bell¿ngcat

MH17

The Open Source Investigation Three Years Later

1

Introduction

At 4:20pm local time on July 17, 2014, Malaysian Airlines Flight 17 (MH17) was shot from the sky over eastern Ukraine, killing all 298 passengers and crew members. Within hours, the world became aware of the general circumstances that led to the tragedy: a Buk anti-aircraft missile was launched from separatist-controlled territory, likely hoping to hit a Ukrainian aircraft rather than a passenger jet. Three years later, we know that these facts still hold up.

Over the past three years, thanks to a wealth of openly accessible and verifiable information, we have been able to determine precisely how that Buk missile launcher reached a field in eastern Ukraine. We know who organized the transport of the weapon in Ukraine, where the missile launcher came from before it arrived in Ukraine, and even the small dents and remaining traces of painted marks on the Buk that reveal its identity, going back to 2010.

The case of MH17 is a convoluted one, drawing the focus of international criminal investigations, state-sponsored disinformation campaigns, and amateur sleuths alike. This report will serve as a survey of the information related to the downing of MH17 that is freely available for anyone with an internet connection to access, analyze, and verify - in other words, open source information. This information can be found anywhere from a television broadcast, to satellite imagery, to the social media accounts of a Russian or Ukrainian serviceman. With an event as controversial and important as the downing of MH17, it is vital that, to the greatest extent possible, information related to the case is accessible and verifiable for the public.

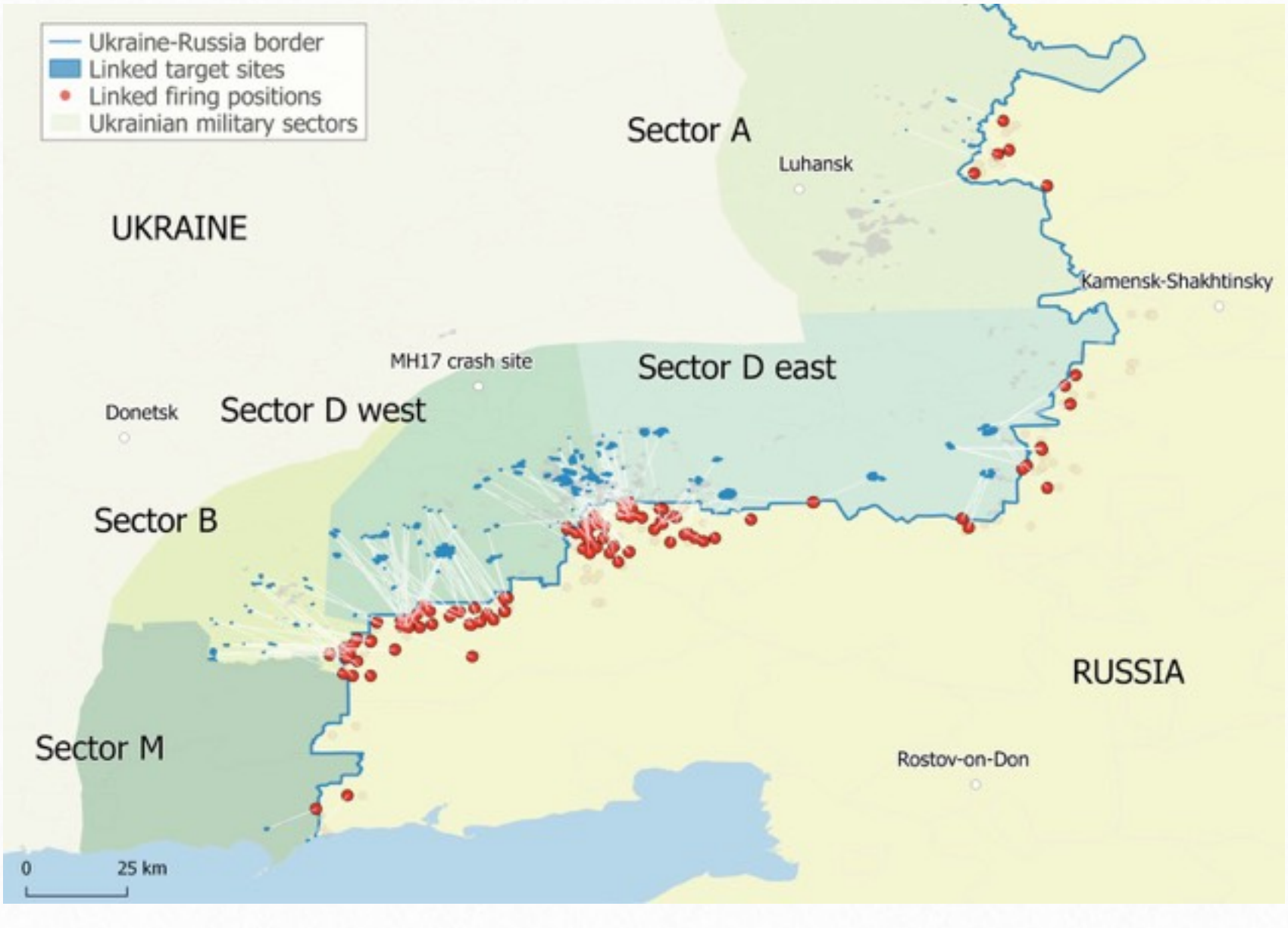
At the end of this report, we will also provide a survey of the counter-narratives to the established account of the downing of MH17. Some of these counter-narratives were created and promoted by the Russian Federation, while others are almost exclusively found online.

