioned objects depicted in S6V1 and S10V1 and their comparison with available satellite imagery of the HTZ microdistrict, the scene of CIV0798D2 was geolocated to likely be at 49.9429, 36.3847[69].

Geolocation of CIV0798D3

The location of the scene of CIV0798D3 was geolocated in the HTZ microdistrict of Kharkiv, at 49.9430, 36.3838[70].

S10V1[71] depicts a damaged civilian car of a beige-blue colour parked in front of the brick-laid entrance to a residential building with a door and two steps, and what appears to be a grey concrete pole. A part of the building is visible through the gap between buildings, indicating its height. Several trees are depicted in the material, forming a distinctive pattern suitable for geolocation.

[69] https://maps.app.goo.gl/c9csAJsg1HCpHm9G9
[70] https://maps.app.goo.gl/6kMSqpqvHFPhX2de8
[71] Timecode: [00.12–00.17]



The damaged car parked near the residential building depicted in S10V1 [00.12–00.17].



The entrance (Yellow Rectangle) and the metal pole (White Arrow) at the scene of CIV0798D3 are depicted in S10V1 and Google Street View imagery from June 2015.

At the scene of CIV0798D3 depicted in S10V1 [00.15], matching basement window and brick window ledges are visible.



A matching entrance (Yellow Rectangle), lower ground window (Blue Rectangle), and brick-laid window ledges (White Arrows) are depicted in S10V1 and Google Street View Google imagery from June 2015.





The direction of the camera of S10V1 indicated on satellite imagery from 02/08/2021 with marked residential buildings (Credit: Maxar Technologies/Google Earth Pro).

Based on the visual examination of Google Street View imagery from June 2015, the building with a matching entrance, trees, and a concrete pole in the spatial layout was identified at 49.9430, 36.3838[72], approximately 40 m from the scene of CIV0798D1, and approximately 55 m from the scene of CIV0798D2.

[72] https://maps.app.goo.gl/6kMSqpqvHFPhX2de8

CIV0798E

The location of the scene of CIV0798E depicted in S6V1 and S3V1 was geolocated in the HTZ microdistrict of Kharkiv, Ukraine, at 49.9515, 36.3663[73].

S6V1 depicts a man in a park describing the moment of the strike and pointing to a broken bench where he reportedly administered first aid to a wounded woman. Near the bench are what seem to be pools of blood. The moment of what appears to be an explosion in the park is depicted in S3V1 from the windows of a residential apartment.

Taking into account that the caption of S6V1 indicates that the events occurred in a "*residential district of Kharkiv, HTZ",* the area where sub-incidents of CIV0798A, CIV0798B, CIV0798C, and CIV0798D were previously geolocated, the date of the post, and the general context of depicted events, the geolocation of the scene of CIV0798E began with a visual examination of public imagery and satellite imagery depicting the area of HTZ microdistrict of Kharkiv. The process of geolocating S6V1 and S3V1 is outlined below.

a) Geolocation of S6V1

S6V1 depicts a man showing the place where a woman was allegedly wounded in a result of the strike. S6V1 depicts the scene of CIV0798E at a wide angle, providing sufficient materials to recreate a panoramic image of the scene by extracting and stitching still frames of S6V1 together.

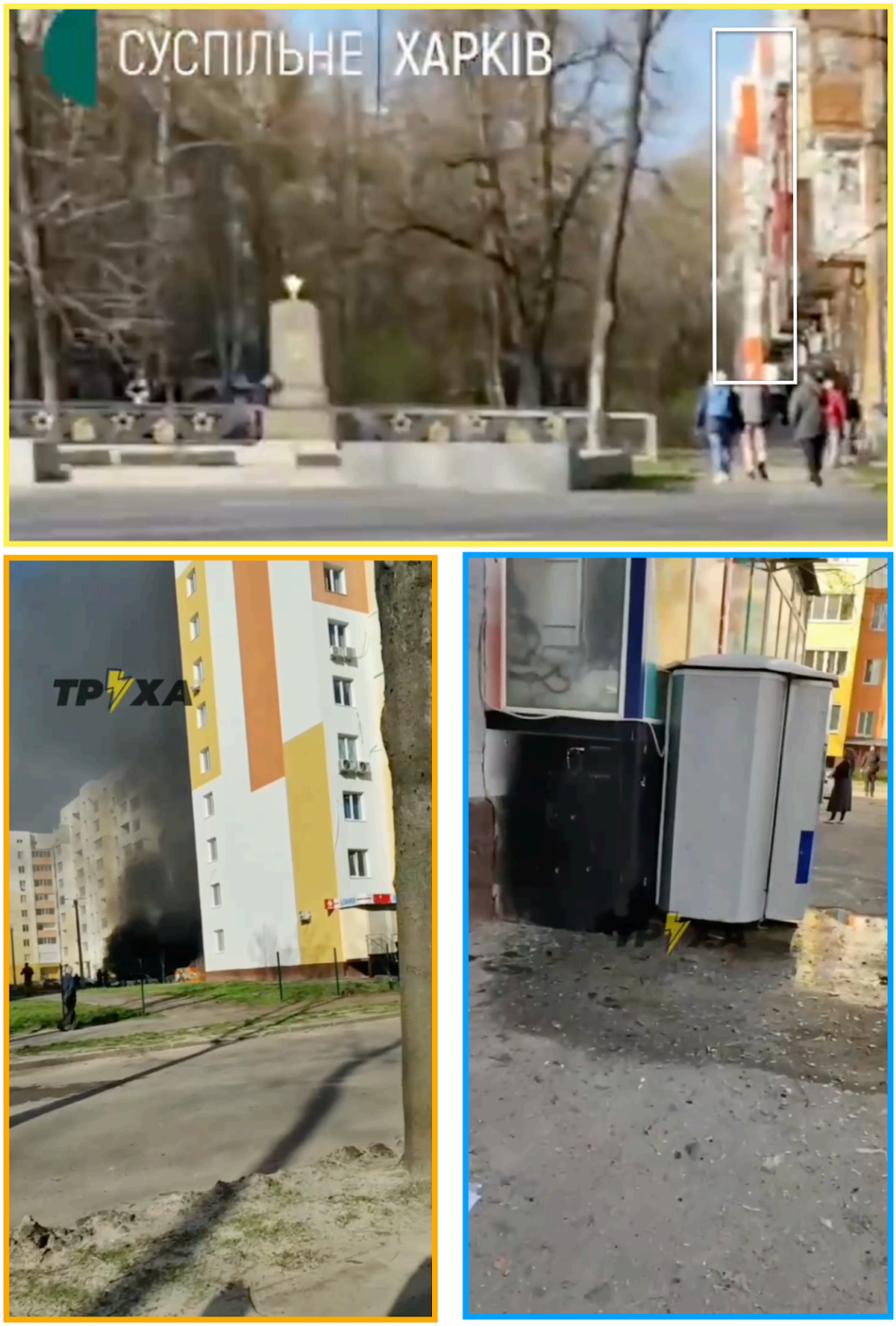


Panoramic image of the scene of CIV0798E composed from stitched frames of S6V1.

S6V1 depicts a square monument in a cobbled square, multiple cobbled walkways, wooden street benches, trees, and streetlight poles with round-shaped domes, suggesting that the scene of CIv0798E is likely an urban park. This is further indicated by the density of residential buildings surrounding the scene.

Furthermore, S6V1[74] briefly depicts what appears to be a tall building with external features similar to those depicted at the scene of CIV0798A1 in S1V1 and visible at the scene of CIV0798A2 in S1V2, indicating that the scene of CIV0798E may be located nearby.

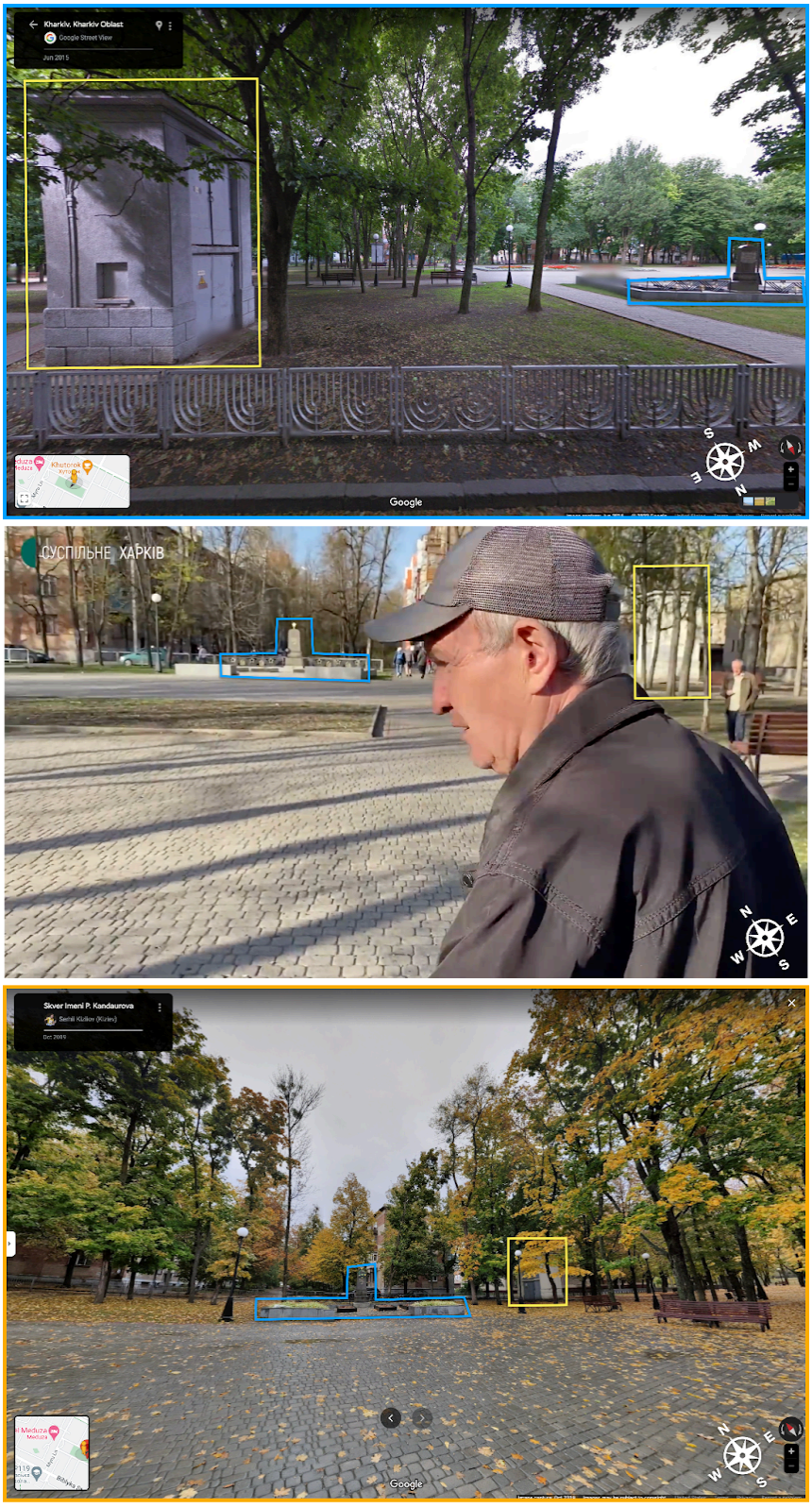
[73] https://maps.app.goo.gl/yrCswt5VZ31Byd6e6
[74] Timecode: [00.06–00.07]



A partially visible multi-coloured building (White Rectangle) similar to the building depicted at the scene of CIV0798A1 on S1V1 (Orange Frame) and CIV0798A2 on S1V2 (Blue Frame) is briefly visible on S6V1 (Yellow Frame).

An examination of street view and satellite imagery identified Google Street View images from June 2015 and October 2019[75], where all objects match in their appearance and spatial layout.

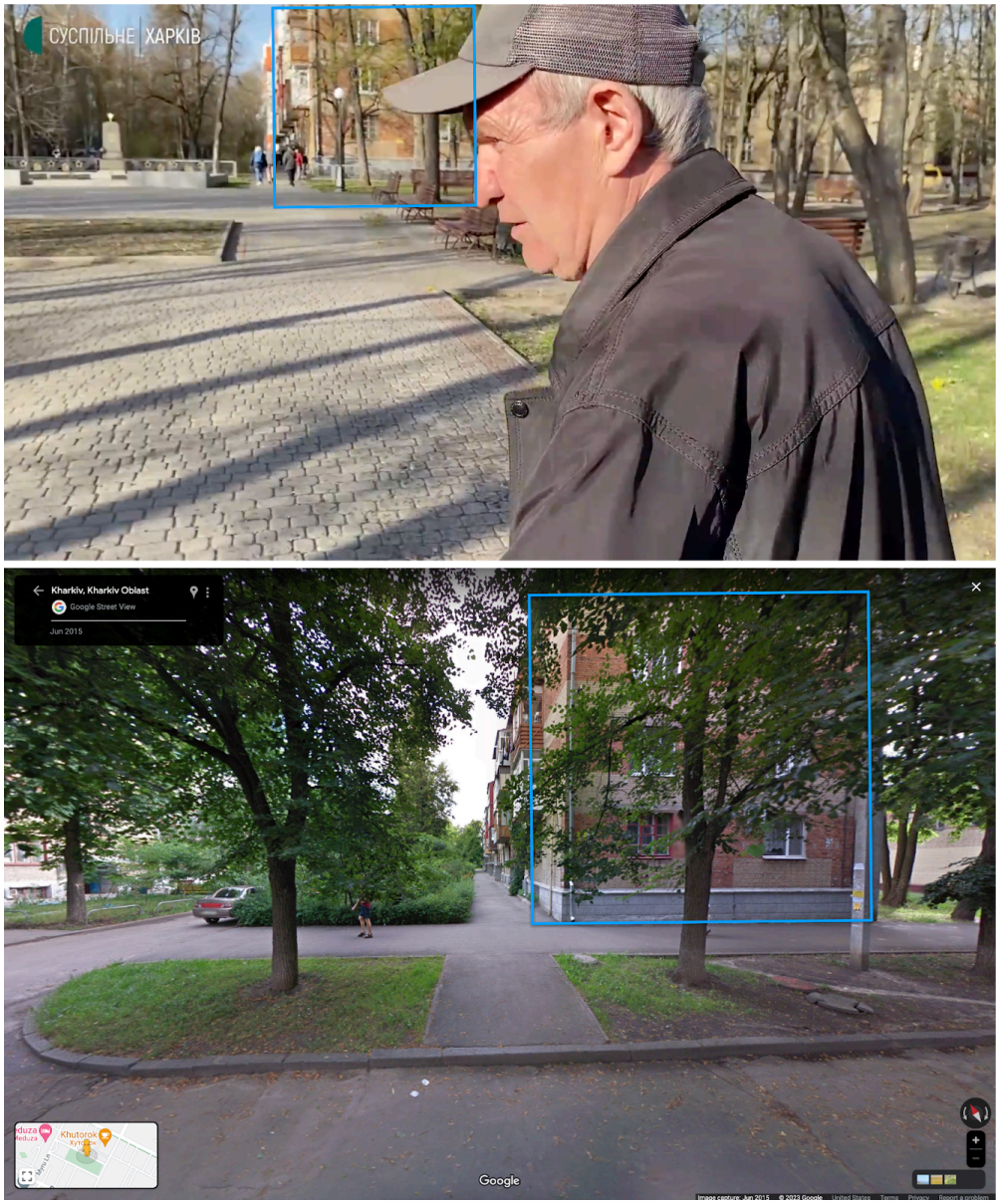
[75] https://maps.app.goo.gl/9nHYrwz7fWiBZhHMA



A matching edifice of undefined purpose (Yellow Rectangle) and a monument (Blue Shape) depicted in S6V1 are visible in Google Street View images from June 2015 (Blue Frame) and October 2019 (Orange Frame).



The direction of the camera of S6V1 is indicated on the satellite imagery dated 02/08/2021 (Credit: Maxar Technologies/Google Earth Pro).



A matching residential building (Blue Rectangle) depicted in S6V1 and on Google Street View image from June 2015.



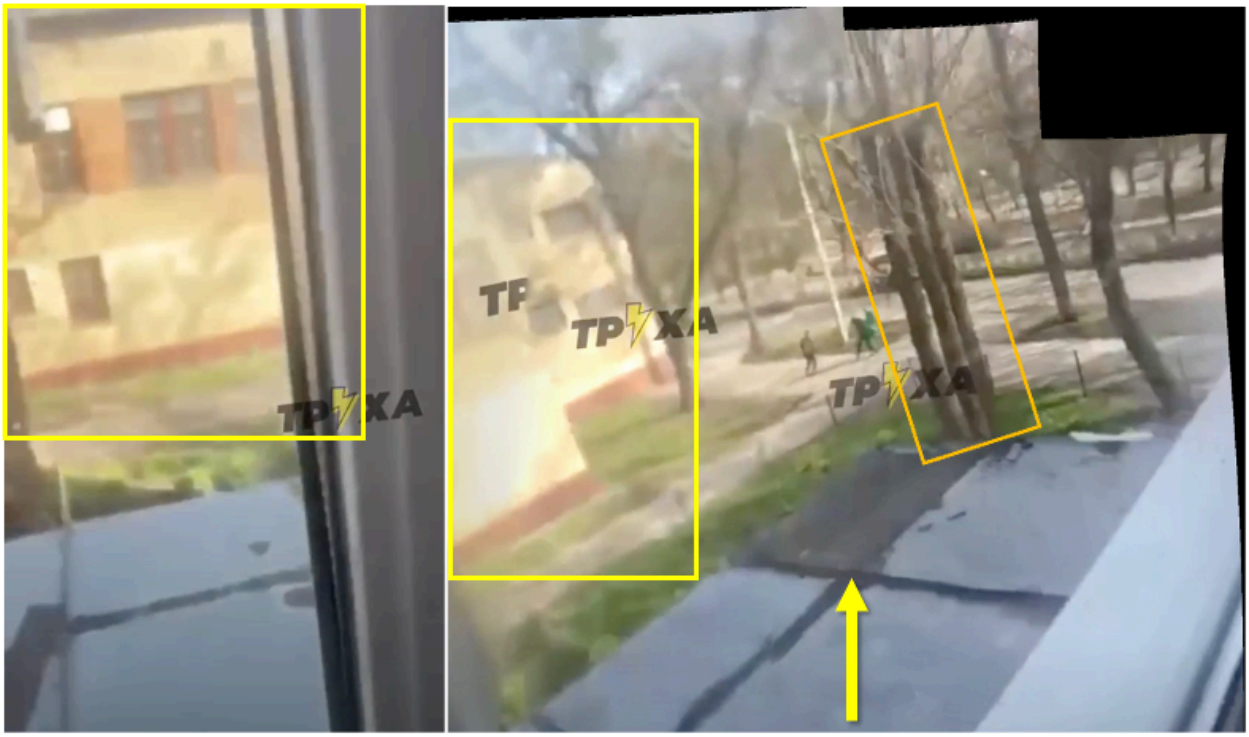
The direction of the camera depicting the scene of CIV0798E in Google Street View from June 2015 indicated on the satellite imagery from 02/08/2021 (Credit: Maxar Technologies/Google Earth Pro).

Hence, based on the visual examination and comparison of the publicly available satellite imagery and public imagery dated June 2015 with S6V1, the scene of CIV0798E was geolocated at 49.9515, 36.3663[76].

b) Geolocation of S3V1

S3V1, filmed through a window, depicts an explosion in what appears to be a park. S3V1 depicts a line of three tall, closely planted trees near a dark concrete tile in the immediate vicinity of a building. A two-story building on the opposite side of the same street, whose facade, colour, and particularly shaped windows are depicted in S3V1, depicts a sufficient number of distinctive objects in a unique spatial layout suitable for the geolocation of the scene.

[76] https://maps.app.goo.gl/yrCswt5VZ31Byd6e6

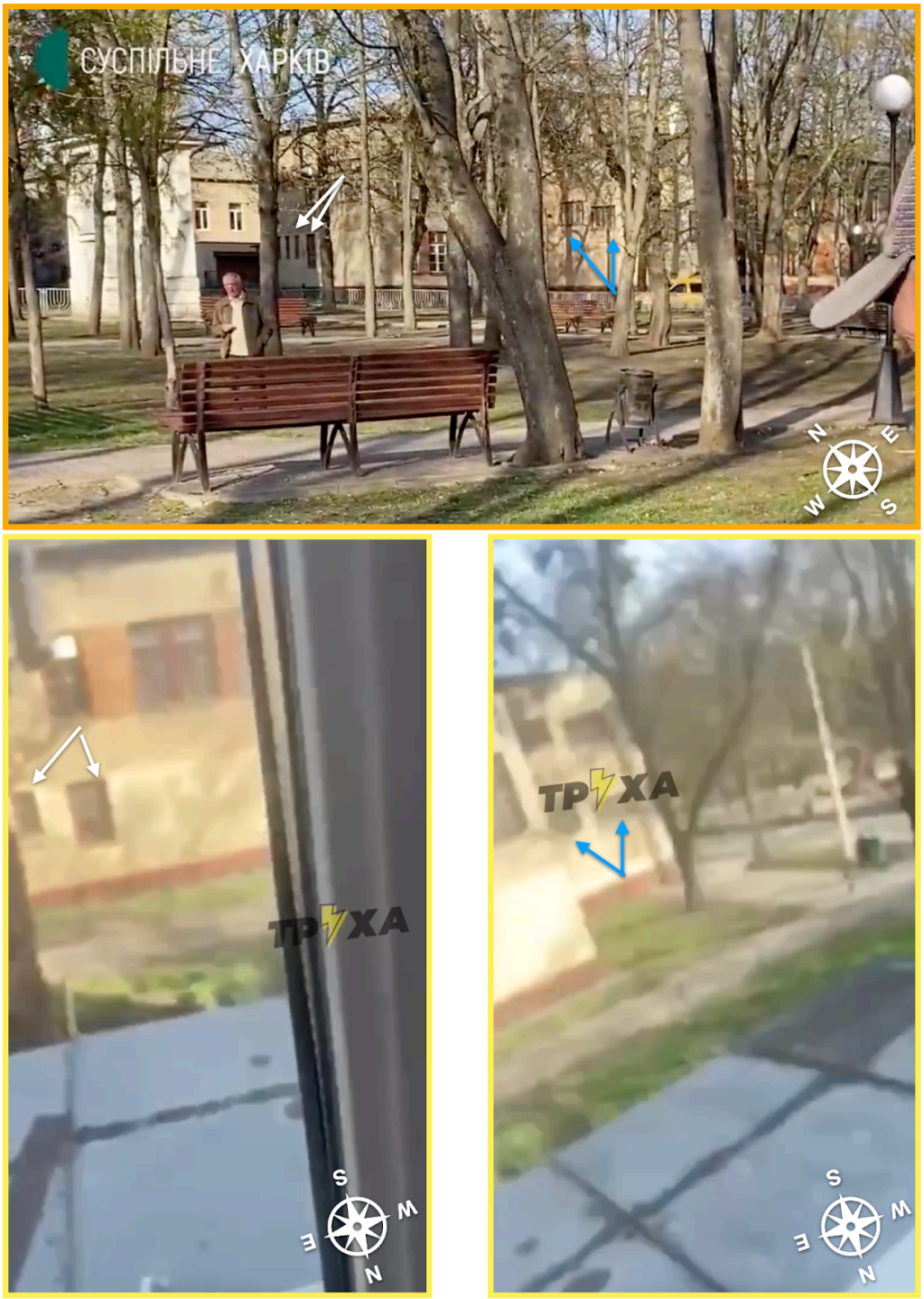


Panoramic image composed of stitched still frames extracted from S3V1 depicting trees (Orange Rectangle), a dark concrete tile (Yellow Arrow), and the facade of the building opposite. (Yellow Rectangle).