2

Situation in July 2014

Downed Ukrainian AN-26 transport plane (AFP Photo/Dominique Faget)

After a week-long ceasefire, the course of the war in eastern Ukraine turned on July 1, 2014 with a renewed offensive from Ukrainian Forces. Most notably, Ukraine retook the city of Sloviansk on July 5, which had been seized by the separatist commander Igor “Strelkov” Girkin. The recently-formed forces of the self-proclaimed Donetsk People’s Republic (DNR) retreated to Donetsk after fleeing Sloviansk, Kramatorsk, and other cities in the northern part of the Donetsk Oblast. In anticipation of a Ukrainian offensive into the separatist stronghold, the Russian-led separatist forces destroyed numerous bridges and blocked a series of strategic roads leading into and near Donetsk.



Overview of 133 firing positions and 136 target sites, showing the full range of artillery attacks conducted by the Russian Armed Forces against Ukrainian positions in the summer of 2014.

Just days before the downing of MH17, soldiers of the Russian Federation launched devastating artillery attacks against Ukrainian army positions near Amvrosiivka, Ukraine. These attacks, which can be observed in at least 330 craters visible on Google Earth imagery from July 16, 2014, were launched from multiple positions, including one inside Russia near the village of Seleznev, approximately 750 meters from the Russia-Ukraine border.

On July 16, numerous videos surfaced of 122mm BM-21 Grad systems launching artillery attacks westward, towards Ukraine, near the Russian city of Gukovo.

For the first time, the Russian military was launching documentable, direct artillery attacks from their own territory, with their own equipment, and with their own soldiers, against the Ukrainian military.

With the gains of the Ukrainian ground forces and counter-attack of Russian artillery systems, Russia and the separatist forces of the DNR also felt the need to counter Ukrainian air offensives in separatist-held territory. Ukrainian jets were operating heavily in the area of Donetsk, including on July 15 when a Ukrainian jet struck a residential building in Snizhne, killing eleven civilians and injuring another eight. The Ukrainian military carried out numerous other attacks in the week before the downing of MH17 in both the Donetsk and Luhansk Oblasts, but separatists also made numerous successful attacks against military jets and transport planes.

On July 14, a Ukrainian AN-26 transport plane was shot down near the Russia-Ukraine border. Two days later, a Ukrainian Su-25 ground attack jet was shot down south of Snizhne, and another was damaged. Video footage from the same day just a few kilometers from the eventual launch site for the missile that downed MH17 shows separatist leaders Aleksandr Borodai and Igor Girkin near a Strela-10 anti-aircraft missile system.

The aftermath of a Ukrainian air strike that hit an apartment building, leading to the deaths of eleven civilians

Clearly, a concerted effort was being made to control the skies in the Donetsk Oblast, with the presence and likely use of a Strela-10 system and MANPADS. With the escalation of Russian involvement with artillery strikes from Russian soil and the prioritized effort to neutralize Ukrainian air power, Russia's decision to provide a powerful Buk-M1 anti-aircraft missile system fits into the general course of events. Furthermore, the Russian Federation later provided additional anti-aircraft missile systems, including a Pantsir-S1 (which has never been used in the Ukrainian Armed Forces), thus showing its tendency towards providing powerful weaponry requiring significant training to Russian-led separatists.

Pantsir-1 anti-aircraft missile system in Makiivka, just east of Donetsk, after being sent from Russia. Photograph taken in January 2015

For additional information on the military situation in the Donetsk Oblast at the time of the downing of MH17, see the following investigations and news articles:

- Bellingcat: Putin's Undeclared War: Summer 2014 - Russian Artillery Strikes Against Ukraine
- BBC: Jets bomb rebel-held town of Snizhne
- DFRLab: MH17 as a Result of a Pattern of Escalation
- BBC: Rebels abandon Sloviansk stronghold
- BBC: Bridges destroyed outside Donetsk

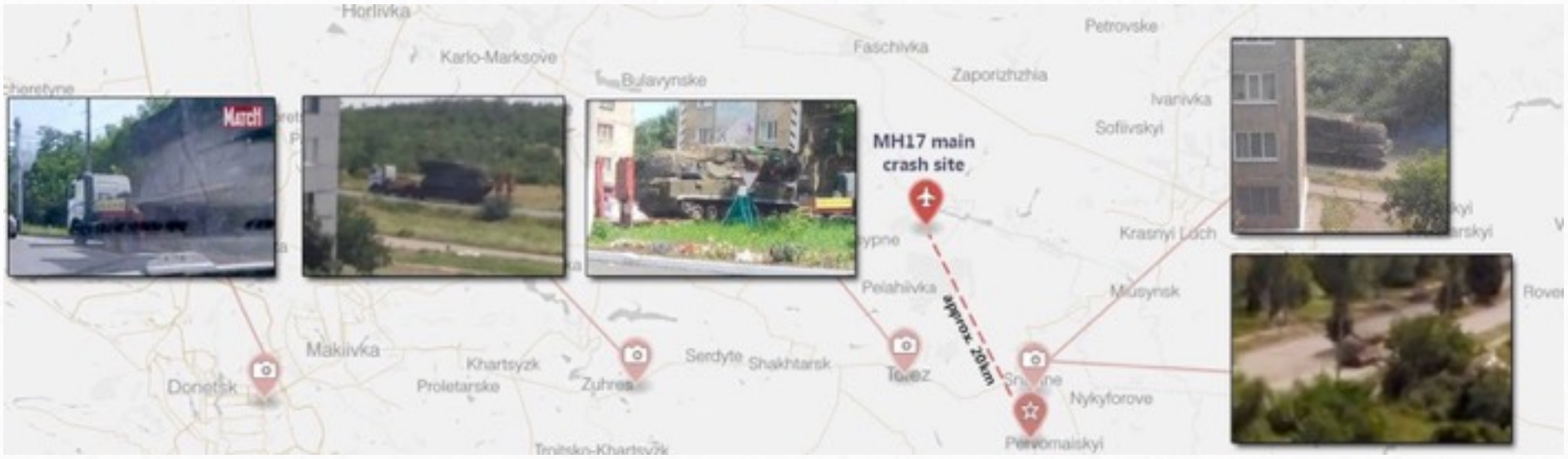
3

July 17, 2014

The flight path of Malaysian Airlines Flight 17 on July 17, 2014

For six hours before the downing of MH17, Ukrainians went online to discuss a Buk missile launcher slowly creeping through eastern Ukraine. Just after Malaysian Airlines Flight 17 left Amsterdam, this weapon was filmed heading south out of the Ukrainian, separatist-controlled town of Snizhne. It would eventually reach the location where the Joint Investigation Team (JIT) determined a missile launch occurred on July 17, 2014.

In this chapter, we will present these public discussions of the transport of a missile launcher that came from Russia, determined to be Buk 332 (see Chapter 7 for more details). This Buk missile launcher was hauled on a red trailer attached to a Volvo truck that had previously been stolen from a vehicle yard in Donetsk. Along with the chatter on social networks about this Buk being seen, there are also a handful of photographs of the Volvo truck, red trailer, and Buk missile launcher taken on the day of the downing. Over the past three years, Bellingcat has exhaustively analyzed these materials and confirmed their veracity.



Portion of the route of Buk 332 through eastern Ukraine on July 17, 2014, from Donetsk to Snizhne.

The first mentions on July 17 of an anti-aircraft missile system in the Donbas came from at around 9-10:00am (local time), where multiple users described how a missile launcher was in eastern Donetsk. A Twitter user living in Donetsk tweeted out a report he received at 10:11am local time describing an anti-aircraft missile system that looked like a Strela-10 was near Prospekt Ilycha about 30 minutes before. Soon after, the public group "Donetsk is Ukraine!" on the Russian-language social network Vkontakte (VK) shared a message that provided additional details from the vague reports that were previously tweeted out.

"Bad news. Around 9am, a hauler was going along the Makiivka highway from Makiivka in the direction of Donetsk. On the platform was a BukM1-M2? This AAMS proceeded to the intersection with Shakhtostroiteley Boulevard. The system was accompanied by a convoy that was composed of 1 grey Rav4 SUV, a camouflaged UAZ, and a dark blue Hyundai van with tinted windows. As of 9:15am, the vehicle was located at the intersection of Shakhtostroiteley and Ilycha. The militants got out of their cars, blocking 2 of the far left lanes. Obviously, they were waiting for logistical guidance."