Taking into account that the caption of S3V1 indicates it is "another video of today's strike of *HTZ in Kharkiv"*, the date of the post, and the general context of depicted events, the geolocation of S3V1 commenced with a visual examination of public and satellite imagery depicting the HTZ microdistrict of Kharkiv, Ukraine.

Visual examination of S6V1 linked to CIV0798E identified a building with matching facade features and windows as the one depicted in S3V1, which was previously geolocated to the scene of CIV0798E at 49.9515, 36.3663[77].

[77] https://maps.app.goo.gl/yrCswt5VZ31Byd6e6

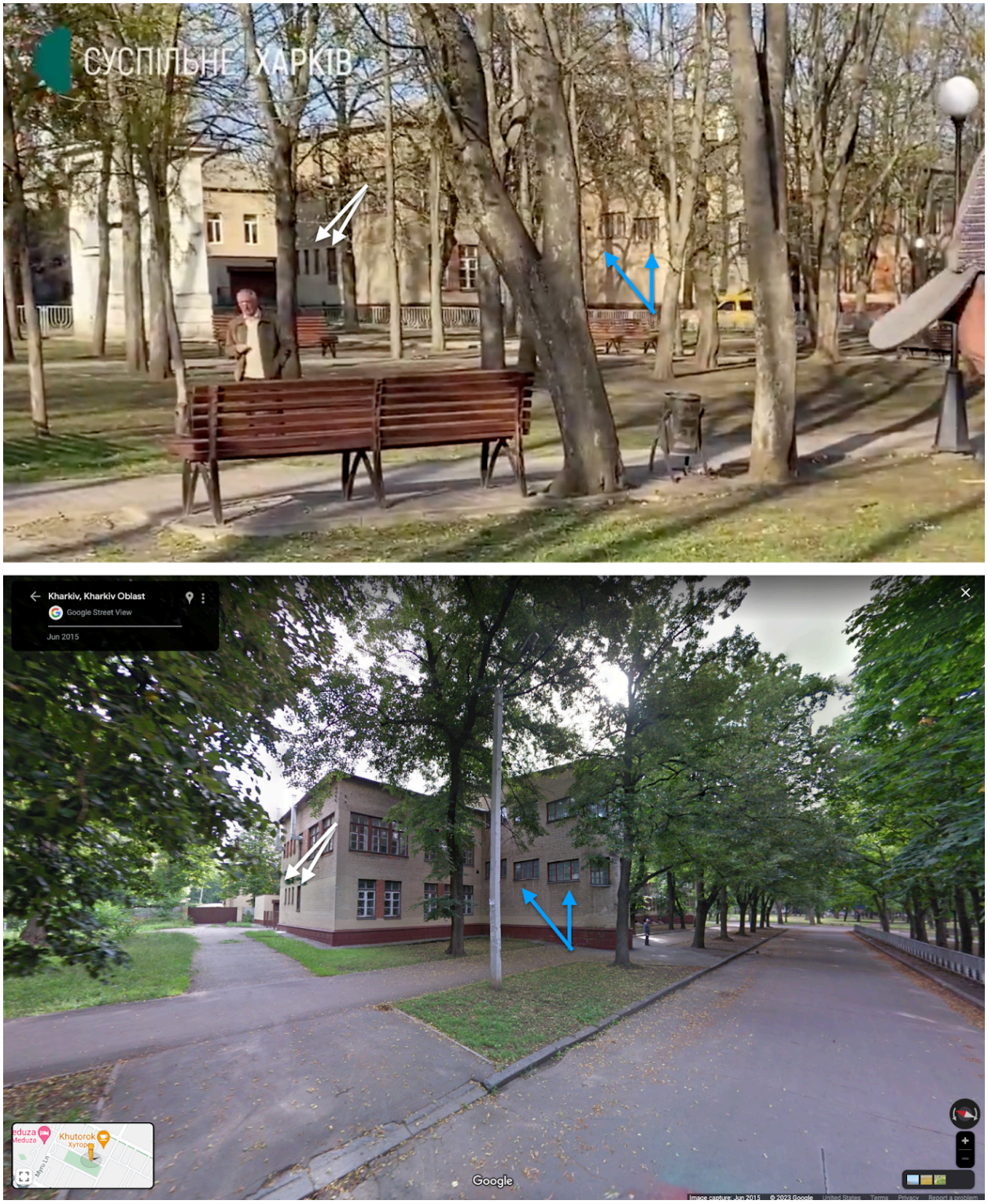


The building depicted in S6V1 (Orange Frame) and S3V1 (Yellow Frames) appears to have a matching facade and set of windows (White and Blue Arrows).

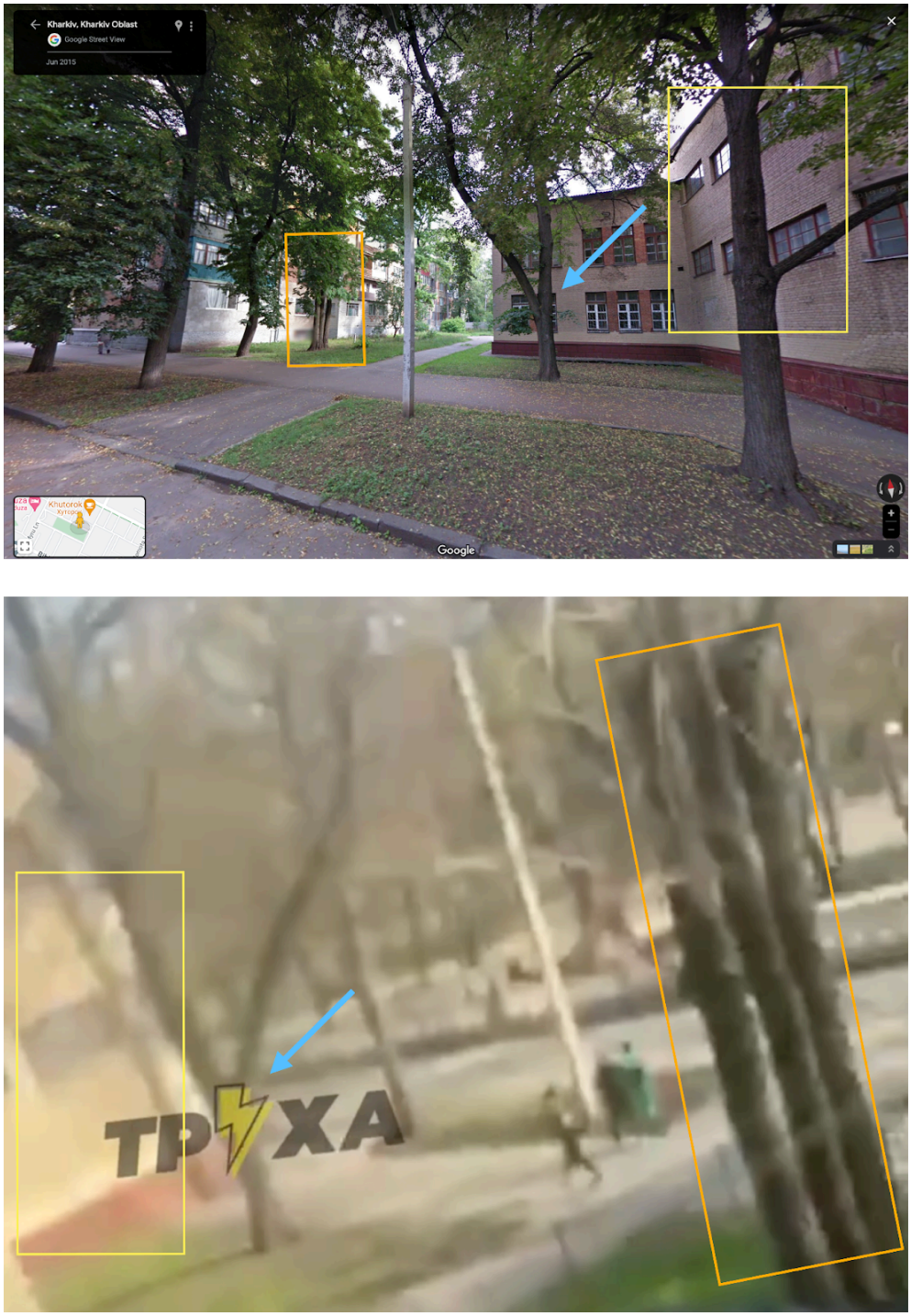


The direction of the camera of S3V1 is indicated on the satellite imagery from 02/08/2021 (Credit: Maxar Technologies/Google Earth Pro).

Visual examination and comparison of Google Street View imagery depicting the area of CIV0798E identified the building depicted in S3V1 in the HTZ microdistrict of Kharkiv, close to the scene of CIV0798E as depicted in S6V1.



A matching set of windows (White and Blue Arrows) is depicted in S6V1, identified on Google Street View image from 2015.



A matching set of windows (Yellow Rectangle), a V-shaped tree (Blue Arrow), and a row of trees (Orange Rectangle) depicted in S3V1 were identified on a Google Street View image from 2015.

Therefore, based on the visual comparison and analysis of S6V1 and S3V1 with publicly available imagery, the explosion depicted in S3V1, which occurred at the scene of CIV0798E, was geolocated at 49.9515, 36.3663[78].

[78] https://maps.app.goo.gl/yrCswt5VZ31Byd6e6

CIV0798F

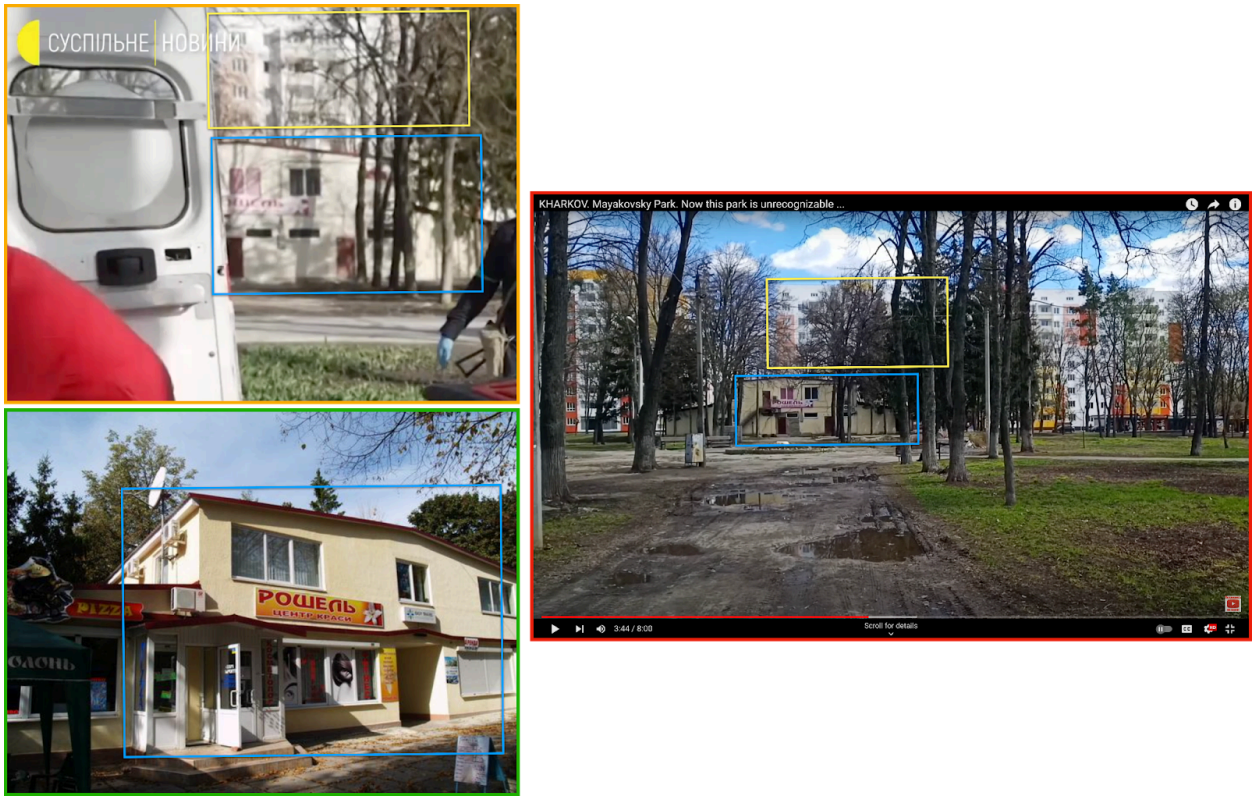
The location of the scene of CIV0798F was geolocated to the HTZ microdistrict of Kharkiv, Ukraine, at 49.9516, 36.3754[79].

S9V1,[80] S11I3, S11I4, S11I5, and S11I6 depict emergency services administering first aid to several people lying on the ground at the scene of CIV0798F. Multiple cobbled walkways, wooden street benches, trees, and round-shaped street lights suggest that the incident likely occurred in a park. In the background, a low two-story building with a partially visible banner containing the cyrillic letters "...ОЕШЛЬ"[81] and a tall residential building with a facade similar to the facade of the building previously geolocated to the scenes of CIV0798A1, CIV0798A2, and CIV0798E are visible.

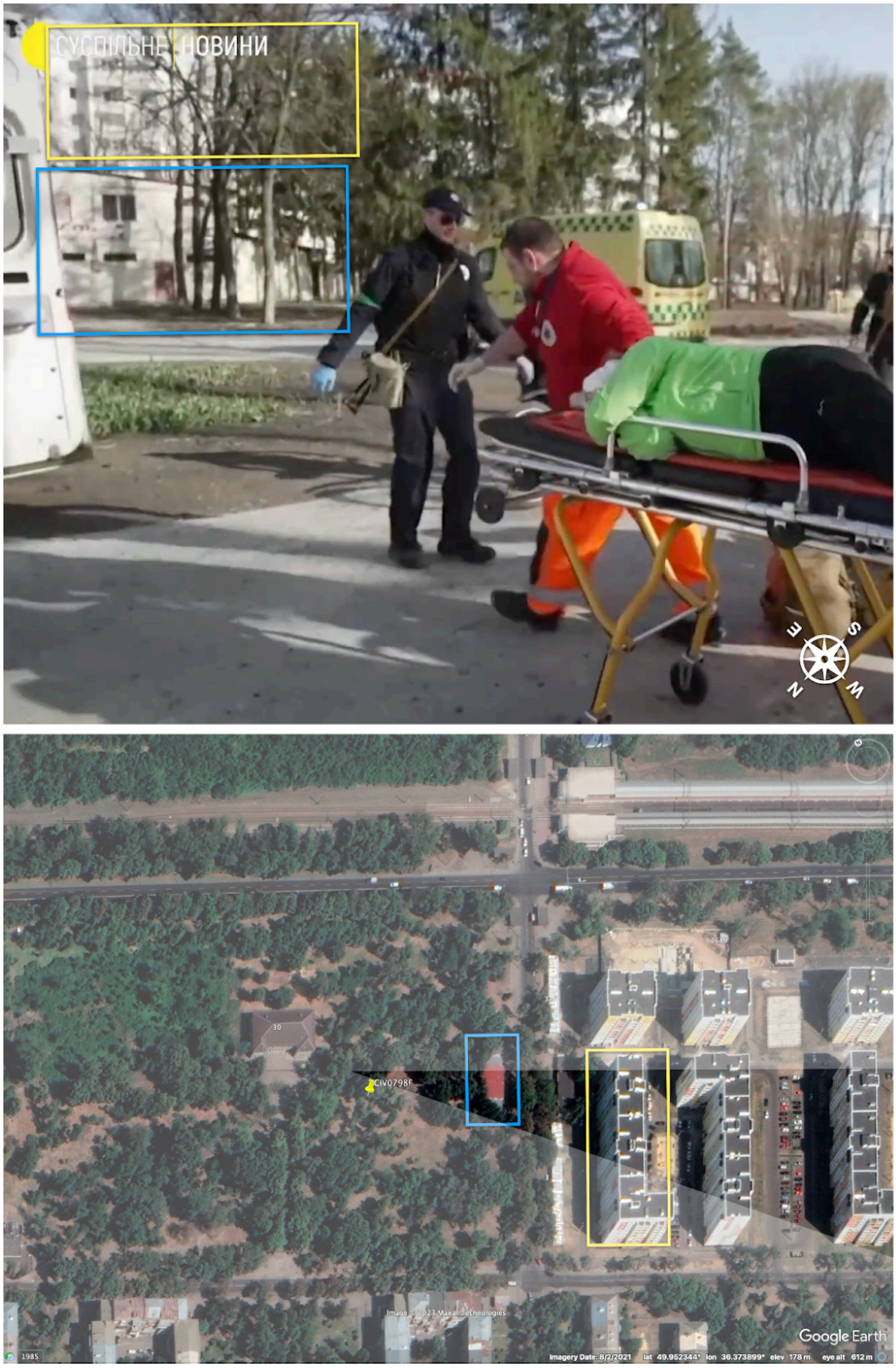
Due to the fact that S9V1 also depicts events previously geolocated to the scene of CIV0798A1 in the HTZ microdistrict of Kharkiv, the geolocation of the scene of CIV0798F commenced with the visual examination of public imagery, videos, and satellite imagery depicting the area of the HTZ microdistrict of Kharkiv.

A search query containing the word "[Р]ОШЕЛЬ" performed using Google Maps in the HTZ microdistrict of Kharkiv identified a "РОШЕЛЬ" beauty salon in the park in the HTZ microdistrict, Kharkiv. An online search query using this name identified an image[82] on Wikimapia depicting the building of the beauty salon in question with a commercial sign similar to the one depicted in S9V1. The building is located in the Mayakovsky Park, which was identified as depicting the opposite side of the same beauty salon depicted in S9V1. A YouTube video[83] depicting the Mayakovsky Park buildings in a layout matching the one depicted in S9V1 was also identified, further indicating the location of the scene depicted in CIV0798F.

[79] https://maps.app.goo.gl/VnB5A11A84xUjr38A
[80] Timecode: [01.15–02.23]
[81] "...OSHEL"
[82] https://wikimapia.org/14046084/ru/%D0%A6%D0%B5%D0%BD%D1%82%D1%80-%D0%BA%D1%80%D0%B0%D1%81%D0%BE%D1%82%D1%8B-%D0%A0%D0%BE%D1%88%D0%B5%D0%BB%D1%8C#/photo/959321
[83] https://www.youtube.com/watch?v=BDztS5DsdE4



The beauty salon (Blue Rectangle) and the residential building (Yellow Rectangle) depicted in S9V1 (Orange Frame) identified on Wikimapia (Green Frame) and in the YouTube video (Red Frame).



The tall residential building (Yellow Rectangle) and a beauty salon (Blue Rectangle) depicted in S9V1, and the direction of the camera indicated on satellite imagery from 02/08/2021 (Credit: Maxar Technologies/Google Earth Pro).

The identified location of CIV0798F is further confirmed by the presence of the building identified as the Seventh Day Adventist church depicted in S9V1.



Seventh Day Adventist Church (Yellow Rectangle) depicted in S9V1 (Orange Frame) and identified in the Youtube video[84] (Red Frame). The direction of S9V1 is indicated on the satellite imagery dated 02/08/2021 (Credit: Maxar Technologies/Google Earth Pro).

Therefore, the visual examination and comparison of public images of the beauty salon and satellite imagery with objects depicted in S9V1, S11I3, S11I4, S11I5, and S11I6 identified the location of the scene of CIV0798F to be in the HTZ microdistrict of Kharkiv, at 49.9516, 36.3754[85].

CIV0798G

CIV0798G is formed by two sub-incidents: CIV0798G1 and CIV0798G2, which, due to their proximity, were grouped for the purposes of geolocation.

Geolocation of CIV0798G1

The location of the scene of CIV0798G1 was geolocated to the HTZ microdistrict of Kharkiv, at 49.9459, 36.3762[86].

[84] https://www.youtube.com/watch?v=BDztS5DsdE4
[85] https://maps.app.goo.gl/VnB5A11A84xUjr38A
[86] https://maps.app.goo.gl/84zXJJjnpepZ64YZ8

S11I13 and S11I14 depict a damaged residential brick building with an "ОЩАДБАНК"[87] commercial sign in Ukrainian above the entrance at the scene of CIV0798G1.



S11I13 (Yellow Frame) and S11I14 (Green Frame).

[87] "OSCHADBANK"

According to open sources, the sign belongs to one of the branches of the State Savings Bank of Ukraine[88], a major banking chain in Ukraine. A search performed using the word "ОЩАДБАНК" on Google Maps in the HTZ microdistrict of Kharkiv identified only one branch office of the OSCHADBANK located at 49.9459, 36.3762[89]. The location of the scene depicted in CIV0798G1 was established based on the visual examination and analysis of Google Street View images from June 2015[90] and September 2020[91]. These depict a residential building with a matching facade and an "ОЩАДБАНК" sign, which matches the ones depicted in S11I13.



The OSHADBAK branch depicted in S11I13 (Green Frame) identified in the Google Street View imagery from June 2015 (Red Frame) and September 2020 (Blue Frame).

S11I14 depicts a damaged window of a brick building, which, by comparison with Google Street View imagery dated June 2015, was identified in the same building, above the OSCHADBANK depicted in S11S13, based on the colour of the building, shape of its window ledge, metal drainpipe, pattern of bricks, and distinctive crack on the wall.

[88] https://en.wikipedia.org/wiki/State_Savings_Bank_of_Ukraine
[89] https://maps.app.goo.gl/84zXJJjnpepZ64YZ8
[90] https://maps.app.goo.gl/xsubkHtcBBNWB5th9
[91] https://maps.app.goo.gl/hjcxMPcacnHXvoEQA



The window (White Rectangle) depicted in S11I14 (Top) identified in the Google Street View image from June 2015 (Bottom).



The damaged window (White Rectangle) depicted in S11I14 identified on Google Street View image from June 2015 based on the matching crack in the wall (White Arrow), the shape of the ledge, the location of the metal drainpipe (Blue Arrows), and the pattern of bricks (Green Arrow).

Geolocation of CIV0798G2

The location of the scene of CIV0798D1 was geolocated in the HTZ microdistrict of Kharkiv, at 49.9458, 36.3765[92].

S11I8, S11I9, S11I10, S11I11, S11I12, and S11I15 depict damage to a brick residential building at the scene of CIV0798G2. S12I10 and S11I15 depict damaged roofing and bricks, and, together with S11I12, several shattered windows that are visible on the building's facade. S11I18 and S11I19 depict what appears to be the inner staircase of the same building covered with concrete dust and debris from the damaged roofing and plaster and several hanging wires. Note the shape of the windows and the frames in the images below.

[92] https://maps.app.goo.gl/UwtTx2J9czGbkky36



S11I10 (Orange Frame), S11I15 (Blue Frame), S11I8 (Green Frame), S11I12 (Red Frame), S11I9 (Yellow Frame), and S11I11 (Grey Frame) depict the damage to a building at the scene of CIV0798G2.

Due to the fact that the scene of CIV0978G2 is depicted in images provided in S11, which also contains images depicting scenes of CIV0798A1, CIV0798F, and CIV0798G1, the geolocation of the scene of CIV0798G2 commenced with the visual examination of public imagery and satellite imagery depicting the area of the HTZ microdistrict of Kharkiv.

Based on the visual examination of identified materials and their comparison with public imagery available in Google Street View and satellite imagery available in Google Earth Pro, the

damaged building at the scene of CIV0798G2 was geolocated at 49.9458, 36.3765[93] on the opposite side of the street where the damaged building at the scene of CIV0798G1 was previously geolocated.

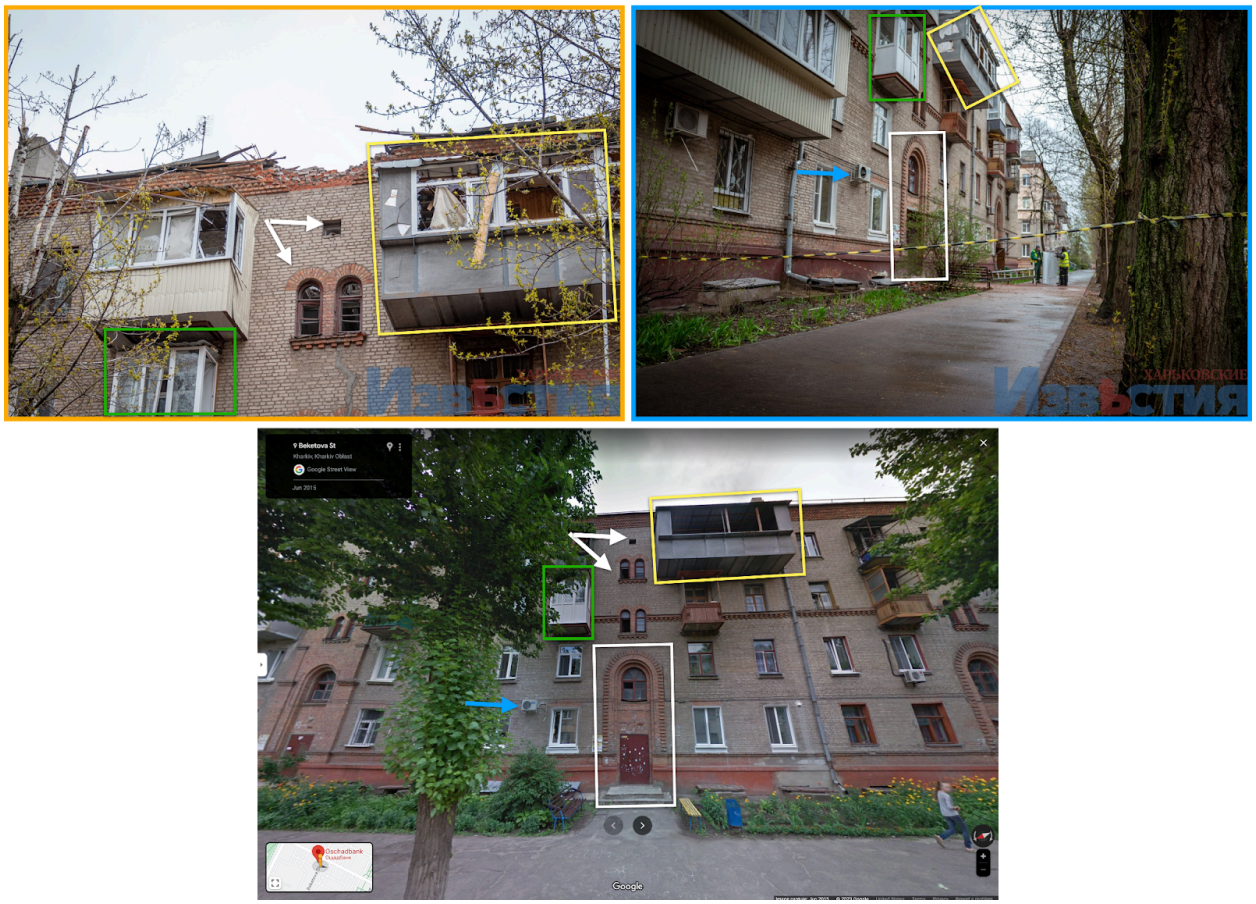
The damaged window depicted in S11I13 and geolocated to the scene of CIV0798G1 is visible through the windows depicted in S11I9, indicating that the damaged building at the scene of CIV0798G2 is located on the opposite side of the same street.



The broken window (White Square) of the building depicted in S11I13 (Blue Frame) geolocated at the scene of CIV0798G1 is visible through the window on S11I9 (Yellow Frame).

[93] https://maps.app.goo.gl/UwtTx2J9czGbkky36

This was further indicated by the comparison of the facade of the building depicted in S11I10 with Google Street View imagery[94] from June 2015. The comparison further established that S11I10 and S11I15 depict the same residential building based on the presence of matching facade features, small arched windows, and the shapes and patterns of residential balconies.



Matching pattern formed by residential balconies (Green and Yellow Rectangles), entrance (White Frame), arched and square-shaped windows (White Arrows), and air conditioning block (Blue Arrow) as depicted in S11I10 (Orange Frame), S11I5 (Blue Frame), and Google Street View imagery from June 2015 (Bottom).

[94] https://maps.app.goo.gl/4u6bhWLrdjvwZPzB8



A matching building with a distinctive arched facade and windows (Yellow Rectangle) depicted behind the men in S11I11 (Grey Frame) and on Google Street View image from 2015.



A matching wrought metal pattern of a balcony (Yellow Ellipse), drying racks with clips (Blue Rounded Rectangle), and a matching crack on the wall (White Arrow) is depicted in S11I12 (Red Frame) and on Google Street View image from June 2015 (Yellow Frame) and its close-up (Yellow Dashed Frame).

CIV0798H

The incident of CIV0798H is formed by the sub-incidents CIV0798H1 and CIV0798H2, which, due to their proximity, were grouped for the purposes of geolocation.

Geolocation of CIV0798H1

The location of the scene of CIV0798H1 was geolocated to the HTZ microdistrict of Kharkiv, at 49.9426, 36.3776[95].

S11I16, S11I17, S11I18, and S11I19 depict an incident at the scene of CIV0798H1, namely, a damaged residential brick building and a red civilian car parked in a courtyard.

[95] https://maps.app.goo.gl/RKYA7yzmEqVsi3bbA



S11I16 (Yellow Frame), S11I18 (Red Frame), S11I17 (Orange Frame), and S11I19 (Blue Frame) depict the scene of CIV0798H1.

a) Equivalence of S11I16, S11I17, S11I18, and S11I19

Visual examination and comparison of S11I16, S11I17, S11I18, and S11I19 identified that these materials depict the same residential building and parked car and, hence, were all taken at the scene of CIV0798H1.



The facade of the residential building (White Rectangle) and the car (Yellow Rectangle) at the scene of CIV0798H1 as depicted in S11I16 (Yellow Frame), S11I18 (Red Frame), S11I17 (Orange Frame), and S11I19 (Blue Frame).

Due to the established equivalency of these materials, the geolocation of the scene of CIV0798H1 was performed simultaneously.

b) Geolocation of the Scene of CIV0798H1

S11I16 depicts a building projecting at the interior corner of a courtyard, narrowing the scope of the search as this shape is less widespread among buildings in the HTZ microdistrict in comparison to the L-shaped ones. A visual examination of satellite imagery and street view imagery and their comparison with S11I16 and S11I18 identified a building with matching elements in the HTZ microdistrict of Kharkiv, at 49.9426, 36.3776[96].

An assessment was made of the date of the publication, the fact that the materials depicting the scene of CIV0978H1 were posted by S11 among other visual materials previously identified to be taken at CIV0798A1, CIV0798F, CIV0798G1, and CIV0798G2, and the general context of events. As a result of this assessment, the geolocation of CIV0798H1 commenced with a visual examination of public imagery available in open sources and satellite imagery that depicts the HTZ microdistrict of Kharkiv.

[96] https://maps.app.goo.gl/RKYA7yzmEqVsi3bbA



The projecting building at the corner of the courtyard (Orange Rectangle) depicted in S11I16 and on satellite imagery (Credit: Maxar Technologies/Google Earth Pro).

One image partially depicting elements of the inner facade, including double arched windows, a high-arched entrance, and street benches in the courtyard, was identified on Google Street View image[97] from June 2015.



Double arched windows above a high-arched entrance (White Rectangle), and street benches (Yellow Rectangle) depicted in S11I16.

[97] https://maps.app.goo.gl/WdcWh7Vu6y2Goxjq6



Double arched windows above a high-arched entrance (White Rectangle), and street benches (Yellow Rectangle) depicted in S11I16 (Top Left), on Google Street View (Bottom Left), the viewpoint of which is indicated on satellite imagery (Right) (Credit: Maxar Technologies/Google Earth Pro).

Finally, S11I16 and S11I18 depict a commercial banner of the “ALTERMO” company visible in one of the windows on the ground floor of a brick building. Google Maps indicates[98] that the TeploMATIKA shop is located at the corner of the building at the identified location. Google Street View contains an image[99] linked to the TemploMATIKA shop, which was uploaded in October 2020 and depicts a banner and a sloped roof of a basement floor visually matching the ones depicted in S11I16 and S11I18, further indicating that this is the location of the scene of CIV0798H1.

[98] https://maps.app.goo.gl/idTReJpj4k7au1JdA
[99] https://maps.app.goo.gl/w8WKx5huLxkdFivd6



Matching commercial ALTERMO banner and a sloped roof of the residential building's basement (White Rectangle) depicted in S11I18 on a Google Street View image from October 2020.



Matching commercial banner and other exterior elements of the residential building (White Rectangle) as depicted in S11I16 and on Google Street View image from October 2020.





The directions of cameras of S11I16 and S11I18 indicated on the satellite imagery from 02/08/2021 (Credit: Maxar Technologies/Google Earth Pro).

Geolocation of CIV0798H2

The location of the scene of CIV0798H2 was geolocated in the HTZ microdistrict of Kharkiv, at 49.9430, 36.3772[100].

S11I20 depicts damaged residential brick buildings and what appears to be a crater visible in the children's playground in its courtyard at the scene of CIV0798H2. The matching colours and features of the facades, including windows and balconies, the same number of floors, and the presence of a high-arched entrance on one of the buildings indicate likely proximity to the scene of CIV0798H1.

[100] https://maps.app.goo.gl/AJg3pcCepjzgosQv6



Matching rounded metal bars (White Arrows) depicted at the scenes of CIV0798H1 and CIV0798H2 in S11I20 (Blue Frame) and S11I18 (Red Frame) indicate the possible proximity of these scenes.

S11I20, which depicts the scene of CIV0978H2, was posted by S11 among other visual materials which were previously geolocated at the scenes of CIV0798A1, CIV0798F, CIV0798G1, CIV0798G2, and CIV0798H1 in the HTZ microdistrict of Kharkiv. Considering the date of the publication and the nature and general context of depicted events, the geolocation of CIV0798H2 commenced with a visual examination of adjacent areas previously geolocated as part of CIV0798, particularly CIV0798H1, using publicly available imagery and satellite imagery of the area.



A high-arched entrance (White Arrow) and what appears to be a crater (Yellow Ellipse) depicted at the scene of CIV0798H2 on S11I20.

Visual examination and comparison of S11I20 to Google Street View image[101] from June 2015 depicting the HTZ microdistrict and satellite imagery from 02/08/2021 identified matching elements of the children's playground and the building's facade in the courtyard. This allowed to geolocate S11I20 to the HTZ microdistrict of Kharkiv, 49.9430, 36.3772[102].

[101] https://maps.app.goo.gl/NqNYs7NPYCMHVYX28
[102] https://maps.app.goo.gl/AJg3pcCepjzgosQv6



Round metal bars (White Arrows) and a building with matching features (Yellow Rectangle) depicted in S11I20 (Blue Frame) and on Google Street View image from June 2015.



The direction of the camera of S11I20 depicts the part of the residential building (White Rectangle) at the scene of CIV0798H2 indicated on the satellite imagery from 02/08/2021 (Credit: Maxar Technologies/Google Earth Pro).

CIV0798I

The incident of CIV0798I is formed by the sub-incidents CIV0798I1 and CIV0798I2, which, due to their proximity, were grouped for the purposes of geolocation.

Geolocation of CIV0798I1

The scene of CIV0798I1 was geolocated in the HTZ microdistrict of Kharkiv, at 49.9483, 36.3769[103].

S4V1 depicts an incident at the scene of CIV0798I1, namely a cargo section of what appears to be an Uragan 9M27K cluster munition on the ground of a road next to a residential building. On the right side of S4V1, a white building with a tall fence and gates with a square pattern is visible, and on the left side, a wheeled silver metal trash bin is visible. What appears to be a residential building is partly visible in the middle part of the video. In the background of S4V1, a multicoloured building can be seen with white-yellow colours and architecture resembling the tall buildings previously geolocated at the scene of CIV0798A1 and in the vicinity of scenes CIV0798A2, CIV0798E2, and CIV0798F. The video depicts people in civilian clothes at the scene surrounding the rocket section.



The trash bin (White Arrow), multicoloured building (White Rectangle), and white gates (Yellow Rectangle) depicted at the scene of CIV0798I1 on S4V1.

S4V1 was posted within the same post as S4V2 and S4V4, which depict the scenes of CIV0798B1 and CIV0798B2, respectively. Both of these were previously geolocated to the HTZ microdistrict of Kharkiv. Moreover, S4V3 and S4V5, also posted as part of S4, were also geolocated to the

[103] https://maps.app.goo.gl/VtJZAMTPomxJSuKP6

HTZ microdistrict of Kharkiv (*see* CIV0798I2 bellow), further indicating the area of their likely location as the HTZ microdistrict of Kharkiv.

No street view imagery at the scene of CIV0798I1 was identified, and the geolocation was performed via the visual examination of publicly available satellite imagery of the HTZ microdistrict using the spatial layout of buildings and its subsequent comparison with S4V1. The location of the scene of CIV0798I1 was geolocated in the HTZ microdistrict of Kharkiv, at 49.9483, 36.3769[104].



[104] https://maps.app.goo.gl/VtJZAMTPomxJSuKP6

The multicoloured building (White Rectangle) depicted in S4V1 is visible on the satellite imagery from 02/08/2021 (Credit: Maxar Technologies/Google Earth Pro).



A matching residential building (Blue) and a round curb (Yellow) depicted in S4V1 are visible in satellite imagery (Credit: Maxar Technologies/Google Earth Pro).

Geolocation of CIV0798I2

CIV0798I2 was geolocated to the HTZ microdistrict of Kharkiv, at 49.9475, 36.3768[105].

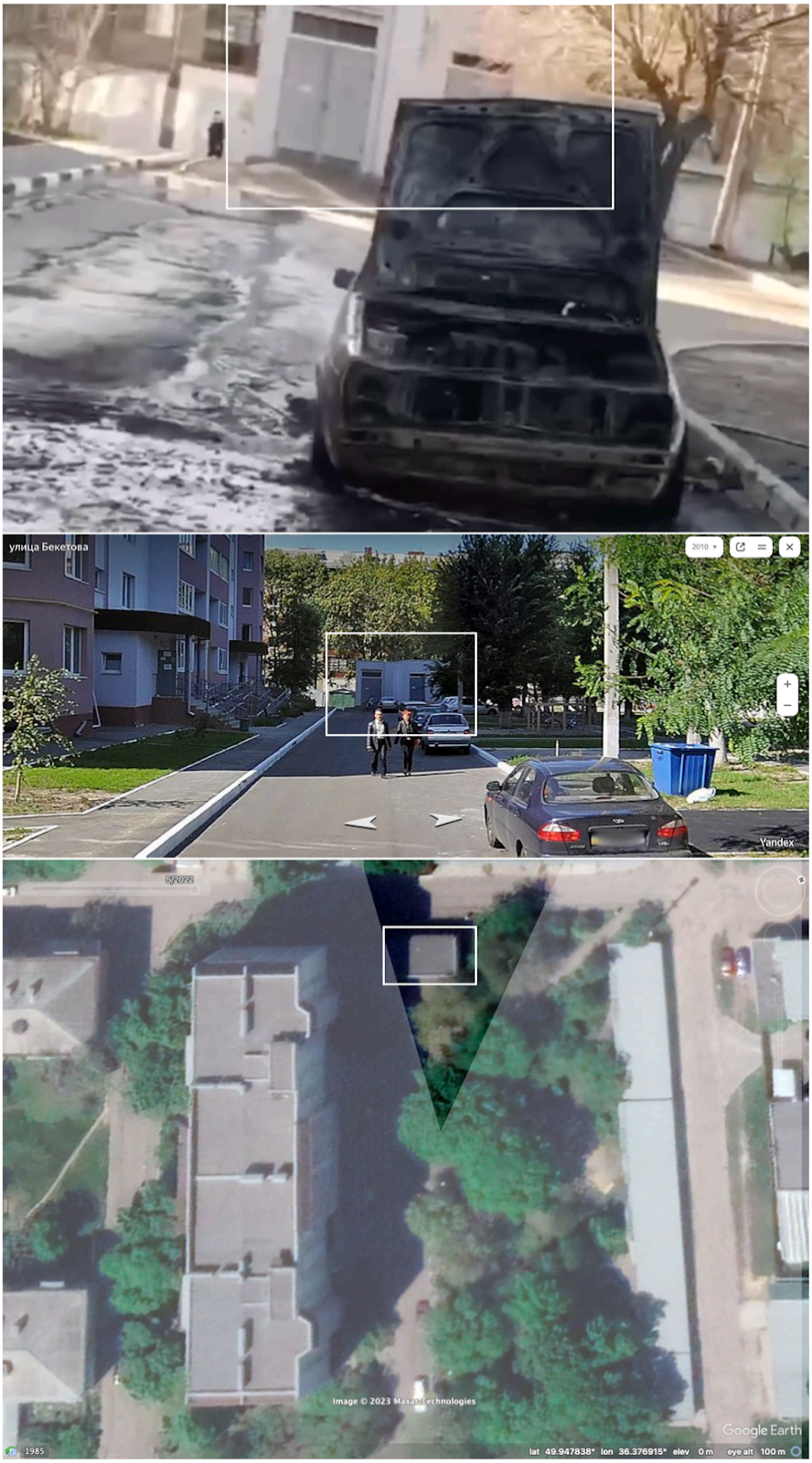
S2V1, S4V3, and S4V5 depict CIV0798I2, namely, the moment of an impact, destruction, and aftermath of a civilian car parked on a road next to a residential building. A large space with footpaths and a long grey building is visible in the background of S2V1. S4V3 and S4V5 provide a 360-degree view of the scene and depict the spatial layout of objects and buildings at the location.



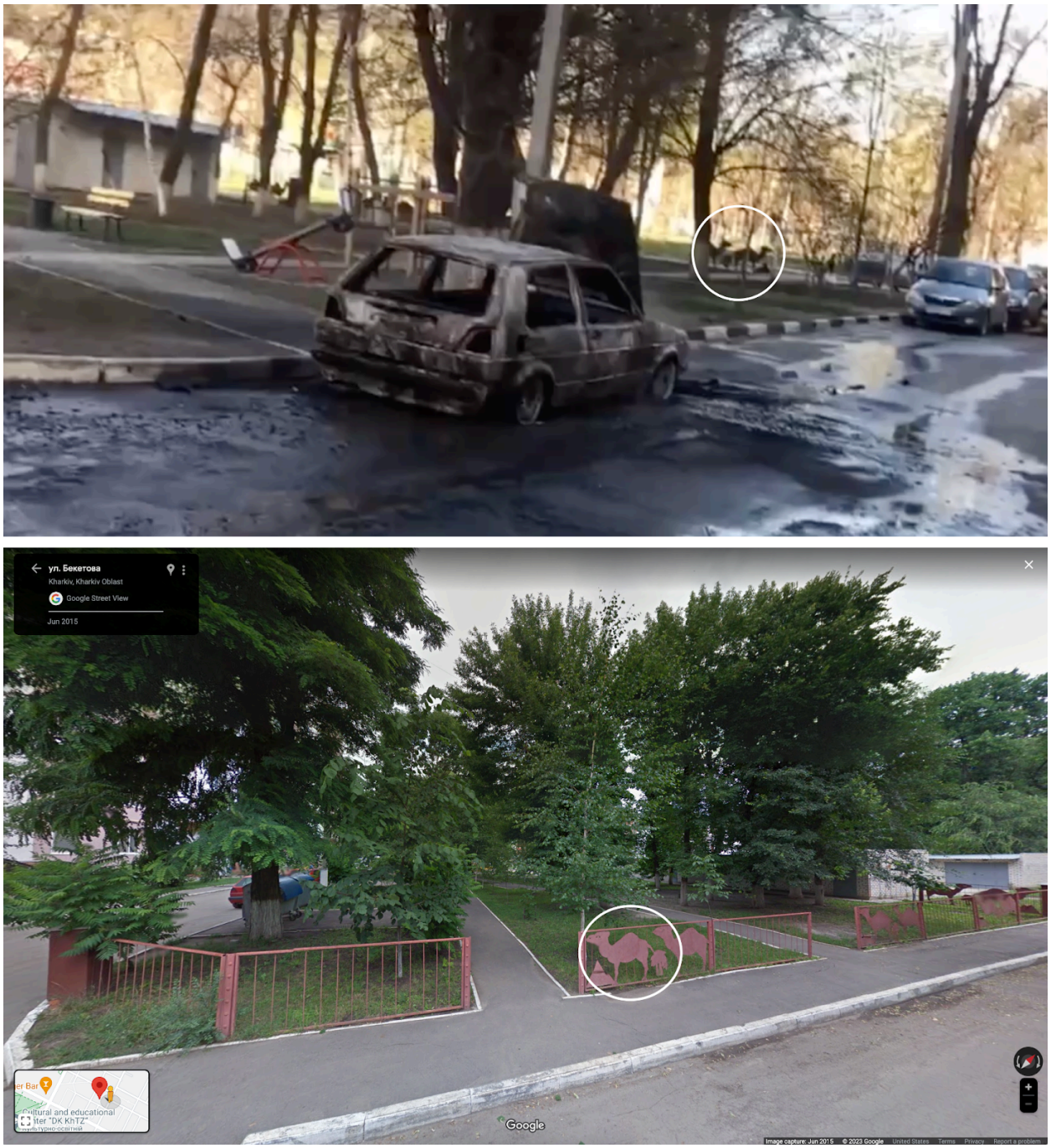
The scene of CIV0798I2 depicted in S2V1 (Green Frame), S4V3 (Orange Frame), and S4V5 (Blue Frame).