This Buk and the convoy described in the post were filmed by a driver passing the scene. The Dutch-led Joint Investigation Team (JIT) presented this video in their press conference held on September 28, 2016. While it took over two years for this video to emerge, the French publication *Paris Match* published two screenshots from the video shortly after the downing of MH17, showing Buk 332, the Volvo truck, red trailer, and the grey Toyota Rav4 SUV. In the video, the UAZ jeep and blue Volkswagen van (not a Hyundai) are also visible.

The Paris Match photograph published in July 2014

Screenshot of the video from which the Paris Match photograph was taken. Video shared by JIT in 2016

On May 3, 2016, a video was uploaded onto YouTube showing Buk 332 being hauled through Makiivka by the same Volvo truck and on the same red trailer with a yellow placard showing a phone number. Just as in the video filmed in Donetsk, Buk 332 has four mounted missiles covered with netting. Additionally, the same vehicles that were filmed with the Buk in Donetsk - a Toyota RAV4, a dark-blue Volkswagen van with a blue siren, and a UAZ-469 jeep - are escorting the missile launcher through Makiivka in this video.

The location of this video provides additional clues regarding the route of the Buk on July 17, showing that the convoy took a detour through Makiivka before reaching the H21 highway again. This detour was likely taken to avoid a low-hanging bridge along the highway, which may have not been high enough for the vehicle hauling a Buk with mounted missiles.

Buk 332, with four mounted missiles, being transported eastward through the separatist-controlled city of Makiivka on July 17, 2014

The private intelligence firm Stratfor published a segment of a satellite image they purchased soon after the Makiivka video was published. On this satellite image, we can see the Buk convoy. Soon after Stratfor published this finding, Google Earth updated its coverage of eastern Ukraine to include this image, snapped by the satellite company Digital Globe, shot at 11:08am local time on July 17, 2014, just moments after the convoy video was filmed. In the image, which can be accessed via Google Earth at coordinates 48.020725, 37.991579, we can see the Volvo truck hauling a Buk, the UAZ-469 jeep, VW van, and RAV4.

Satellite image from 11:08am, July 17, 2014, showing the Buk convoy traveling through separatist-controlled Makiivka

The next confirmed sighting of the Buk was in the town of Zuhres, located approximately 25 kilometers east of the location in Makiivka where the missile launcher was previously seen. The Buk was filmed traveling east on the H21 highway, which runs from Donetsk, through Makiivka, Khartsyz'k, and eventually to Torez and Snizhne. On July 17, Twitter user created a YouTube account, uploaded a video with the title "IMG 0647," and tweeted out a link of the video with coordinates and an exact time.

Photographs published by the Ukrainian Security Service showing military vehicles outside of Zuhres

This Zuhres video can be geolocated by matching the landmarks seen in the video, confirming the coordinates given in the tweet. Furthermore, numerous journalists, including teams from ARD, Correct!v, and 60 Minutes Australia, have visited the site and confirmed the location provided by a Twitter user. The Ukrainian Security Service (SBU) published a composite photograph (above) showing the same shot of the Buk, but additional footage of a tank and Ural truck full of militants that was taken at a different time. This same modified Ural truck was filmed near Torez on July 17, 2014 by a local resident, as seen below.

Comparison of an Ural truck on July 17 near Zuhres (left) and Torez (right)

After the sightings in Donetsk, Makiivka, and Zuhres, the next string of witness accounts would take place around noon in the town of Torez, located due east along the H21 highway from the previous locations. At 12:07pm, Twitter user @WowihaY, a native of Torez, passed on a message he had received from a local contact:

"A surface-to-air missile launcher just passed us in the direction of the city center. 4 rockets, people are saying it's a Buk. In Torez, in the direction of Snizhne."

About twenty minutes later, another tweet relayed a local report:

"They are transporting a missile complex on a low-loader with two cars providing escort through Torez towards Snizhne, at 12:10pm."

This scene being described by locals was shown in a photograph taken in the center of Torez showing the Volvo truck hauling the Buk, along with the familiar UAZ-469 jeep behind.

The Buk in Torez on July 17, 2014

There are additional witness reports and one other video that further corroborates the aforementioned tweets and photograph. Journalists from the Guardian and Buzzfeed visited the location where the photograph was taken, outside of a hardware store at coordinates 48.024446, 38.615177. There, witnesses told journalists that they heard and saw the Buk passing by on the same street where it was photographed.