S4V3 and S4V5 were included in a post which also contained S4V1, S4V2, and S4V4, which depict the scenes of CIV0798B1, CIV0798B2, and CIV0798I1, all of which were geolocated to the HTZ microdistrict of Kharkiv. Considering the date of the publication, the nature and general context of depicted events, and the geolocation of CIV0798I2, it commenced with the identification and visual examination of public street view and satellite imagery depicting the HTZ microdistrict of Kharkiv adjacent to the above-mentioned scenes. The comparison of public imagery and S2V1, S4V3, and S4V5 identified the scene of CIV0798I2 in the HTZ microdistrict of Kharkiv at 49.9475, 36.3768[106].

[105] https://maps.app.goo.gl/9AriaRmdUktU04DL9
[106] https://maps.app.goo.gl/9AriaRmdUktU04DL9



A grey building (White Rectangle) depicted in S4V5 (Top Frame) identified in Yandex Panoramas (Middle) from June 2015 and satellite imagery depicting the perspective of S4V5 (Bottom) (Credit: Maxar Technologies/Google Earth Pro).



Matching camel-shaped patterns (White Circle) depicted in the background of S4V5 were identified on Google Street View [imagery](https://maps.app.goo.gl/EUCSRcq4h1ETnypR9)[107] from June 2015.

[107] https://maps.app.goo.gl/EUCSRcq4h1ETnypR9



Building with matching-shaped windows depicted in S4V3 (Top Left) identified in a Yandex Panorama image from June 2010 (Bottom Left) and on satellite imagery from 20/05/2022 with the viewpoint of S4V3 marked (Credit: Maxar Technologies/Google Earth Pro).



The long grey building (Orange Rectangle), a building behind the camel-shaped fence (Blue Rectangle), and a partly visible residential building (Yellow Rectangle) depicted in S4V5 marked on satellite imagery of the HTZ microdistrict (Credit: Maxar Technologies/Google Earth Pro).

CIV0798J

CIV0798J was geolocated to the HTZ microdistrict in the Industrialnyi district of Kharkiv, at [49.9452, 36.3954](#)[108].

The incident at the scene of CIV0798J is depicted in S12V1, which appears to be a phone camera recording of a monitor displaying the CCTV camera footage. S12V1 depicts the moment of impact by an unidentified object followed by an explosion and the dispersion of fragmentation. Three people appear to be present in the area at the time. In the background, a concrete fence and what appear to be five tall multicoloured buildings are visible. Their architectural style and facades appear to be visually similar to those previously geolocated in the HTZ microdistrict of the Industrialnyi district of Kharkiv at the scenes of CIV0798A1, CIV0798A2, CIV0798E, and CIV0798F. S12V1 contains a partly visible timestamp which reads as "15-04-2022 16.18.47(9?)".

[108] https://maps.app.goo.gl/CCJ9R5njYYiPC4Pe7

The floating “Typical hTz”[109] logo with the name of the Telegram channel which posted S12V1 suggests that it is primarily focused on providing media coverage of the local events associated with the HTZ microdistrict of Kharkiv, which further indicates the possible location of the incident.



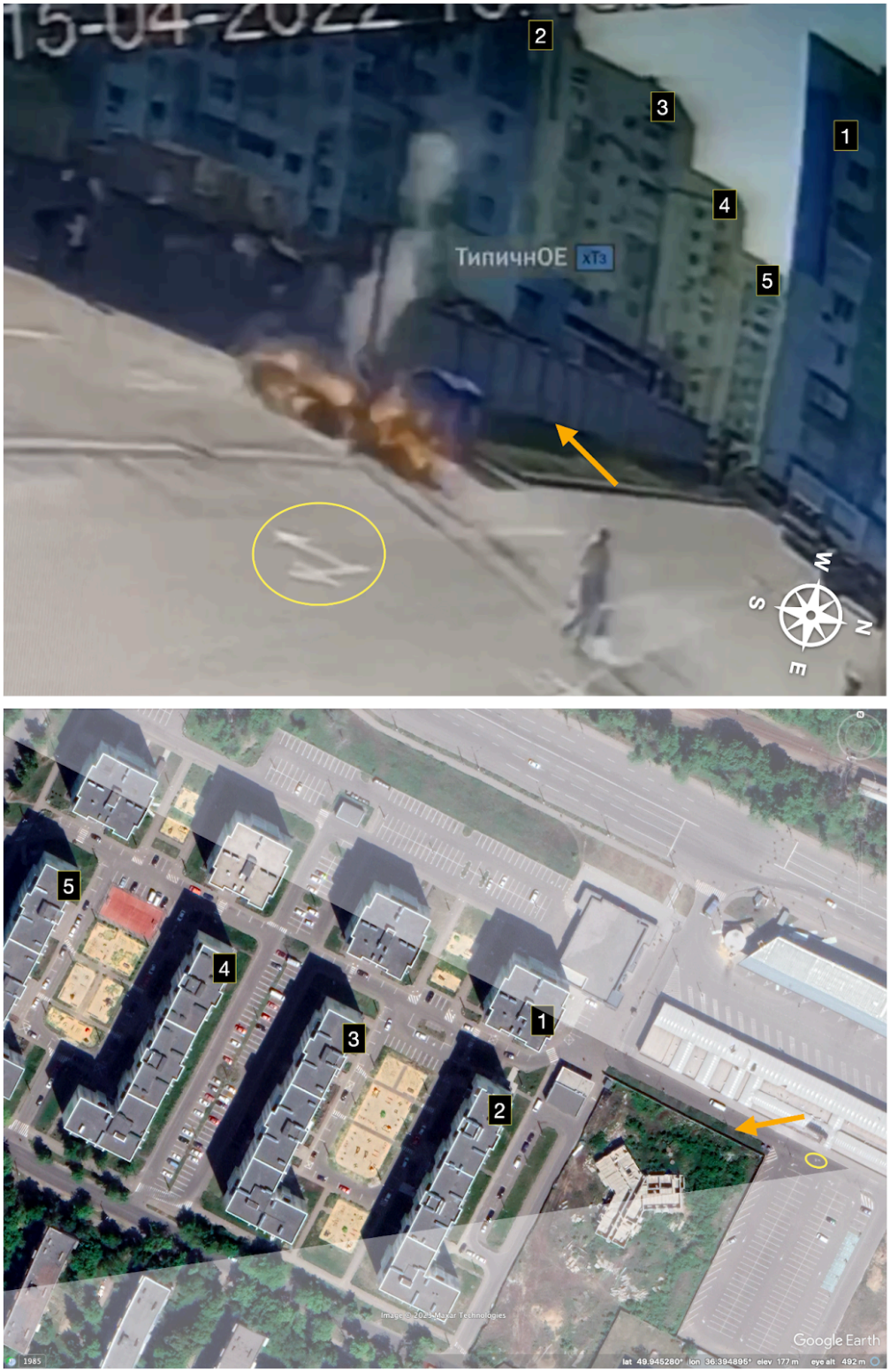
The moment of impact depicted at the scene of CIV0798J in S12V1.

[109] *In Russian:* “ТипичнОЕ хТз”

As such, taking into consideration the date when the earliest post containing S12V1 was identified in open sources, its timestamp, the presence of several multicoloured buildings with facades visually similar to those previously geolocated in other CIV0798 scenes, as well as the nature of depicted events and the focus of the Telegram channel which posted the video, the possible location of S12V1 was narrowed down to the area of HTZ microdistrict in the Industrialnyi district of Kharkiv, and its vicinity.

The geolocation process commenced with a visual examination of publicly available images and satellite imagery depicting the area where the multicoloured residential buildings were previously geolocated at the scenes of CIV0798A1, CIV0798A2, CIV0798E, and CIV0798F and its vicinity. The location of S12V1 was established by the means of visual examination and comparison of objects depicted in S12V1, namely buildings, a concrete fence, painted arrow signs on the road surface, and their spatial layout, with objects visible on the satellite imagery. Despite the fact that no street view or ground-level images of the geolocated area were identified in open sources, the satellite imagery provides sufficient information to conclusively geolocate the CIV0798J incident depicted in S12V1 to the HTZ microdistrict in the Industrialnyi district of Kharkiv, Ukraine, at 49.9452, 36.3954[110].

[110] https://maps.app.goo.gl/CCJ9R5njYYiPC4Pe7



Five residential buildings depicted in S12V1 are marked with corresponding digits, together with the concrete fence (Orange Arrow) and painted street sign (Yellow Ellipse) indicated on satellite imagery (Credit: Maxar Technologies/Google Earth Pro).

What Kind of Munition Was Used?

The objects depicted in the scenes of CIV0798B2, CIV0798C, CIV0798D1, and CIV0798I1 appear to be consistent with reference imagery[111] of 220mm 9M27K cluster munition rockets, namely a rocket motor section with a tail and four cargo sections.

CIV0798B2

Visual examination of two objects depicted at the scene of CIV0798B2 in S4V2, S6V1, and S10V1 identified them as being consistent with the reference imagery for cargo sections of 9M27K rockets based on their distinctive shapes and the position of vent holes as demonstrated in the graphics below.

a) Cargo section depicted in S4V2



The shape and position of vent holes on the object depicted in S4V2 appear consistent with the reference imagery depicting cargo sections of 9M27K Uragan rockets (White Ellipse) (Credit: Mark Hiznay/HRW).

[111] https://x.com/MarkHiznay/status/1496719886009126912?s=20&t=YjisQbzlIfzMFdp_ozOoKw

b) Cargo section depicted in S6V1 and S10V1



The shape and position of vent holes on the object depicted in S6V1[112] appear consistent with the reference imagery depicting cargo sections of 9M27K Uragan rockets (White Ellipse) (Credit: Mark Hiznay/HRW).

CIV0798C

The objects depicted at the scene of CIV0798C in S6V1[113] appear to be consistent with reference images of rocket motors and tail sections of 9M27K rockets as demonstrated in the graphics below.

[112] Timecode: [00.59–01.11]
[113] Timecode: [01.57–02.04]



The elongated metal object (Yellow Dashed Shape) and a metal fragment with fins (White Circle) depicted at the scene of CIV0798C on S6V1.

Using a reverse image search, a Telegram post[114] from 20/11/2022 depicting an object matching the one depicted in S6V1 was identified as being attached to the rocket body.

[114] https://t.me/syriantube/12005



The elongated metal object (Yellow Dashed Shape) depicted in S6V1 (Orange Frame) visually matches the object identified in the Telegram post from 20/11/2022.

Although the reference letters are not fully visible on the Telegram photo due to its low quality and angle, the reference markings partly visible on the object appear consistent with the marking depicted in images of motor sections of 9M27K rockets identified in social media posts[115], including a tweet[116] posted by Rob Lee[117], a senior fellow in the Foreign Policy Research Institute's Eurasia Program, where he identified the section with matching markings as being the rocket motor section of a 9M27K rocket.



Partly visible reference markings (Yellow Ellipse) depicted in the Telegram post[118] (Orange Frame) appear consistent with those on the rocket section depicted in the 9M27 Uragan rocket image.[119]

[115] https://t.me/KharkivPolitics/7142
[116] https://twitter.com/RALee85/status/1501654989940342786/photo/2
[117] https://www.fpri.org/contributor/rob-lee/
[118] https://t.me/syriantube/12005
[119] https://twitter.com/RALee85/status/1501654989940342786/photo/2

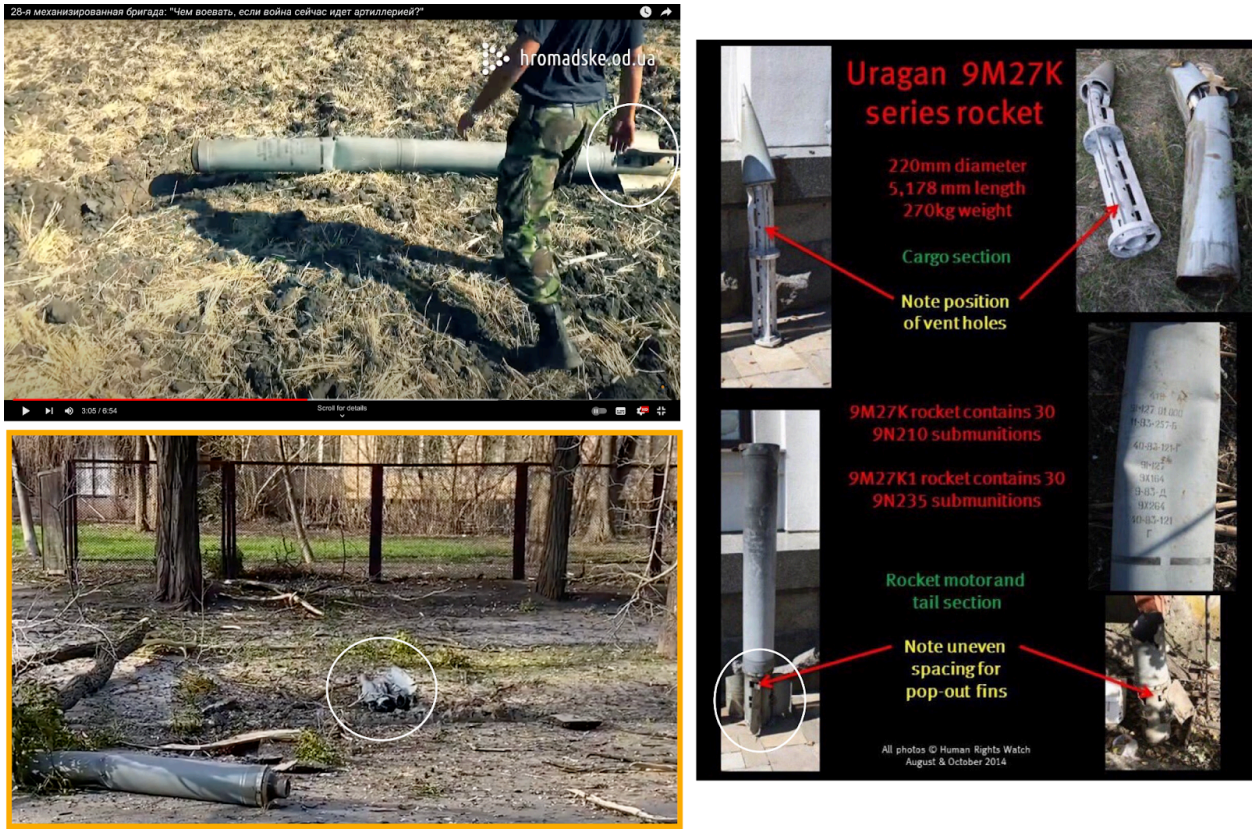
Matching reference markings on the 9M27 Uragan rocket motor section depicted in the Telegram photo[120] were also identified in a Youtube video[121] from 26/08/2014 at 00:34 EET.



Matching fragment shapes (Dashed White Rectangle) and reference markings (Yellow Ellipse) on the fragments depicted in the Telegram photo (Blue Frame) and a still frame from the Youtube video.

Finally, a tail section attached to the rocket motor depicted in the YouTube video appears to be visually similar to what appears to be the tail section at the scene of CIV0798C. The shape and uneven spacing for pop-out fins depicted in the YouTube video appear to be consistent with the reference imagery of tail sections of 9M27K rockets. This suggests that the tail section at the scene of CIV0798C possibly detached from the rocket motor section depicted nearby, which further indicates that it might be a part of a 9M27K rocket.

[120] https://t.me/syriantube/12005
[121] https://www.youtube.com/watch?v=Qa5RBmcpNB4

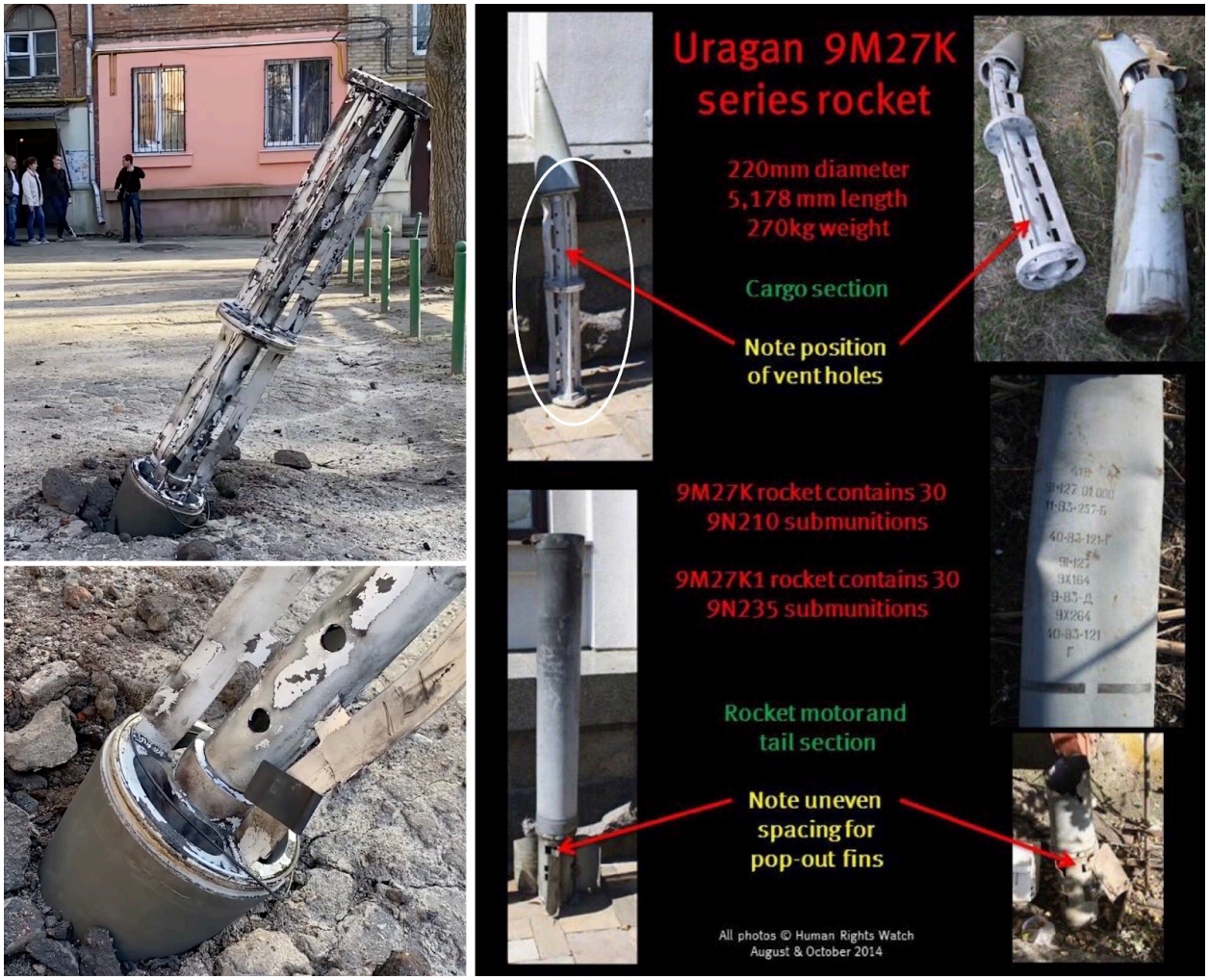


The tail sections (White Circle) depicted in the YouTube video and S6V1 (Orange Frame) appear consistent with the reference imagery depicting tail sections of 9M27K Uragan rockets (Credit: Mark Hiznay/HRW).

CIV0798D1

The object depicted at the scene of CIV0798D1 in S6V1[122] appears to be consistent with the reference imagery of cargo sections of a 9M27K Uragan rocket based on its distinctive shape and the position of vent holes, as demonstrated in the graphic below.