"We were inside and heard a noise much louder than usual," said one shopkeeper, who did not want to be identified. "We came running out and saw a jeep disappearing into the distance with something much larger in front of it. Later, customers said it had been a missile carrier." In another shop further down the street, there was talk of a convoy of two jeeps and a missile launcher covered in a net driving past in the direction of the town of Snizhne. "I've never seen anything like it," said a middle-aged woman. She said her husband showed her a photograph of a Buk launcher afterwards and she realised that was indeed what she had seen. A group of men also said they had seen a Buk."
(The Guardian, "Ukrainians report sightings of missile launcher on day of MH17 crash")

After their September 28, 2016 press conference, the Dutch-led Joint Investigation Team (JIT) published a censored video shot by a witness in Torez, showing the Volvo truck, Buk, Volkswagen van, and UAZ-469 jeep.

Composite of Buk 332 and the Volvo truck from a censored video published by the JIT after its September 28, 2016 press conference

After Torez, the Buk was taken eastward to Snizhne, where it was unloaded from the Volvo truck. A photograph of the unloaded Buk was snapped by a Snizhne resident, showing the Buk moving through a residential area with its netting still covering the mounted missiles. Later, a video emerged showing the same Buk moving southward through Snizhne, headed toward a field where it would launch the missile that downed MH17.

Corroborating this photograph and video, an Associated Press reporter wrote that he saw a Buk missile launcher in Snizhne on July 17, 2014.

Top: Photograph of Buk 332 in Snizhne

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Bottom: Screenshot from a video showing Buk 332 moving under its own power south, out of Snizhne

This Buk was filmed only once more after this - heading east through Luhansk, towards Russia, and with only three missiles instead of four.

For additional information on the route that Buk 332 and its accompanying convoy took through eastern Ukraine on July 17, 2014, see the following investigations and news articles:

- Bellingcat: MH17 In Their Own Words: Witness Testimonies on Social Media from July 17, 2014
- Bellingcat: Origin of the Separatists' Buk
- Bellingcat: Interview with "WowihaY," the Man Who Narrated MH17 as it Happened
- Bellingcat: Tracking the Vehicle that Transported the MH17 Buk
- Bellingcat: Possible new sighting of MH17 Buk Convoy on July 17th 2014 in Ukraine
- Bellingcat: New Google Earth Satellite Update Confirms Presence of Buk in Eastern Ukraine
- Bellingcat: Separatist Convoy Linked to MH17 Buk Transport
- Bellingcat: Revelations and Confirmations from the MH17 JIT Press Conference
- Correctiv: Flight MH17: Searching for the Truth
- Paris Match: A stolen truck to transport the missiles
- BBC: Who Shot Down MH17?
- 60 Minutes Australia: MH17: A Special Investigation
- Stratfor: Examining the Evidence of Russia's Involvement in a Malaysia Airlines Crash

4

The Missile Launch

Smoke trail from the missile that downed MH17, taken from Torez

Shortly after local residents heard the first of a pair of loud noises, a man who lives in Torez took the photograph seen above, showing the white trail of a missile launch from a field south of Snizhne, Ukraine. This photograph, which is one of three known images showing the trail of the Buk missile that downed MH17, was shared on Twitter hours after the shoot-down, and has since been analyzed and verified by multiple independent experts.

This photograph was first shared in a tweet by @WowihaY, with a message describing the location and how it is from “a witness who took a photo of the moment of the rocket launch.” The tweet was sent three hours after the downing, at 7:23pm local time.

The blogger Ukraine@War (now Putin@War) was able to geolocate the source of the missile trail in the photograph to a field just east of the village of Chervonyi Zhovten (Red October), and south of Snizhne. Bellingcat conducted a similar investigation, coming to similar conclusions: the missile was fired from a field south of Snizhne.

Both the forensic investigation into the downing of MH17, the Dutch Safety Board (DSB), and the criminal investigation, the JIT, have confirmed this assessment, pointing to a field south of Snizhne as the launch location for the Buk missile that downed the plane. At their September 28, 2016 press conference, the JIT published a photograph received from a local witness that had not been previously published. In this photograph, taken from north of the launch location, we see the same smoke trail as in the image shared by @WowihaY.

Buk missile smoke trail shown by the JIT in a press conference

In the same September 28, 2016 press conference, the JIT revealed their calculation of where the missile was launched. Using witness accounts and by determining the sight lines of the two smoke trail photographs, the JIT triangulated the missile launch to a field south of Snizhne and just northeast of the village of Chervonyi Zhovten' at coordinates 47.973906, 38.763963.