[122] Timecode: [02.12–02.22]

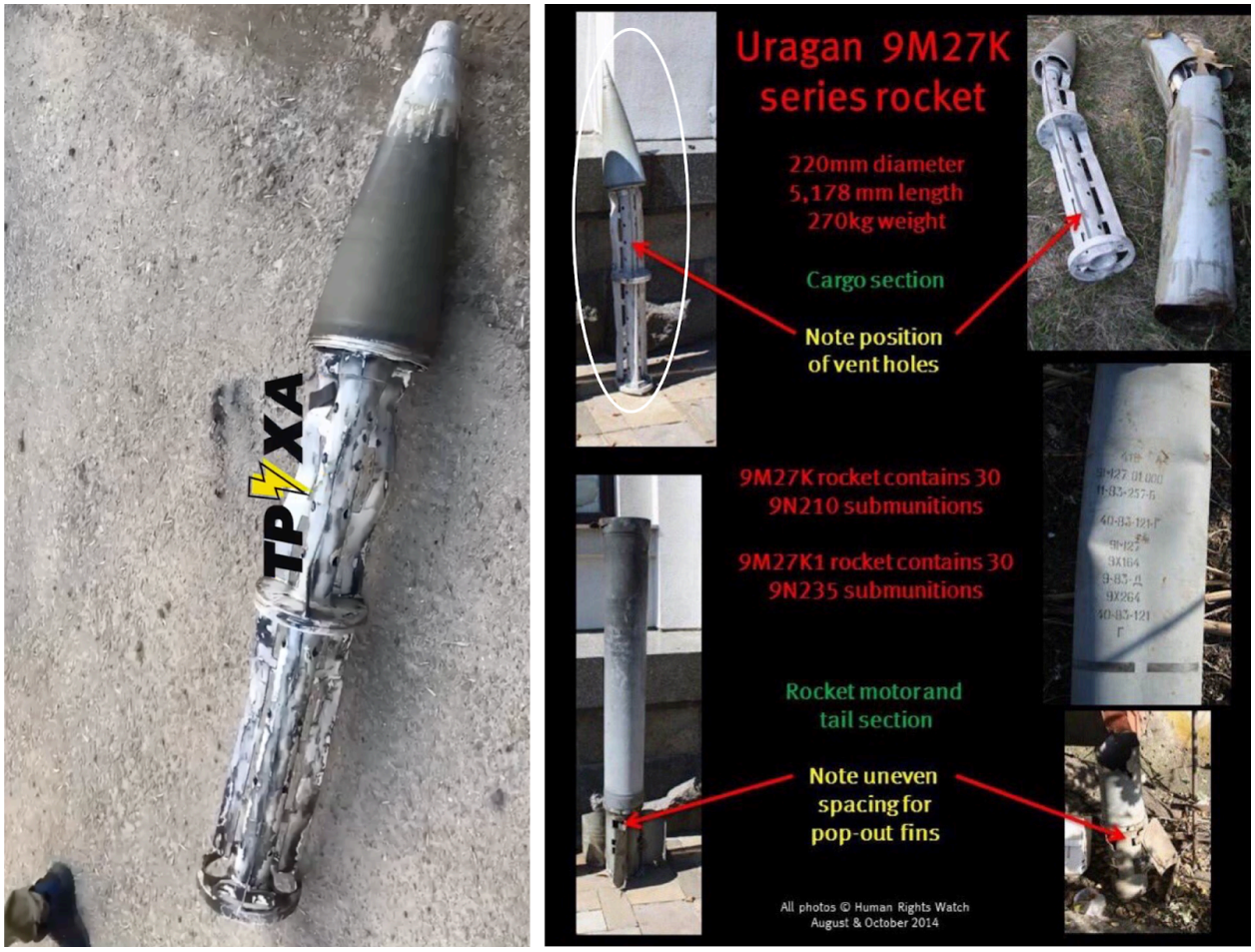


The shape and position of vent holes on the object depicted in S6V1[123] appear consistent with the reference imagery depicting cargo sections of 9M27K Uragan rockets (White Ellipse) (Credit: Mark Hiznay/HRW).

CIV0798I1

The object depicted at the scene of CIV0798I1 on S4V1 appears to be consistent with the reference images of cargo sections of the 9M27K Uragan rocket based on its distinctive shape and the position of vent holes, as demonstrated in the graphic below.

[123] Timecode: [00.59–01.11]



The shape and position of vent holes on the object depicted in S4V1 appear consistent with the reference imagery depicting cargo sections of 9M27K Uragan rockets (White Ellipse) (Credit: Mark Hiznay/HRW).

CIV0798J

S12V1 depicts a sequence of events that occurred at the scene of CIV0798J, namely, two explosions and the dispersion of what appears to be fragmentation over the scene of CIV0798J.



S12V1 depicts the scene of CIV0798J at the moment of the first explosion (Left) and second explosion (Right). Note the multiple small areas where dust has been thrown up in the right image, which is consistent with fragmentation.

Both of these explosions appear to be consistent with a small explosive weapon, such as a 9N210/9N235[124]. Other consistent munitions could include mortars or grenades such as the VOG-17[125].

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

Using the direction of origin methodology, it was estimated that the fragments of what appear to be 9M27K Uragan rockets identified at the scenes of CIV0798 belong to the rockets which were likely launched from 10-40 km to the east of Kharkiv.

CIV0798B2

The general direction of origin was established by assessing the further left and furthest right of the arc that the cargo section could have originated from, based on the observed angle of impact. This resulted in an arc of 267 degrees. While the exact direction of origin was not possible to ascertain, the centre of this arc provides a good indicator of the general direction of origin. A standardised arc was then overlaid on this direction of origin in order to identify an area of origin.

[124] https://cat-uxo.com/explosive-hazards/submunitions/9n210-submunition
[125] https://cat-uxo.com/explosive-hazards/grenades/30mm-vog-17-projected-grenade

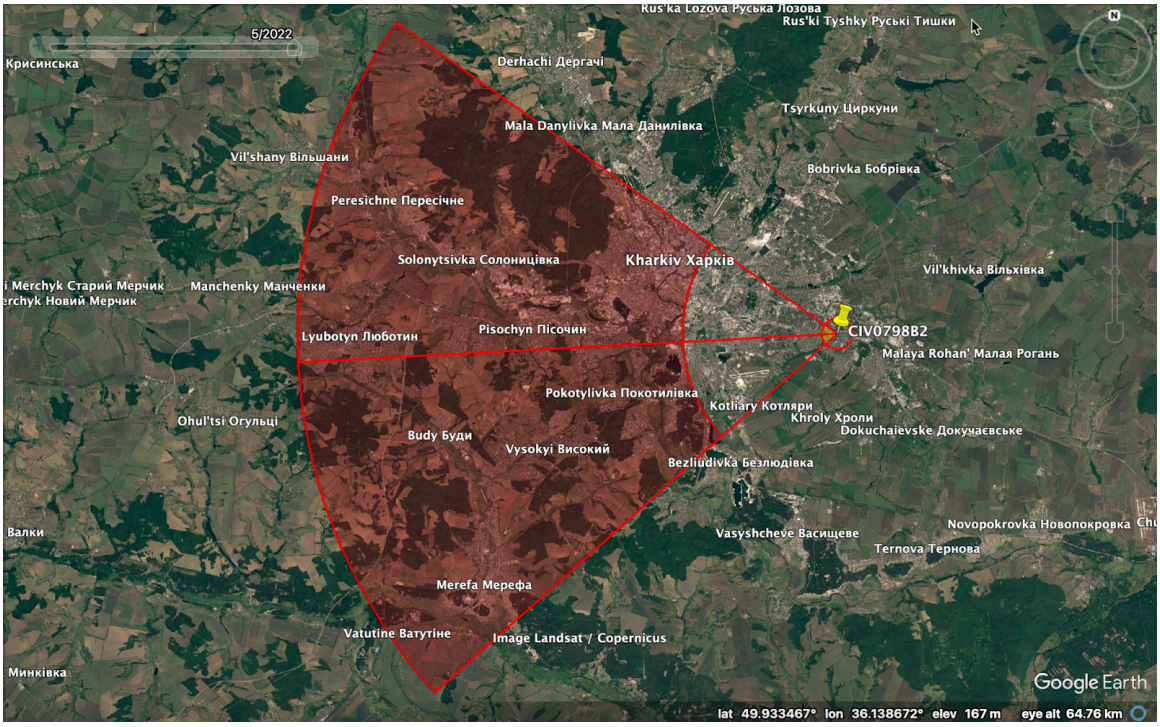


Left: Assessment of angle of origin using Source S4V2. Right: Representation of angle in satellite imagery from 20/05/2022 (Credit: Google Earth Pro/Maxar Technologies).

A 9M27k rocket is fired from a BM 27 system, which, according to the information indicated by Army Recognition,[126] has a range of 10 to 40 km. When combined with the arc of direction of origin, this gives us an area of origin within which this 9M27K was likely fired.

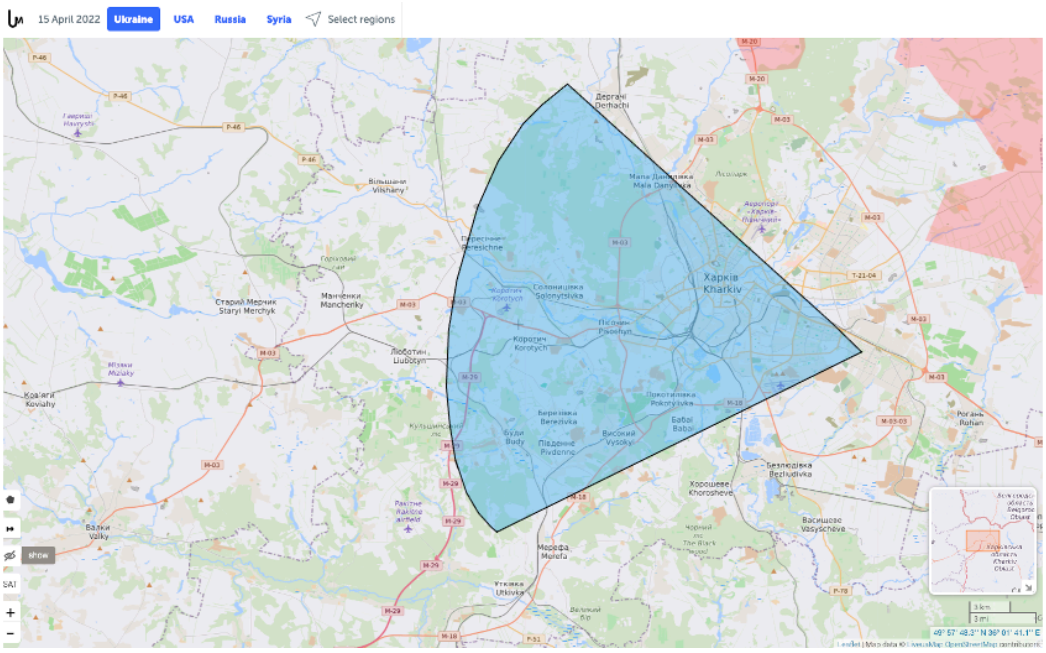
126

https://www.armyrecognition.com/russia_russian_army_vehicles_system_artillery_uk/bm-27_9p140_uragan_9k57_220mm_mlrs_multiple_launch_rocket_system_technical_data_sheet_specifications.html



Satellite image from Google Earth Pro, centre of arc in blue and 10 km to 40 km arcs plotted in red (Credit: Google/Landsat/Copernicus).

The 10 km - 40 km arcs can be compared to a map of areas which were reported to be under Russian control for the period starting on 15/04/2022, which is the earliest reported date of the incident. It should be noted that the areas of control within the graphic below should be regarded as rough estimates.



A 10-40 km wide arc was placed over a [Liveuamaps](https://liveuamap.com/en/time/14.04.2022)[127] with positions of belligerent armed forces reported on 15/04/2022.

According to an expert consulted by Bellingcat, the cargo section of 9M27K typically lands approximately 1 km further away from the area impacted by the submunitions, making it possible to estimate the area possibly affected by its submunitions.



Satellite imagery with a 1 km-wide arc indicating an area possibly impacted by the submunitions of a 9M27K rocket, which impacted the scene of CIV0798B2 (Credit: Google/Maxar Technologies).

[127] https://liveuamap.com/en/time/14.04.2022

CIV0798C

The direction of origin could not be conclusively established based on the materials depicting the incident at the scene of CIV0798C.

CIV0798D1

The general direction of origin was established by assessing the furthest left and furthest right of the arc that the cargo section could have originated from, based on the observed angle of impact. This resulted in an arc of 288 degrees. While the exact direction of origin was not possible to ascertain, the centre of the arc provides a good indicator of the general direction of origin. A standardised arc was then overlaid on this direction of origin in order to identify an area of origin.

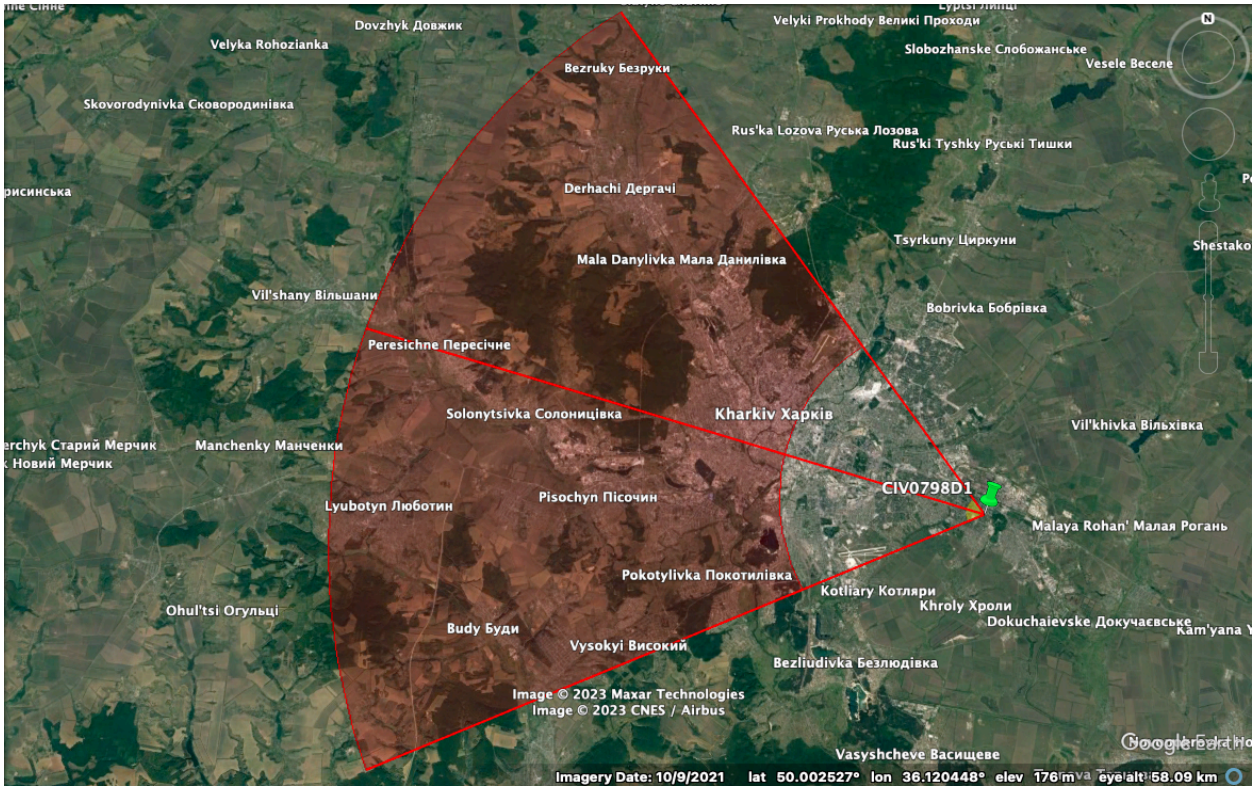


Left: Assessment of angle of origin using S10V1. Right: Representation of the angle in satellite imagery from 20/05/2022 (Credit: Google Earth Pro/Maxar Technologies).

According to Army Recognition,[128] the range of a 9M27K Uragan rocket launched from a BM-27 MLRS is reportedly between 10 and 40 km. Hence, a 10-40 km wide arc placed on the point of impact along the assessed direction of origin indicates an area from which the rocket that impacted the scene of CIV0798D1 could have been launched.

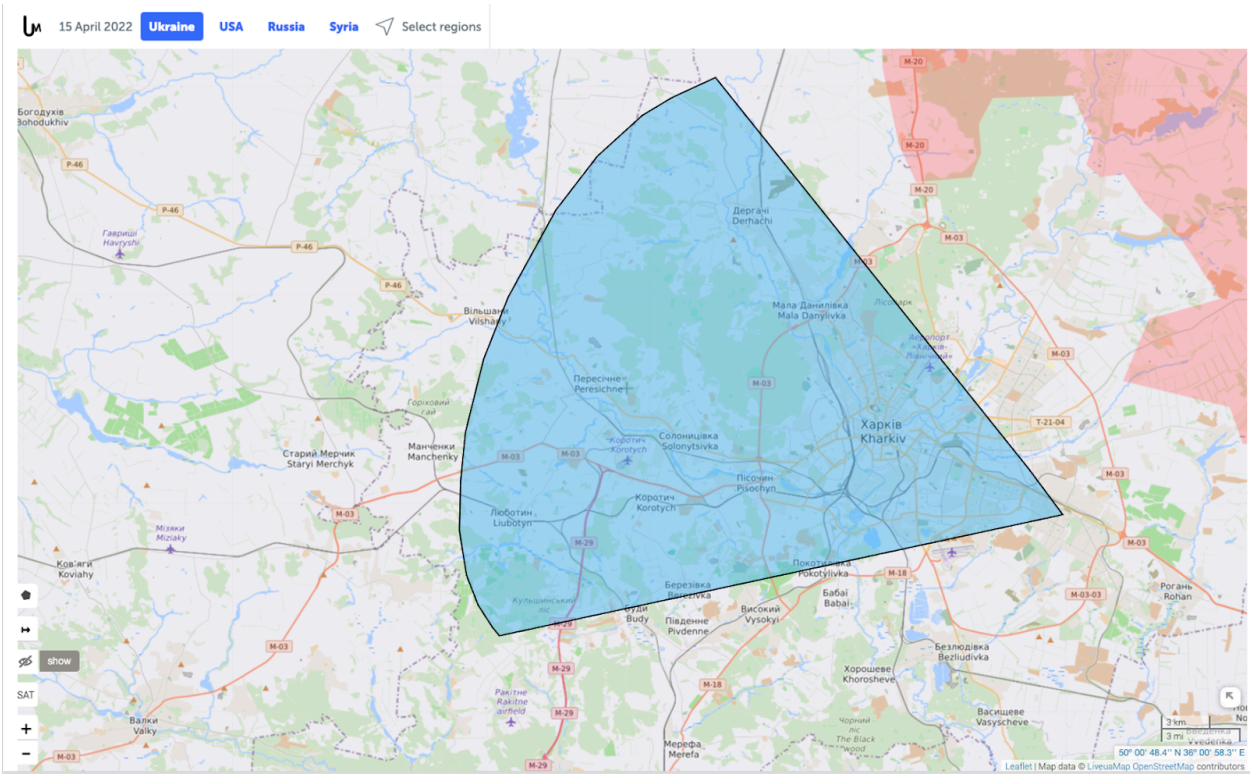
128

https://www.armyrecognition.com/russia_russian_army_vehicles_system_artillery_uk/bm-27_9p140_uragan_9k57_220mm_mlrs_multiple_launch_rocket_system_technical_data_sheet_specifications.html



Satellite image from Google Earth Pro, centre of the arc in blue, and 10 km to 40 km arcs plotted in red (Credit: (c) 2023 Maxar Technologies/CNES/Airbus).

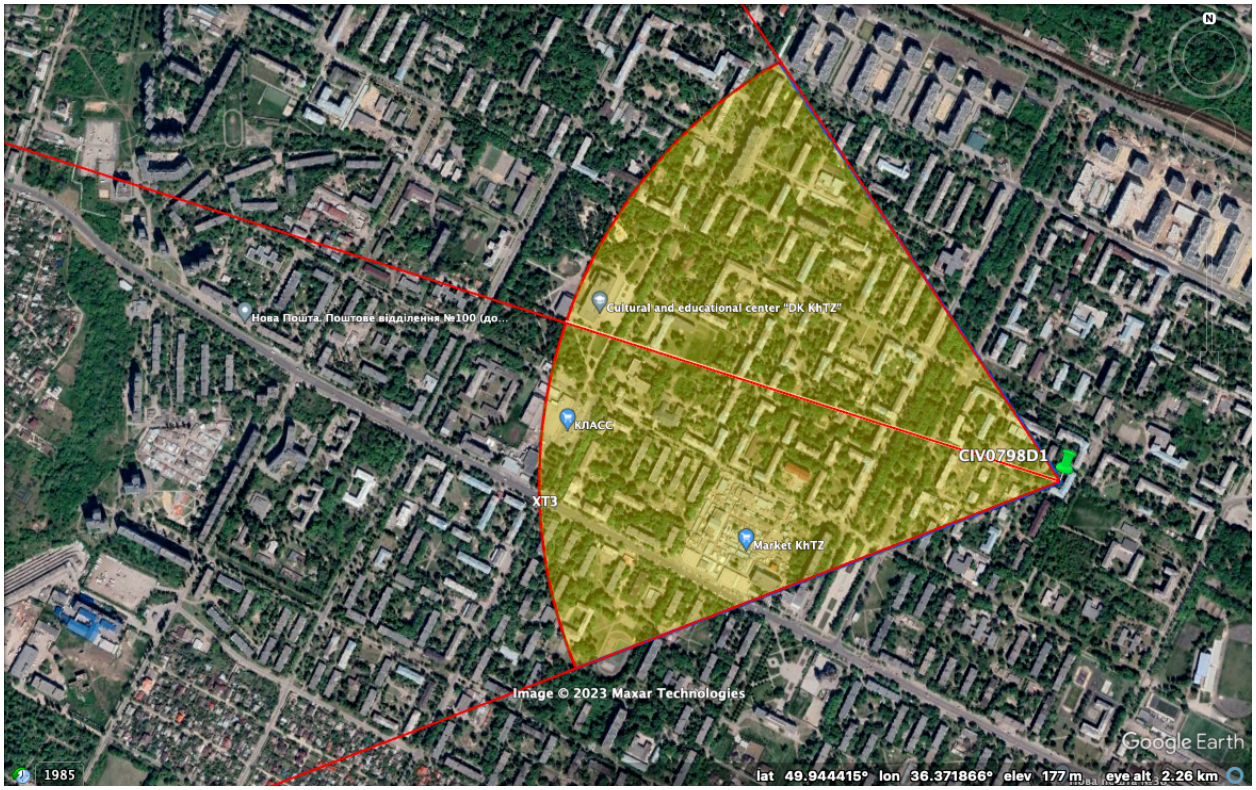
The 10 km - 40 km arcs can be compared to a map of areas which were reported to be under Russian control for the period starting on 15/04/2022, which is the earliest reported date of the incident. It should be noted that the areas of control within the graphic below should be regarded as rough estimates.



A 10-40 km wide arc was placed over [Liveuamaps](https://liveuamap.com/en/time/14.04.2022)[129] with positions of belligerent armed forces reported on 15/04/2022.

According to an expert consulted by Bellingcat, the cargo section of 9M27K typically lands approximately 1 km further away from the area impacted by the submunitions, making it possible to estimate the area possibly affected by its submunitions.

[129] https://liveuamap.com/en/time/14.04.2022



Satellite imagery with a 1 km-wide arc indicating an area possibly impacted by submunitions of the 9M27K rocket that impacted the scene of CIV0798D1 (Credit: Google/Maxar Technologies).