Triangulated missile launch site, calculated by the JIT. Lines used in image are not representative of actual evidence

Along with these two photographs and the JIT's calculation, we also have numerous witness accounts from Ukrainians who saw and heard the missile launch. Before the narratives of both the Russian-separatist and Ukrainian sides emerged, the raw reactions of these locals reveal unfiltered information about what occurred. In one thread on VK, a witness says that "something buzzed above us, but not like a plane, people are saying that it was a rocket that went up to it." In another witness account, a man describes what could only be a rocket launch immediately before the downing of MH17: "I saw that something was flying. I was out in the country in a tree, picking pears. And then an explosion." Another Snizhne resident posted soon after the crash, "I saw how this rocket flew! I even saw where it came from and where it went!" In a particularly descriptive message, a local woman described:

"I saw how a rocket flew from the direction of Saurovka…and then a minute-long lull and a loud explosion…a trail remained in the sky from the rocket…I didn't see the explosion myself it was very loud…all of my family ran out into the street…we were all very scared…….I don't know who to believe but we didn't hear the sound of a SU[-25]….it was quiet just like with a normal passenger plane and then that's all…."

The Dutch RTL Nieuws contacted various forensic experts to verify the first smoke photograph's authenticity: the Fox-IT company, which focuses on cyber crime, and Eduard de Kam at the Dutch Institute of Digital Photography (NIDF). All of these consulted experts agreed on the same conclusion: there was "no indication of post-processing, fraud, or manipulation" in the photograph that showed the traces of a missile launch. The JIT agreed with their assessment, including the photograph in their September 28, 2016 press conference as evidence regarding the missile launch, as did a US intelligence report on July 22, 2014.

Looking to the launch site itself, journalists Christopher Miller and Roland Oliphant visited the field south of Snizhne on July 22, 2014. The two found a burned field with various pieces of debris, including a piece of plastic from a weapons container manufactured by Steklo Plastik, which had its offices raided of approximately $25,000 worth of equipment by separatist soldiers about three weeks before the downing of MH17. Christopher Miller spoke with a resident of Chervonyi Zhovten, the nearest village from the field, who said that he saw and heard a missile launch from the field immediately before the downing of MH17.

"It was such a huge explosion," the 58-year-old said recently. "It felt like the end of the world!" The blast was the sound of a missile launcher, firing its weapon into the sky, he said. "It was a big missile and it wobbled as it flew right over our house in the direction of Torez," he added, pointing in a northwesterly direction. He said he watched as the missile struck a plane and fiery debris fell to the ground.

Satellite imagery of the site reveals that between July 16 and 21, 2014 the corner of the field was significantly altered, and new track marks appeared in the area between the dates.

Field south of Snizhne between July 16 and 23 (Source Google Earth/ Digital Globe)

For additional information on the missile launch site, see the following investigations and news articles:

- Bellingcat: Is this the Launch Site of the Missile that Shot Down Flight MH17?
- Bellingcat: Examining the MH17 Launch Smoke Photographs
- Bellingcat: Interview with “WowihaY,” the Man Who Narrated MH17 as it Happened
- Meduza: The trace above Torez: From where did they shoot down the Malaysian Boeing
- Mashable: “It felt like the end of the world”: How MH17 was brought down
- Business Insider: Local Ukraine Residents Say They Saw Rebels With Missiles Suspected of Taking Down Malaysia Plane
- RTL Nieuws: Hoe onderzocht RTL Nieuws de nieuwe MH17-foto's?
- JIT: MH17 Animation regarding the transport route and the launch site
- The Guardian: Flight MH17 investigators to pinpoint missile launch in rebel-held Ukraine