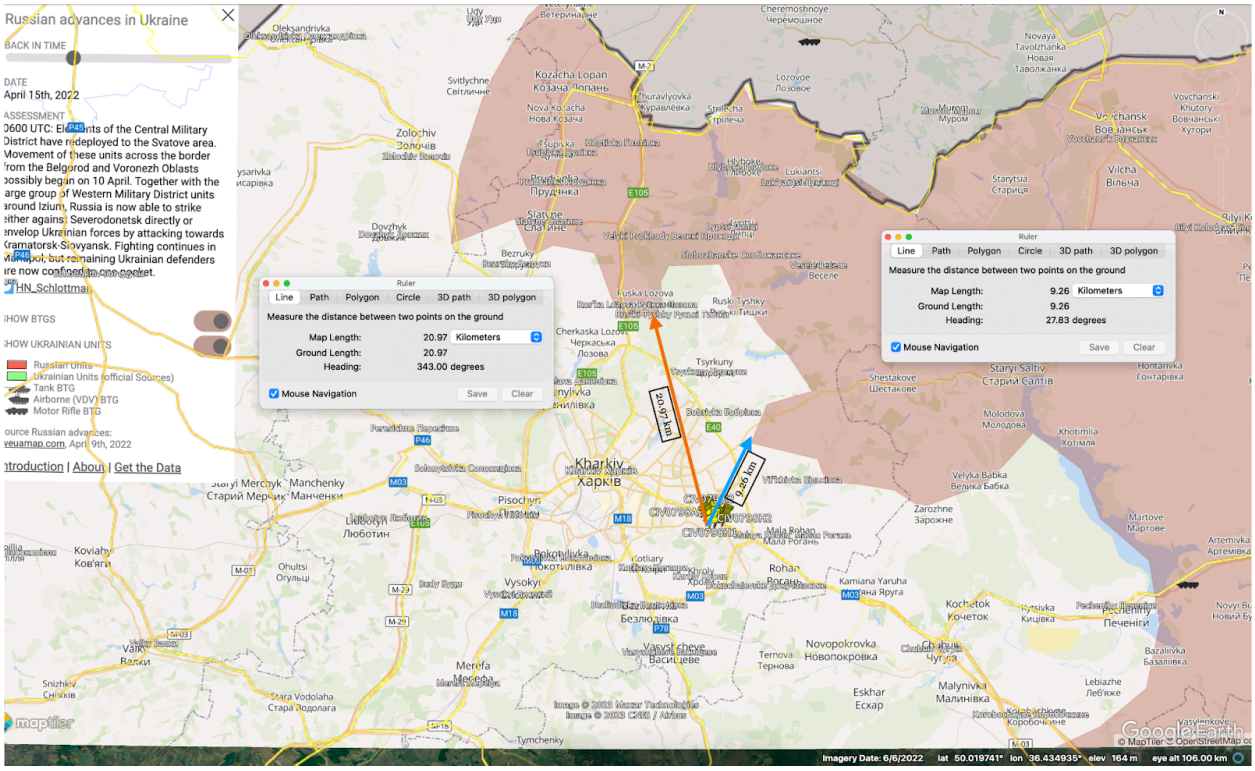
CIV0798I1

The direction of origin could not be conclusively established based on the identified materials depicting the incident at the scene of CIV0798I1.

Reported Location of Armed Forces of Belligerent Parties on 15/04/2022

According to DeepState[130] and UAWarData[131] websites which monitor, collect, and visualise open source information with regards to the movement and location of Russian and Ukrainian armed forces, including troops and vehicles, on 15/04/2022 the Russian armed forces were reportedly present approx. 20 km to the North/North-West and approx. 9.26 km to the East of the scenes of CIV0798. No information concerning the location of Ukrainian troops on 15/04/2022 was identified in open sources at the time of the present assessment.

[130] https://deepstatemap.live/en#6/49.438/32.053
[131] https://uawardata.com/



The distance from the scenes of CIV0798 to the closest locations with reported (UAWarData) presence of the Russian armed forces on 15/04/2022 (Credit: Google Earth Pro).

When Was the Incident?

General Information

General criteria for selecting materials suitable for chronolocation

In the present assessment, the process of identification of the time when an incident has occurred (chronolocation) is performed only where an identified material clearly depicts the actual moment of the incident, such as the impact of fragmentation, or where there are reasonable grounds to believe that the materials depict the scene shortly afterwards, which can be indicated by the presence of actively burning objects, such as cars or buildings, and/or wounded individuals.

Limitations of the SunCalc tool

To visually replicate the movement of the sun through the day, SunCalc[132] uses satellite imagery. As a general rule, satellite imagery is susceptible to a certain level of geometric distortion[133] (i.e., a discrepancy between the actual and depicted sizes and shapes of objects, as well as their spatial

[132] https://www.suncalc.org/
[133] https://www.sciencedirect.com/topics/engineering/geometric-distortion

relationships) arising[134] due to various factors such as altitude, lens distortion, camera tilt, and environmental conditions at the time the satellite imagery was taken, or their combination. All these factors have the potential to affect the accuracy of chronolocation performed using satellite imagery; hence, a degree of approximation inherent to shadow analysis performed using SunCalc must be acknowledged. Therefore, the temporal estimates should be considered as indicating approximate temporal periods when the analysed incidents have occurred rather than their precise times.

Chronolocation of CIV0798 Sub-incidents:

Based on the estimations made using the SunCalc tool, the approximate temporal periods for the incidents that occurred at the scenes of CIV0798A1, CIV0798E, CIV0798I2, and CIV0798J on 15/04/2022 were identified as follows:

- **S1V1 (CIV0798A1):** between 16:42 and 16:52 EET, with the actual incident occurring earlier;
- **S6V1 (CIV0798D):** between 14:50 and 15:25 EET;
- **S3V1 (CIV0798E):** between 14:50 and 15:25 EET;
- **S9V1 (CIV0798F):** between 16:26 and 16:59 EET, with the actual incident occurring earlier;
- **S2V1 (CIV0798I2):** between 15:00 and 15:30 EET, possibly at 15:14 EET as indicated by the timestamp of S2V1;
- **S12V1 (CIV0798J):** between 16:10 and 16:40 EET, possibly at 16:18 EET as indicated by the timestamp of S12V1.

S1V1 (CIV0798A1)

The direction of shadows depicted at the scene of CIV0798A1 indicates that S1V1 was likely filmed on 15/04/2022 between 16:42 and 16:52 EET, shortly after the area was impacted by the 9M27K rockets.

S1V1, the earliest identified post containing the video depicting the scene of CIV0798A1, was posted on 15/04/2022 at 20:48 EET. Although not explicitly stated, the accompanying caption to S1V1 states that the incident at the depicted scene of CIV0798A1 is linked to a strike by Russian armed forces using the MLRS Uragan, which occurred "*today* [i.e., 15/04/2022] *around 16:30* [EET]". While S1V1 does not depict the actual moment of the scene being impacted, the presence of actively burning cars emitting thick black smoke indicates that the impact likely took place shortly before the footage was filmed.

The position of the sun at the scene appears to be in the southwest based on the direction of shadows cast by the trees and streetlight poles spaced alongside the street. These shadows fall

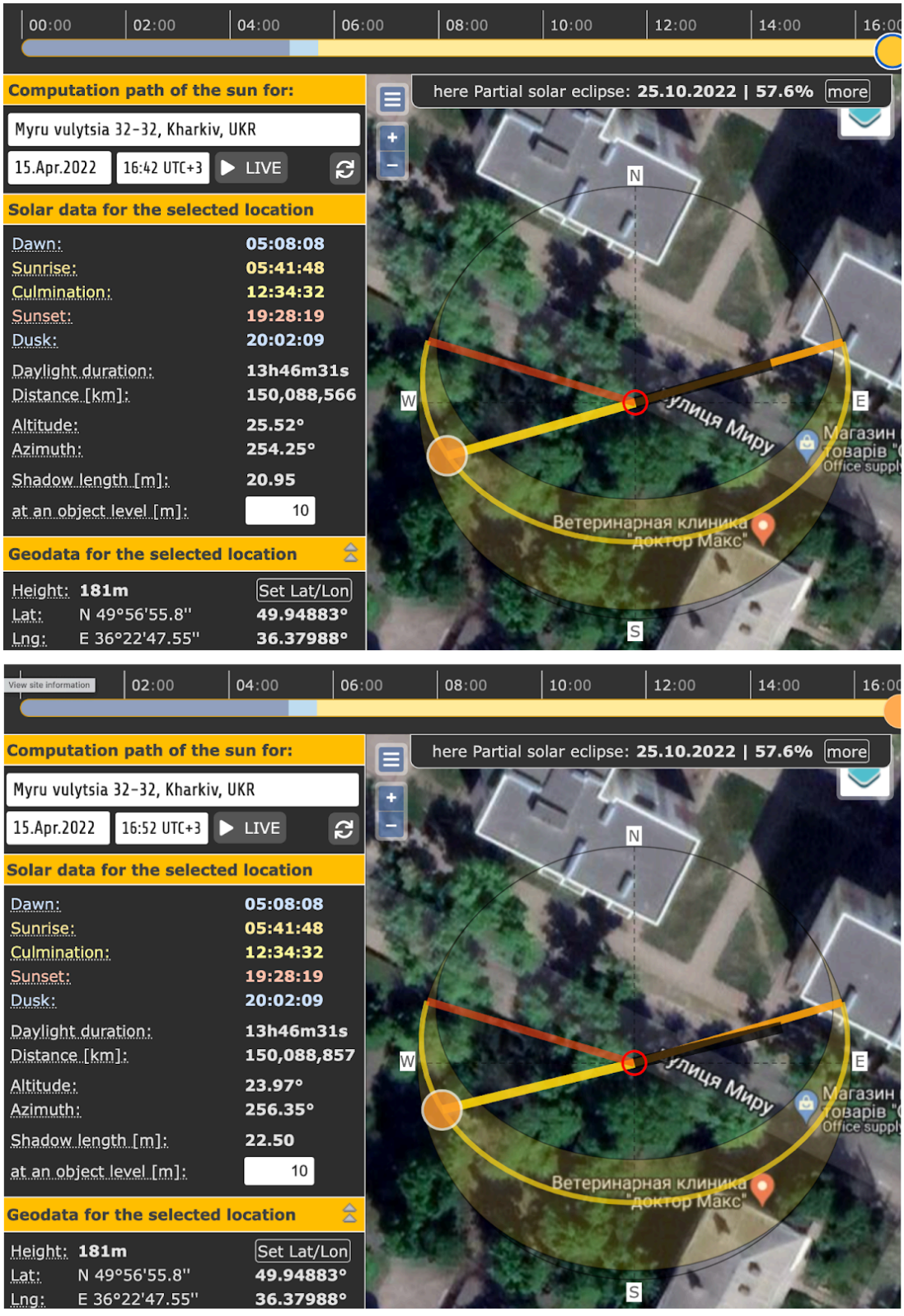
[134] https://mapware.com/blog/understanding-errors-and-distortion-in-remote-sensing/

over the road towards the corner of a multicoloured residential building located in the northeastern direction.



The shadow cast by concrete pole (White Arrow) depicted in S1V1 used for chronolocation.

According to SunCalc, in order for the concrete pole to cast the shadow towards the northeastern direction on 15/04/2022, the sun would have to be in a position which indicates a time period of between 16:42 and 16:52 EET. Despite the fact that S1V1 does not depict the actual moment of the impact, it appears likely that the incident occurred recently based on the presence of actively burning cars emitting thick black smoke and a large group of bystanders and people wearing uniforms, possibly police officers.



The direction of the shadow indicates that the incident occurred between 16:42 and 16:52 EET (Credit: SunCalc).

S6V1 (CIV0798D)

S6V1 appears to depict the incident that occurred at the scene of CIV0798D on 15/04/2022 between 14:50 and 15:25 EET.

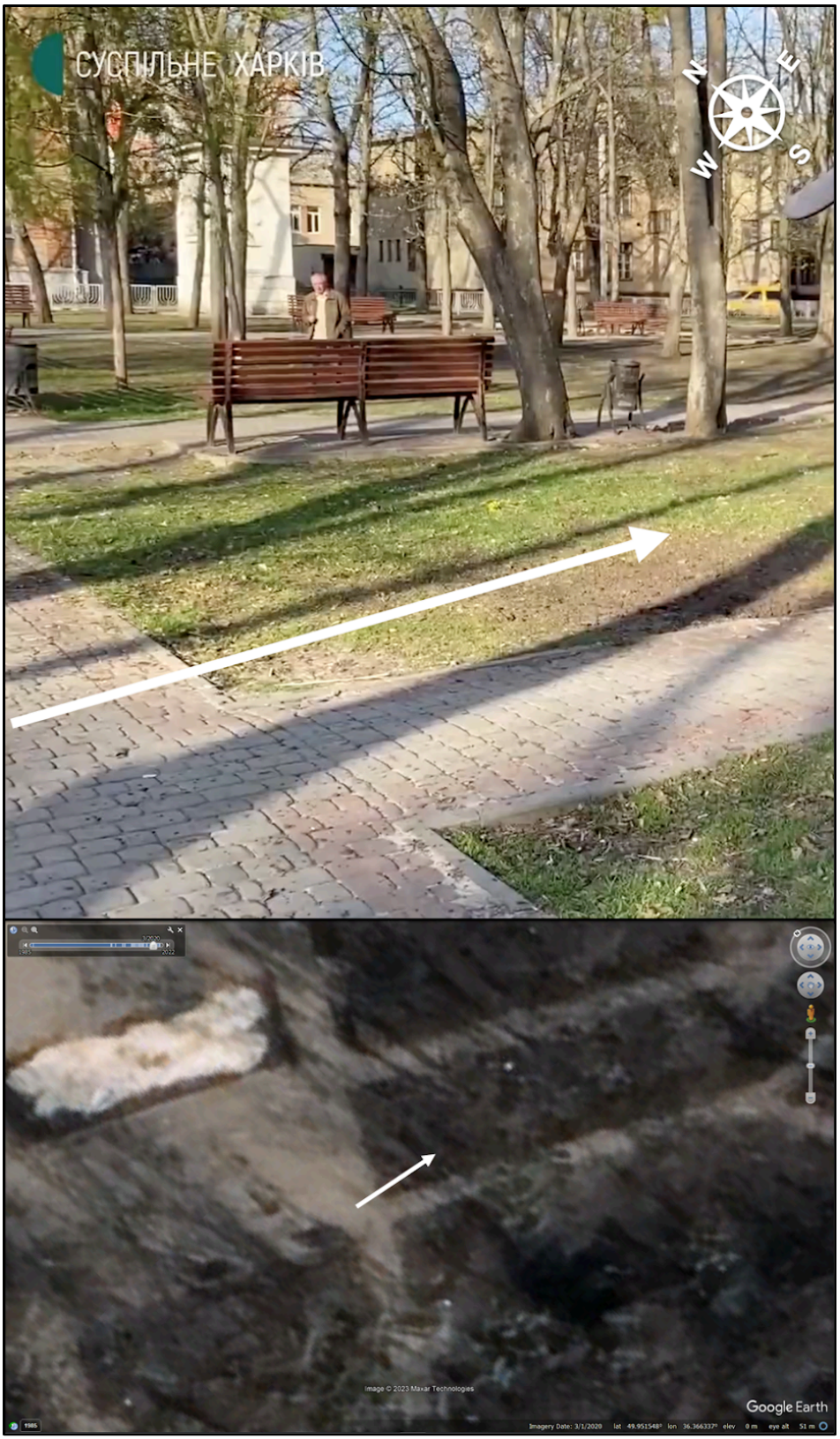
S6V1, the earliest identified post containing the video depicting the incident at the scene of CIV0798E, was posted on 15/04/2022 at 19:10 EET. It depicts[135] a man showing the spot at the scene of CIV0798E covered with what appears to be a pool of blood. The man states that this is the place where he administered first aid to an injured woman who was lying on the ground using his shirt and belt. At the time when the footage was filmed, no injured people were visible at the scene. The man then demonstrates his palms being covered with what appears to be dried-out blood, indicating that the footage was filmed shortly after the reported incident took place.



S6V1 depicts what appears to be blood on the ground (Yellow Arrow) and palms of a man.

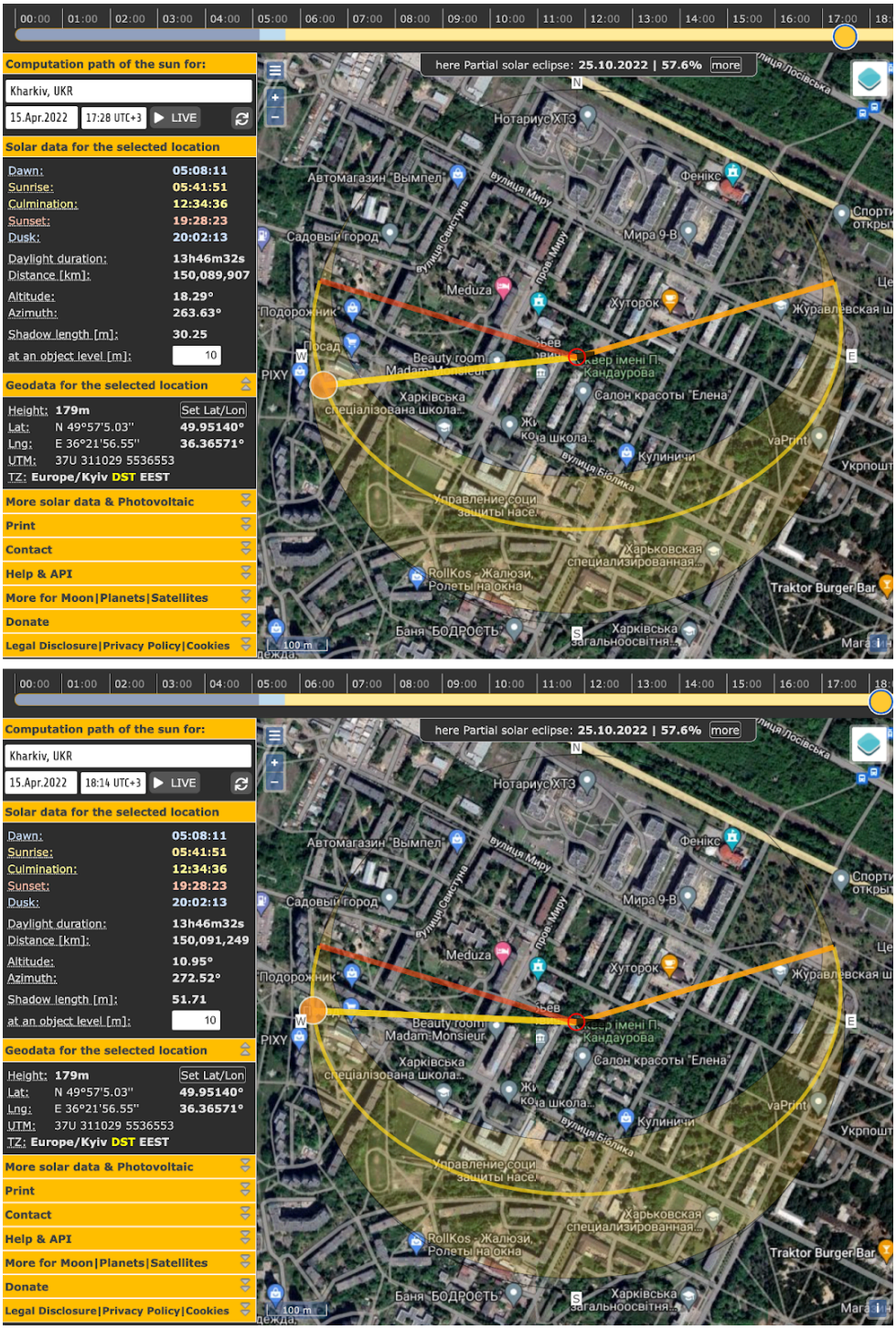
The position of the sun appears to be in the southwest based on the direction of shadows cast by trees, which fall over the park alley towards the northeastern direction.

[135] Timecode: [00.02 - 00.24]



Top: The shadow used for chronolocation (White Arrow) depicted in S6V1. Bottom: The direction of the shadow as seen above depicted in satellite imagery (Credit: Google/Maxar Technologies).

According to SunCalc, in order for the tree to cast the shadow towards the northeastern direction on 15/04/2022 in the manner seen in S6V1, the sun must have been in a southwestern position that corresponds to a time period between 17:28 and 18:14 EET, with the incident likely taking place earlier the same day.



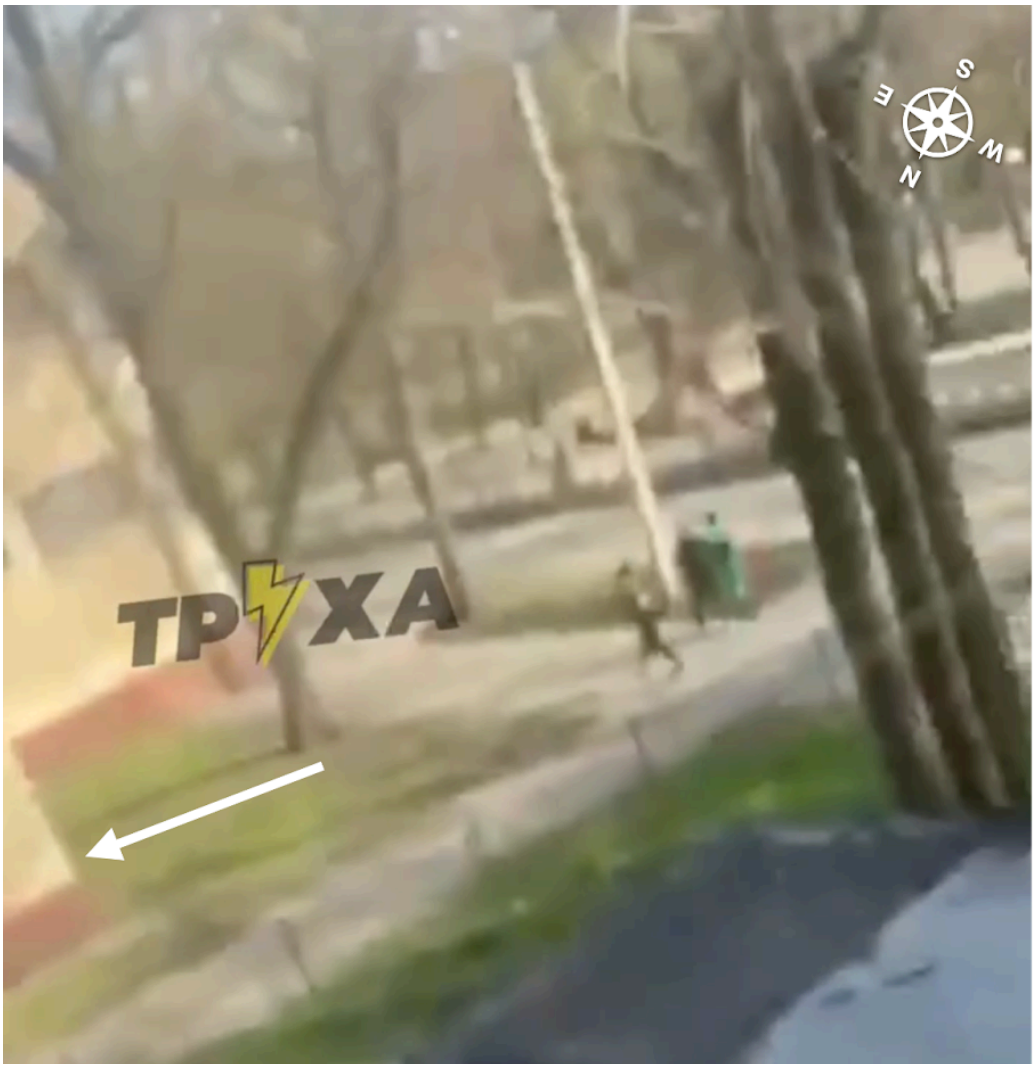
The direction of the shadow indicates that the incident occurred between 17:28 and 18:14 EET (Credit: SunCalc).