5

The Morning After

Buk 332 being transported through Luhansk on July 18, 2014

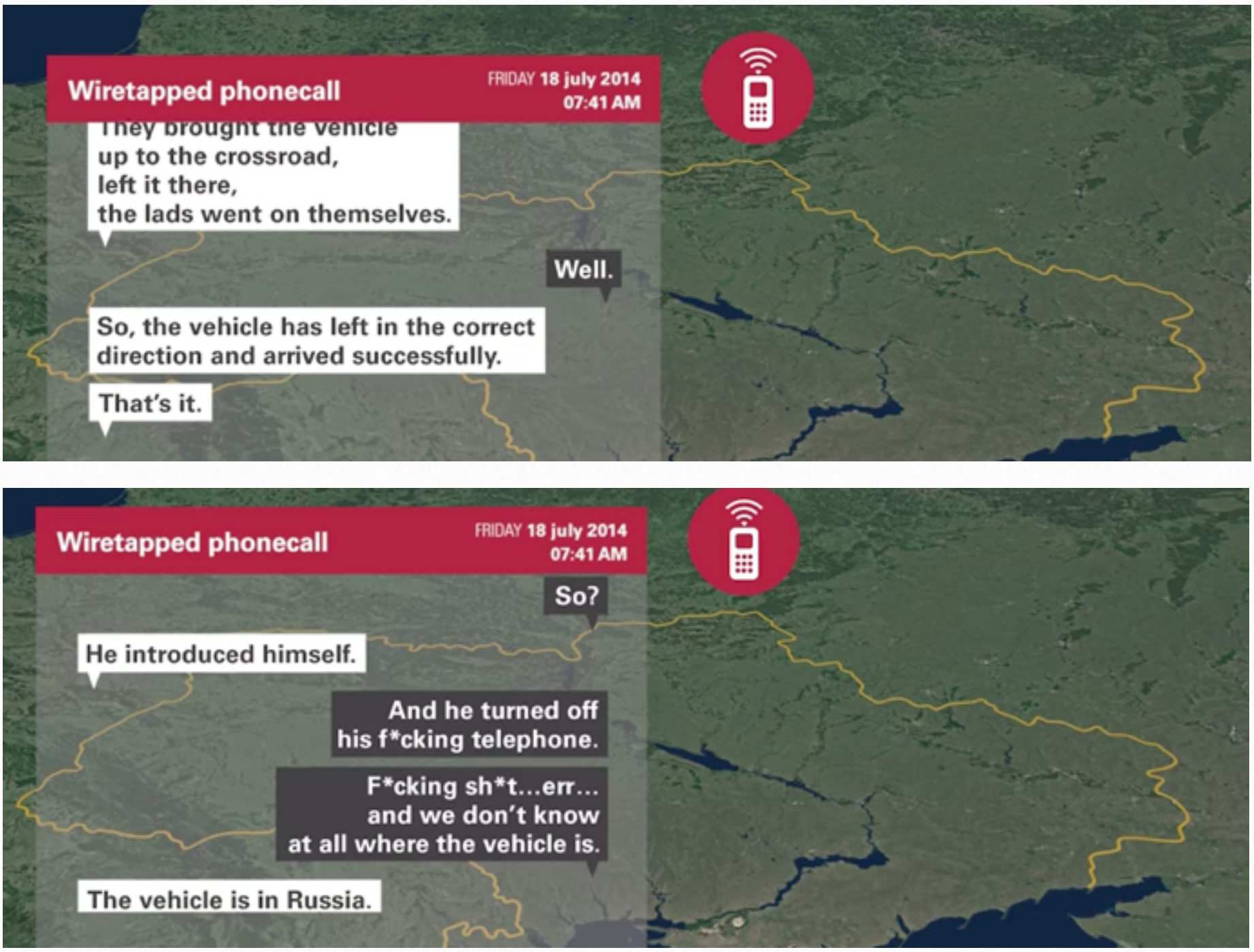
On July 18, 2014 the Ukrainian Ministry of Interior published a video filmed in the separatist-controlled city of Luhansk, in which they claimed to show a Buk heading towards the Russian border on the morning after the downing of MH17. A recent report from the Dutch channel NOS reports that this video was filmed by a Ukrainian policeman from a safe-house, whose job was to report on all military convoys moving along the filmed road. In this video, the Buk only had three missiles, instead of the four missiles that it had in Makiivka approximately five hours before the shoot down. Ukrainian Minister of Interior Arsen Avakov later published the coordinates of where the video was recorded, which were confirmed both by geolocation and news organizations visiting the site.

The JIT has determined that before the Volvo and Buk reached Luhansk, where it was filmed in the early hours of the morning, it traveled a roundabout route through through Krasniy Luch, to Debaltseve, and finally to Luhansk, where it was filmed passing along Vulytsia Pavlivska-Nechuya Levytskoho. The JIT determined that this route was taken through information received through “telecommunications data.”

JIT graphic showing the Buk's route from Snizhne to Luhansk

Comparison of Buk 332 in Makiivka on July 17, 2014 (left), with the third missile from the driver's side present, and Buk 332 in Luhansk on July 18, 2014 (right) from the JIT's September 28, 2016 press conference, with the third missile from the driver's side missing

The JIT published intercepted phone conversations describing where the Buk went after it went through Luhansk - Russia. In these intercepted calls, panicked separatists say that the Buk was taken across the Ukraine-Russia border in the early hours of July 18 and given to a group of “lads.”



Screenshots of the JIT’s published phone calls from July 18, 2014

For additional information on the Buk’s transport through Luhansk and into Russia, see the following investigations and presentations:

Bellingcat: Who’s Lying? An In-Depth Analysis of the Luhansk Buk Video
JIT: MH17 Animation regarding the transport route and the launch site

6

The Other Vehicles

The vehicles that accompanied Buk 332 in eastern Ukraine

The Buk that downed MH17 was hauled by a Volvo truck and accompanied by three vehicles operated by DNR forces: a dark-blue Volkswagen van, a Toyota RAV4 SUV, and a UAZ-469 jeep. These three vehicles were a part of a convoy on July 15 (two days before the downing) on roughly the same route that the Buk traveled on in eastern Ukraine.