S3V1 (CIV0798E)

S3V1 appears to depict the incident that occurred at the scene of CIV0798E on 15/04/2022 between 14:50 and 15:25 EET.

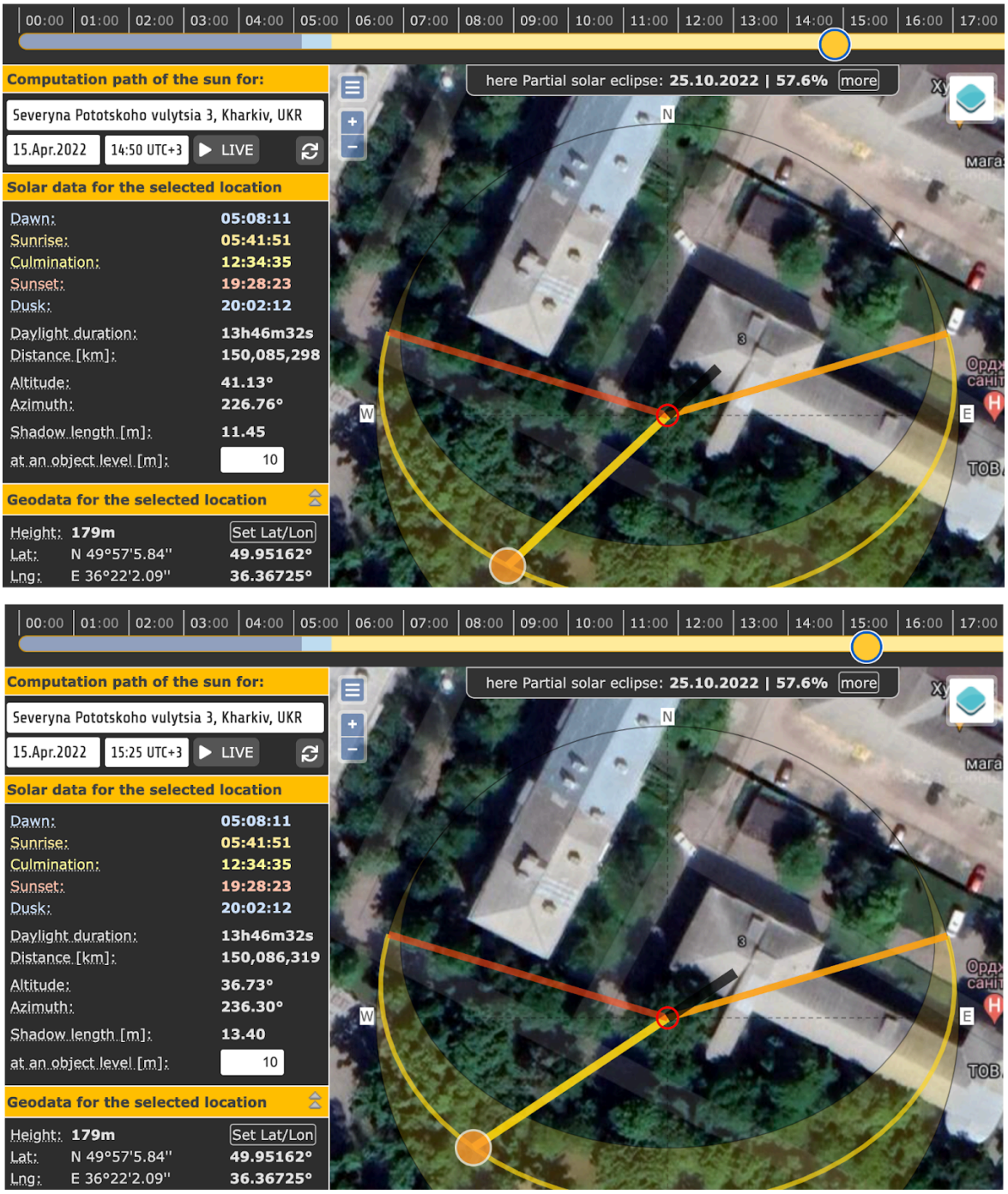
S3V1, the earliest identified post containing the video depicting the incident at the scene of CIV0798E, was posted on 15/04/2022 at 19:10 EET. The accompanying caption states that S3V1 depicts "*another video of today's* [15/04/2022] *strike in the HTZ district*".

The position of the sun appears to be in the southwest based on the direction of shadows cast by trees, which fall towards the building located in the northeastern direction.



The shadow used for chronolocation (White Arrow) depicted in S3V1.

According to SunCalc, in order for the tree to cast the shadow towards a northeastern direction as seen in S3V1 on 15/04/2022, the sun must have been at the southwestern position that corresponds to a time period between 14:50 and 15:25 EET, which is further indicated by the accompanying caption of S3V1.



The direction of shadow depicted in S3V1 indicates that it was filmed between 14:50 and 15:25 EET (Credit: SunCalc).

S9V1 (CIV0798F)

S9V1 depicts the scene of CIV0798F on 15/04/2022 between 16:26 and 15:59 EET, shortly after the actual incident took place.

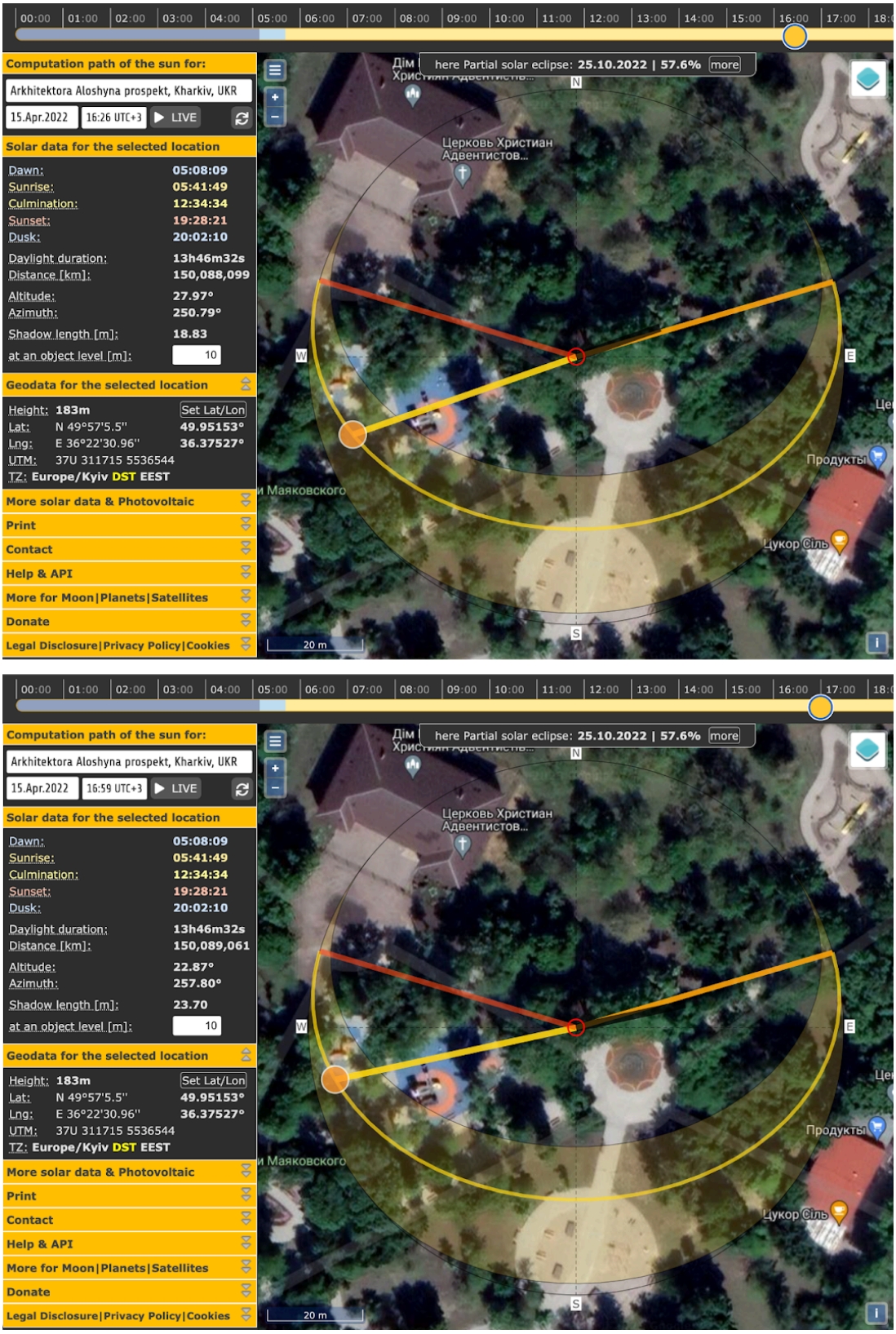
S9V1, the earliest identified post containing the video depicting the scene of CIV0798F, was posted on 17/04/2022 at 17:22 EET. The accompanying caption of S9V1 states that "on Friday, 15 April, Russian armed forces shelled one of the residential districts of Kharkiv"[136], suggesting that the footage depicts an incident which occurred on 15/04/2022. While S9V1 does not depict the actual moment of impact, the presence of wounded individuals and emergency services at the scene indicates that the incident must have occurred shortly before this footage was filmed.

The position of the sun at the scene appears to be in the southwest based on the direction of shadows cast by the trees spaced alongside the park alley, which fall over the path towards a northeastern direction. According to SunCalc, in order for the shadows to fall towards the north-eastern direction on 15/04/2022 as seen in S9V1, the sun must have been at the south-western position that corresponds to a time period between 16:26 and 16:59 EET.

[136] *In Ukrainian*: "У п'ятницю, 15 квітня, російські війська обстріляли один із житлових районів Харкова."



Top: The shadow used for chronolocation (White Arrow) of the CIV0798F scene depicted in S9V1. Bottom: The shadow as seen on Google Earth Pro satellite imagery (Credit: Google/Maxar Technologies).



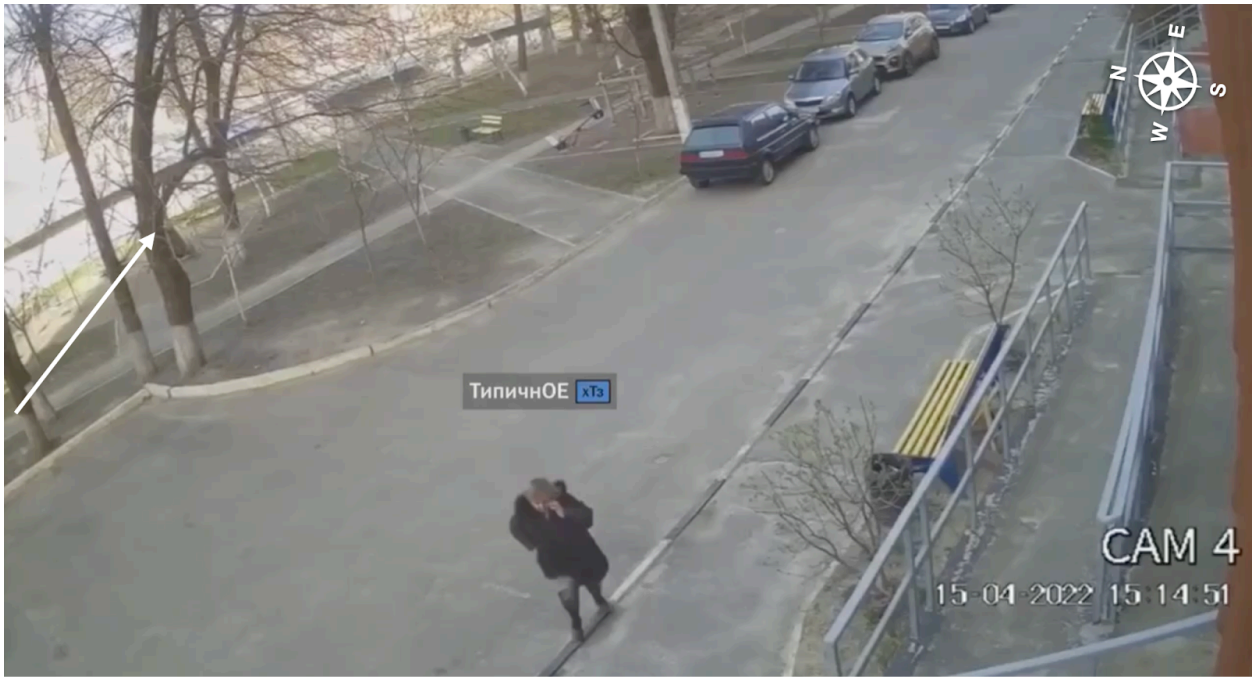
The direction of shadow depicted in S9V1 indicates that it was filmed between 16:26 and 16:59 EET (Credit: SunCalc).

S2V1 (CIV0798I2)

S2V1 depicts the incident at the scene of CIV0798I2 that was estimated to likely occur on 15/04/2022 between 15:00 and 15:30 EET, probably at 15:14 EET as indicated by the timestamp of S2V1.

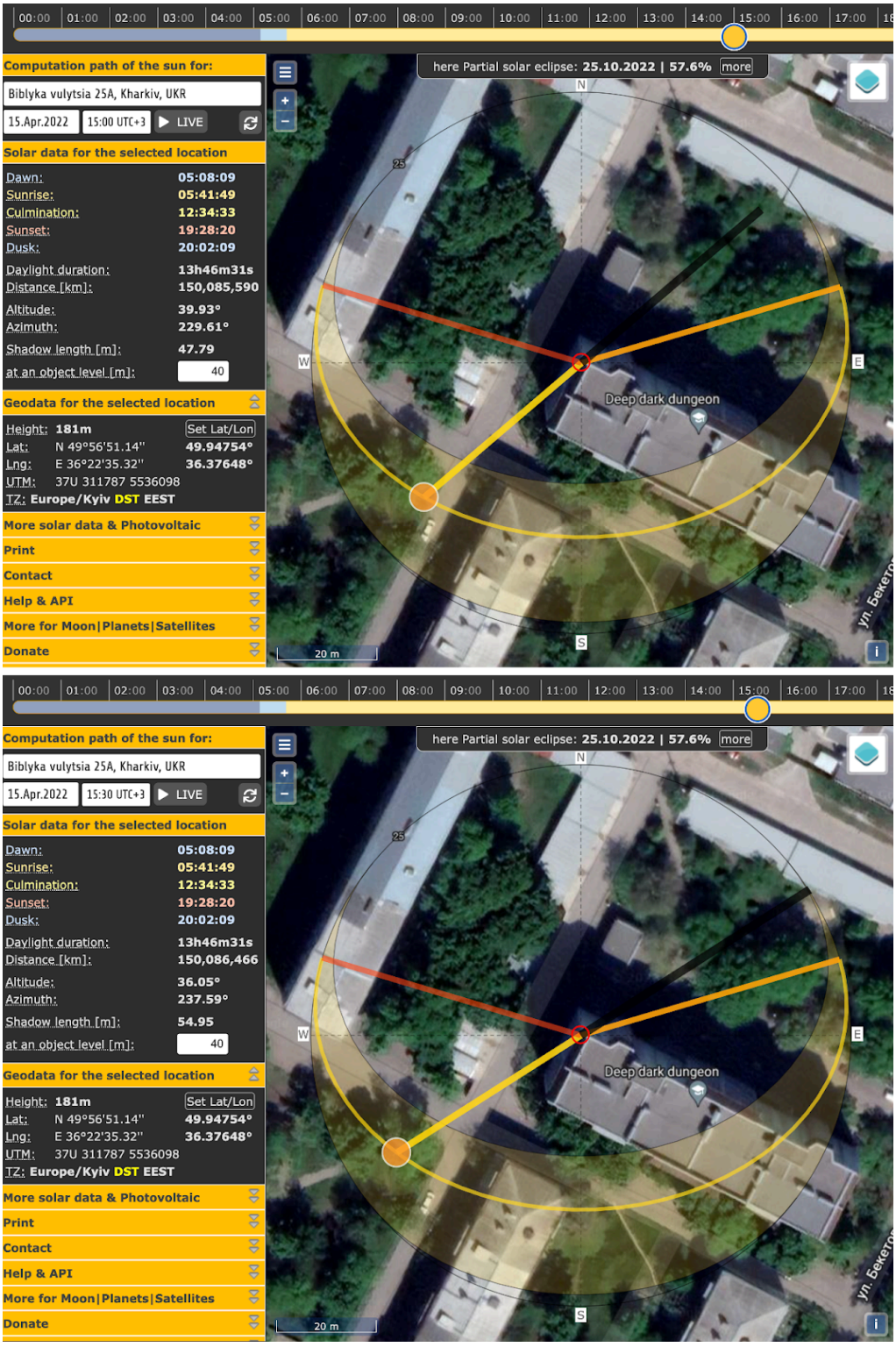
S2V1, the earliest identified post containing the video depicting the incident at the scene of CIV0798I2, was posted on 16/04/2022 at 08:06 EET. The accompanying caption of S2V1 states that S2V1 depicts "*Kharkov at the moment of yesterday's* [i.e., 15/04/2022] *strike*". The time and date of S2V1 is indicated by the timestamp visible in the lower right corner, which reads "15-04-2022 15:14:51".

The position of the sun at the scene appears to be in the southwest based on the direction of the shadow cast by the residential building, which falls towards the garages in the northeastern direction.



The shadow cast by the residential building used for chronolocation (White Arrow) depicted in S2V1.

According to SunCalc, in order for the building to cast a shadow towards the northeast on 15/04/2022 in this way, the sun must have been in a position that corresponds to a time period of between 15:00 and 15:30 EET. This is further indicated by the timestamp visible in the lower right corner of S2V1 and its accompanying caption. No other incidents of shelling of the HTZ microdistrict in the vicinity of CIV0798I2 that reportedly occurred before the date when S2V1 was posted were identified in open sources.



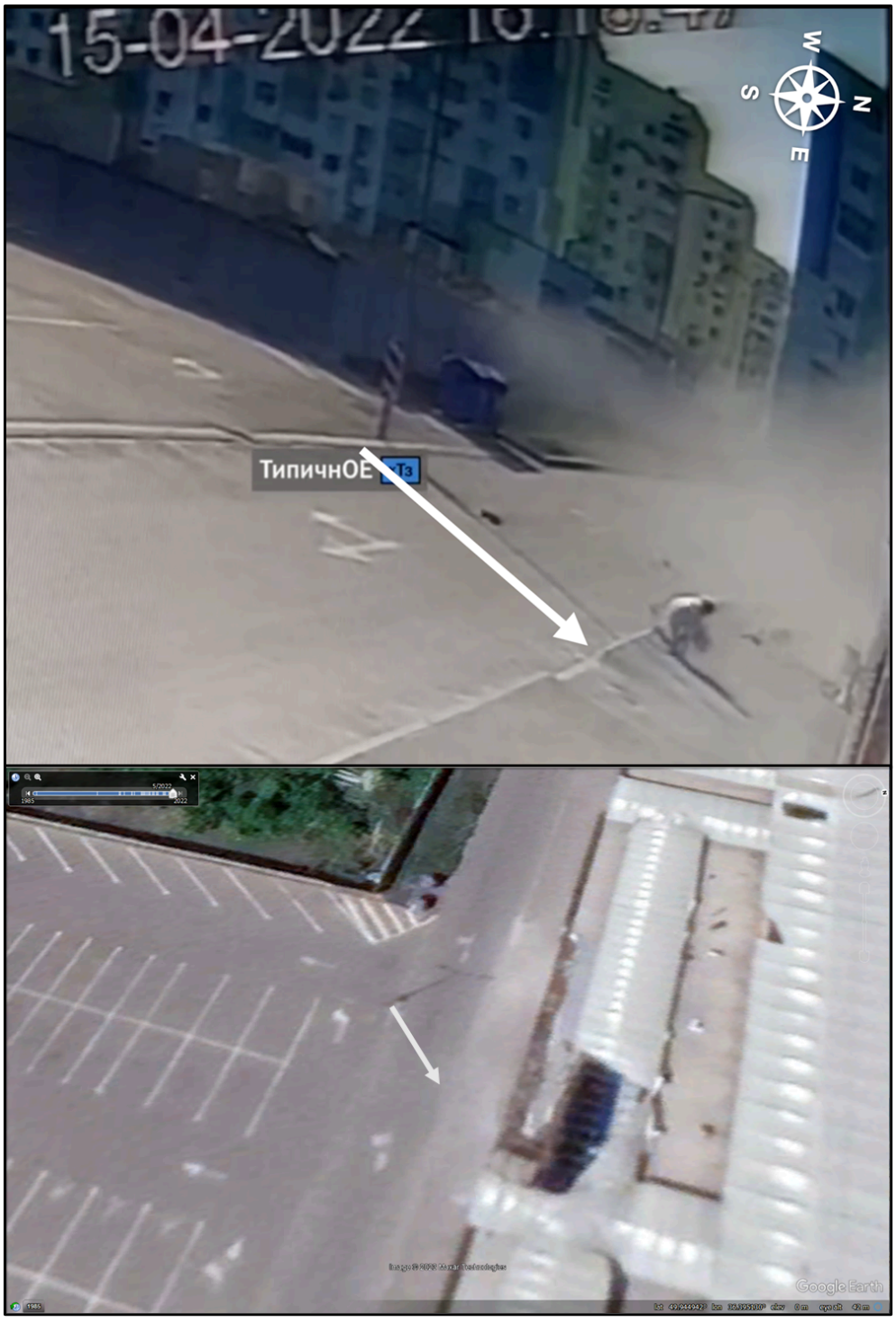
The direction of shadow depicted in S2V1 indicates that S2V1 was filmed between 15:00 and 15:30 EET (Credit: Suncalc).

S12V1 (CIV0798J)

S12V1 depicts the incident at the scene of CIV0798J that was estimated to likely occur on 15/04/2022 between 16:10 and 16:40 EET, possibly at 16:18 EET as indicated by the timestamp of S12V1.

S12V1, the earliest identified post containing a video which depicts the incident at the scene of CIV0798J, was posted on 17/04/2022 at 07:43 EET. The time of the day and the length of shadows depicted in S12V1 indicate that the incident must have occurred earlier than 17/04/2022, which is further indicated by the timestamp "15-04-2022" and partly visible time "16.18.47" timecode visible in the upper right corner of the video.

The position of the sun at the scene appears to be in the southwest based on the direction of the shadow cast by the streetlight pole, which falls over the road towards the sidewalk in the north-easterly direction.



Top: The shadow of the street pole used for chronolocation (White Arrow) depicted in S12V1. Bottom: The shadow as seen on Google Earth Pro (Credit: Google/Maxar Technologies).

According to SunCalc, in order for the streetlight to cast a shadow towards a north-easterly direction on 15/04/2022 in this way, the sun must have been in a south-western position that corresponds to a time period between 16:10 and 16:40 EET, which is also consistent with the

timecode and date visible in S12V1. No other incidents of shelling of the HTZ microdistrict in the vicinity of CIV0798J were reported in open sources before S12V1 was posted.



The direction of shadow depicted in S12V1 indicates that S12V1 was filmed between 16:10 and 16:40 EET (Credit: Suncalc).

Who and What Was Present?

People Depicted at the Scenes of CIV0798

S2V1, S3V1, and S12V1 depict at least seven people in what appears to be civilian clothes at the scenes of CIV0798I2, CIV0798E, and CIV0798J, respectively, at the time when these locations were impacted by the strike.



People wearing civilian clothing (Yellow Arrows) depicted at the scenes of CIV0798I2 on S3V1 (Orange Frame), CIV0798E on S2V1 (Green Frame), and CIV0798J S12V1 (Blue Frame) shortly before the shelling.

Casualties among Civilian Population

According to information reported[137] by Oleh Synyehubov, head of the Kharkiv Regional Civil-Military Administration (HOVA), in his official Telegram channel, as a result of the strike on the HTZ microdistrict of Kharkiv, seven people were killed, including a seven-months-old child, and 34 people were injured, including three children.

Visual materials taken at various CIV0798 scenes depict nine people who sustained injuries from the impact and explosion of 9M27K Uragan rockets. A woman who was identified as being injured at the scene of CIV0798F reportedly died in the hospital on 11/06/2022.

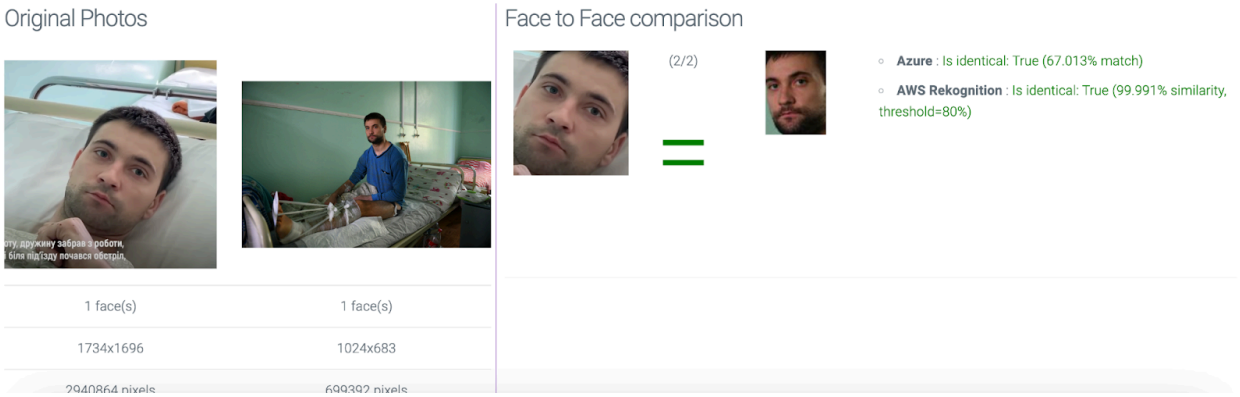
CIV0798A1

According to information in open sources, at least two people were injured and one person was killed as a result of the explosion of submunitions from 9M27K Uragan rockets.

A Youtube video[138] identified in the course of research depicts[139] a man in a hospital bed who stated that his leg was broken by the explosion that occurred near his home. Although the man does not indicate either location or the date of the incident, the accompanying caption to the video indicates that the footage depicts individuals injured as a result of a Russian strike on the public garden and the residential building located in the HTZ microdistrict on 15/04/2022.[140] The man was subsequently identified in the Amnesty International report as Bohdan Burlutsky, who, according to the caption, "*was injured when cluster munitions exploded all over the courtyard in front of his building in Myru Street on 15 April*".[141]

The possibility that the man depicted in the video and in the Amnesty report are the same person is further supported by the results of the face-to-face comparison performed using AZURE and AWS Rekognition services.

[137] https://t.me/synegubov/2883
[138] https://www.youtube.com/watch?v=PffBosGiYPM
[139] Timecode: [01.41 - 02.03]
[140] *In Ukrainian*: "29 з 35 людей, які постраждали внаслідок обстрілу ракетами РФ скверу та житлового кварталу ХТЗ 15 квітня, отримують допомогу в одній з міських лікарень. Суспільне поспілкувалося із жертвами обстрілу."
[141] https://www.amnesty.org/en/documents/eur50/5682/2022/en/, p.7



The results of the face-to-face comparison of the man depicted in the Youtube video from hospital and the Amnesty International report (Credit: Azure/AWS Rekognition).

The Amnesty report also indicates that Ilkham Aliyev was another person who "*sustained deep abdominal injuries when cluster munitions exploded all over the courtyard in front of his building in Myru Street on 15 April*"[142] *and* states that the doctors had removed pellets from Ilham's abdomen which match the longer 4.5 g pellets found in 9N235 cluster munitions.



Ilkham Aliyev was reportedly injured on Myru Street on 15/04/2022.

As such, the reported location and date of the incident, the type of fragmentation extracted from the body of Ilkham Aliyev, and the fact that damaged cars in this section of the report were

[142] https://www.amnesty.org/en/documents/eur50/5682/2022/en/, p.7

previously geolocated to the scene of CIV0798A1 suggest that Ilkham Aliyev appears to have been wounded in the same incident.

It should be noted that this section of the report is focused on the incident that occurred on Myru Street on 15/04/2022, including the photo of damaged cars with submunition marks, which were geolocated at the scene of CIV0798A1. According to the Amnesty International report, the pellets that were removed from one individual also injured at Myru Street on 15/04/2022 are consistent with the metal fragments used in 9N235 cluster submunitions. Moreover, according to the same report, "*all over the area, Amnesty International researchers found the distinctive black fins and metal pellets from 9N210/9N235 cluster munitions, as well as craters with symmetrical spalling, consistent with the expected damage and fragment pattern from the explosion of these munitions.*"[143] This further indicates that the man indicated in the report as Bohdan Burlutsky was likely injured at the scene of CIV0798A1.

CIV0798E

At the scene of CIV0798E, this is what appears to be a pool of blood, indicating that at least one person experienced a significant blood loss.

S6V1 depicts[144] a man at the scene of CIV0798E covered with what appears to be blood. The man states that this is the place where he administered first aid to an injured woman who was lying on the ground using his shirt and belt. At the time when the footage was filmed, no injured people were visible at the scene.

The man then demonstrates his palms being covered with what appears to be dried-out blood, indicating that at least one person may have sustained significant blood loss.

[143] https://www.amnesty.org/en/documents/eur50/5682/2022/en/, p.9
[144] Timecode: [00.02 - 00.24]



*S6V1 depicts what appears to be blood on the ground (**Yellow Arrow**) and palms of a man*

Search queries on Youtube performed using the phrases "*хтз 15 квітня 2022*" and "*хтз 15 апреля 2022*" identified a video[145] which was filmed inside the hospital by Suspilne, a Ukrainian public broadcast service. It was posted on 16/04/2022 at 19:51 EET with the title: ""*I was lying in a pool of blood": testimony of victims of the Russian rocket attack in Kharkiv*". According to the caption, the video contains interviews with the victims of a shelling that occurred on 15/04/2022 in the park and the residential area of the HTZ microdistrict. The hospital was identified as 25th City Clinical Hospital, located in the HTZ microdistrict of Kharkiv at 49.9432, 36.3647[146].

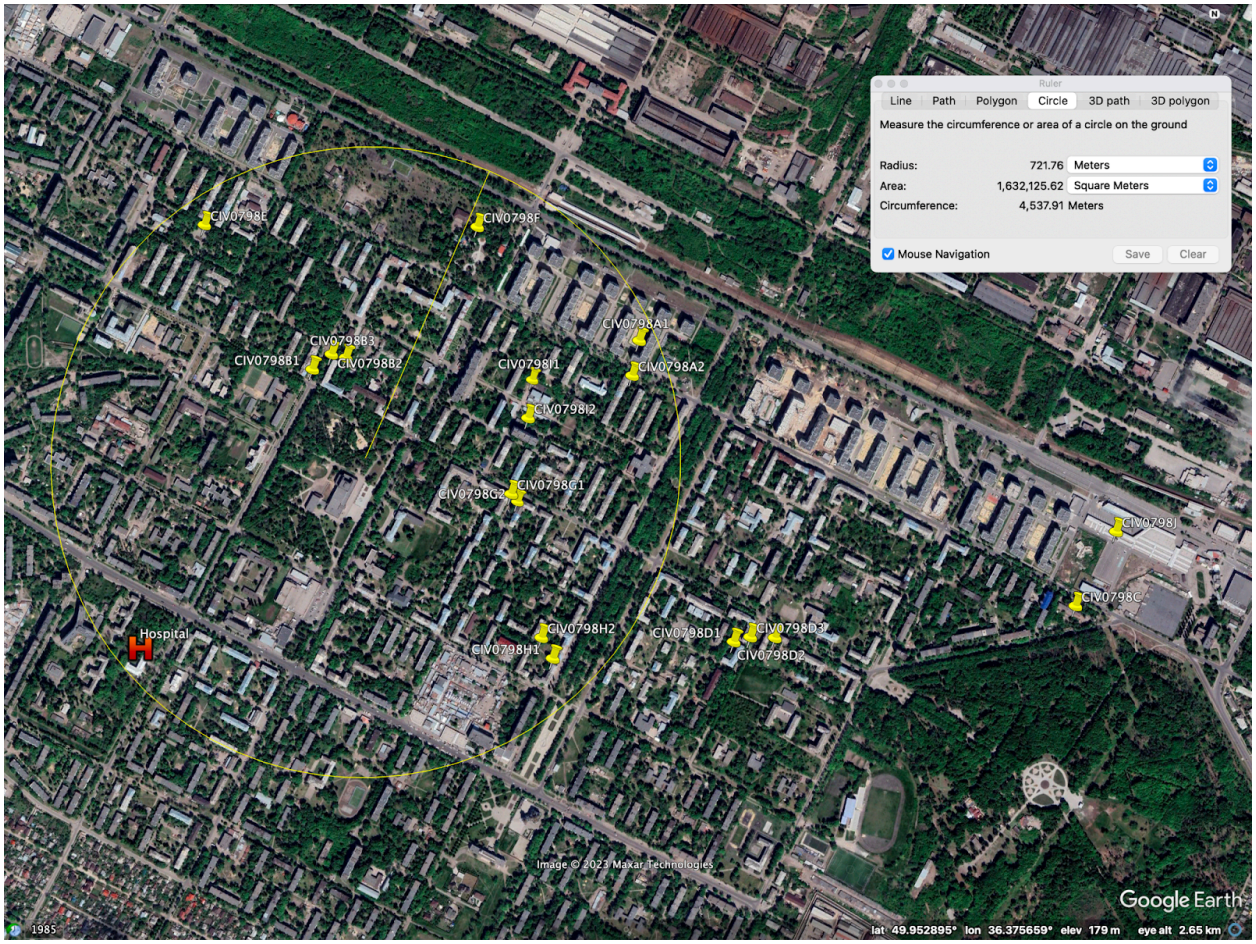
[145] https://www.youtube.com/watch?v=PffB0sGiYPM
[146] https://maps.app.goo.gl/TMWqLpB3yYpgDX3C9



The hospital depicted in the Youtube video (Yellow Rectangle) was identified on Google Street View [image](#)[147] from Jan 2017.

The hospital and the scenes of CIV0798, which depict apparent casualties, are located within a ~1.6 km area. This proximity further indicates that wounded people were likely transported to the hospital and hence are likely linked to CIV0798.

[147] https://maps.app.goo.gl/EeJzcJa3FanMsuBH7



The 25th City Clinical Hospital and the scenes with casualties are located within a ~1.6 km area (Credit: Maxar Technologies/Google Earth Pro).

The footage depicts a woman named Olga on a hospital bed with a bandaged left leg. The woman explained that she went outside to breathe some fresh air and enjoy sunny weather when she heard a loud noise and then was hit in her leg. She stated that the blood *"gushed"*[148] out of the wounded leg quite strongly so that at some point she "*was lying in a pool of blood*".[149]

[148] *In Russian*: "Била фонтаном"
[149] *In Russian*: "Я лежала в луже крови"



The woman was reportedly injured in the HTZ microdistrict on 15/04/2022.

Although it is not possible to conclusively establish whether the woman was injured at the scene of CIV0798E based on the information reported in open sources, the following publicly available information indicates that the woman could have been injured at the scene of CIV0798E:

1) The woman was injured in the HTZ microdistrict on 15/04/2022;

2) It is feasible that the severity of the blood loss sustained by the woman could have formed a pool of blood depicted at the scene of CIV0798E on S6V1.

According to the report[150] on use of cluster munitions in Kharkiv published by Amnesty International on 11/06/2022, Olha Sadovska, age 65, was sitting on a bench near the Hulliver Park, which is located at the scene of CIV0798E, when several cluster munitions exploded, injuring her in the leg from which, according to Olha, the "blood was oozing". Although the report does not provide a photo of Olha Sadovska, her first name and age, as well as the date, place, and circumstances under which she was injured, strongly indicate that Olha is likely the woman depicted with an injured leg on the Youtube video[151].

Finally, the sunny weather conditions at the time of the strike reported by the woman on the video are consistent with the weather conditions depicted in identified materials taken on 15/04/2022.

CIV0798F

At the scene of CIV0798F, at least two individuals who appear to be injured are shown. A toy pushchair depicted near the wounded woman indicates that at least one child could have been present at the time of the incident.

S9V1 depicts a wounded man and woman lying on the ground near a children's playground at the scene of CIV0798E, both of whom are receiving medical assistance from medical workers. Splotches of what appear to be blood are visible on their clothes, faces, and the ground nearby. Near the woman, a small pink pushchair in an upside-down position is depicted, indicating the possible presence of a child at the time of the incident, although no reports indicating that a child might have been injured at the scene of CIV0798F were identified in open sources. The small size and visibly weak construction of the depicted children's pushchair indicate that it was likely used as a children's toy rather than to transport actual children.

[150] https://www.amnesty.org/en/documents/eur50/5682/2022/en/
[151] https://www.youtube.com/watch?v=PffB0sGiYPM



A wounded woman (Yellow Arrow), two men (Green and Blue Arrows), and a children's pushchair are depicted in S9V1 at the scene of CIV0798F.

According to the Amnesty International's report[152], "*Oksana Litvynyenko, a 41-year-old mother of two, suffered devastating injuries when several cluster munitions exploded near…Shrapnel penetrated her back, chest, and abdomen, puncturing her lungs and damaging her spine.*"

The description of injuries in the Amnesty report appears to be consistent with the location of injuries sustained by the woman depicted at the scene of CIV0798F on S9V1, indicating that S9V1 possibly depicts Oksana Litvynyenko after being wounded.

[152] https://www.amnesty.org/en/documents/eur50/5682/2022/en/



The location of the wound (Blue Arrow) depicted in S9V1 corresponds to the location of the wound sustained by Oksana Litvynyenko reported in the Amnesty International report.

Finally, in the other picture provided in the report, Oksana Litvynyenko, a brown-haired woman, is depicted wearing a light green jacket, which appears to visually match the one worn by the injured brown-haired woman depicted in S9V1, further indicating that the woman depicted in S9V1 could be Oksana Litvynyenko.



The green jacket and hair colour of the woman depicted in S9V1 (Green Frame) appear to be consistent with the photo of Oksana Litvynyenko from the Amnesty International report (Orange Frame).

The report states that Oksana Litvynyenko died from the sustained injuries on 11/06/2022.

Damage to Civilian Infrastructure

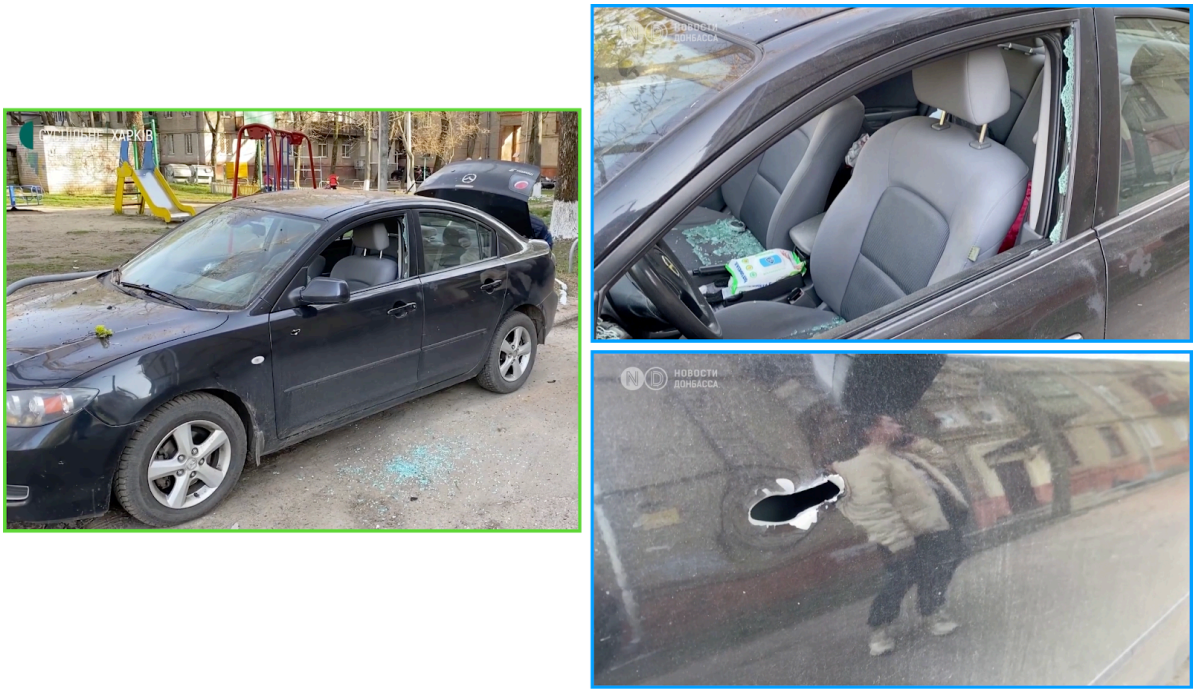
S1V1, S4V5, S6V1, S7V1, S8I2, and S10V1 depict at least six civilian cars which sustained severe damage caused by fragmentation, which impacted the scenes of CIV0798A1, CIV0798B3, CIV0798D2, and CIV0798I2.

CIV0798A1



Four burnt civilian cars at the scene of CIV0798A1 depicted in S1V1 (Blue Frame), S7V1 (Orange Frame), and S8I2 (Green Frame).

CIV0798B3



A damaged civilian car at the scene of CIV0798B3 depicted in S6V1 (Green Frame) and S10V1 (Blue Frame)

CIV0798D2



A severely damaged civilian car at the scene of CIV0798D2 depicted in S6V1 (Blue Frame) and S10V1 (Orange Frame).

CIV0798I2



A severely damaged civilian car at the scene of CIV0798I2 depicted in S4V5.

What Was the Location Used for?

All incidents forming CIV0978 are located within a ~4 km area. Within the impacted area, only residential, commercial, and industrial buildings, parks, and other recreational facilities were identified in open sources. No information concerning the presence of armed forces, weapons, or other objects that were or could have been used for military purposes was identified within the area in open sources.



No information indicating the presence of armed forces or military objects was reported in open sources within the ~4 km area formed by the incidents forming CIV0798 (Credit: Maxar Technologies/Google Earth Pro).

Statements from Parties of the Conflict

Ukraine

Oleh Synyehubov, head of the Kharkiv Regional Civil-Military Administration, in his official Telegram channel[153] confirmed that as a result of the strike on the HTZ microdistrict of Kharkiv, 34 people were injured, including three children, and seven people were killed, including a seven-months-old child.

[153] https://t.me/synegubov/2883

Russia

No public statements made by the Russian authorities concerning CIV0798 or any of its sub-incidents were identified in open sources.

Conclusion

Based on the analysis of visual materials and other open-source information, it was established that on 15/04/2022, several munitions impacted residential areas of the HTZ microdistrict of the Industrialnyi district in Kharkiv. This led to deaths and injuries among the civilian population, including children, and significant damage to civilian objects. The shadow analysis established that the incidents at the scenes of CIV0798 likely occurred on 15/04/2022 between 14:50 and 16:45 EET.

The weapon remnants, damage, and injuries sustained by civilians depicted at the scenes of CIV0798 as well as explosions appear to be consistent with those associated with 220 mm 9M27K rockets.

Using the adopted methodology for establishing the direction of origin, it was estimated that the rockets which impacted the scenes of CIV0798 were likely launched from the territories between 10 and 40 km of Kharkiv towards the west. This area appears to have been under the control of the Ukrainian government at the time of the incident.

No information indicating the presence of military troops or objects of military nature or armed forces at the areas impacted by the rockets was identified in the analysed visual materials and in open sources at the time of the present assessment.