The Volvo truck in Donetsk (left) and Luhansk (right)

The Volvo truck that transported the Buk on July 17 and 18 was seized by separatists from the vehicle yard of Stroymekhanizatsiya, located in northern Donetsk. A 2013 video filmed in Crimea shows this same Volvo being used, including the same yellow placard with a phone number. Soon after the downing of MH17, journalists contacted the owner of the truck, confirming that the vehicle that hauled the Buk is the same that was captured by separatists in Donetsk, In the interview, he told the journalists:

"My base in Donetsk was taken over and it was parked there. Yes, this is my vehicle. They came to our base and said they needed it. Everyone left from the eighth (of July), and the base was under their control, including my equipment and that white truck."

The Volvo truck when it was filmed by its owners, Stroymekhanizatsiya, in Crimea in 2013 (left) and with the Buk in Donetsk on July 17, 2014 (right)

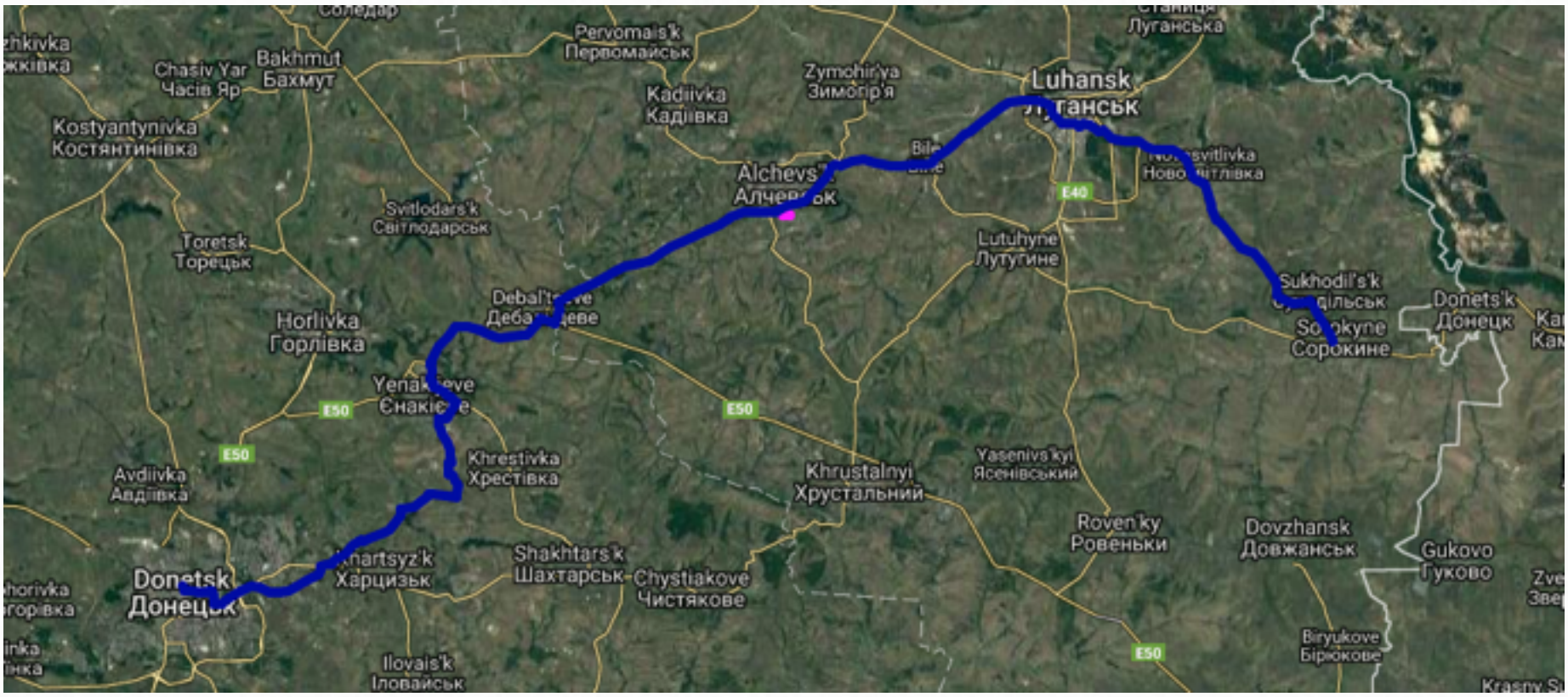
Satellite imagery from 11:08am on July 17, 2014 shows the low-loader was absent from the vehicle yard, supporting the fact that it was hauling the Buk through the Donbas at the time, while in imagery before and after July 17 the low-loader and truck were visible.

If there is any remaining doubt that this truck that hauled the Buk on July 17 and 18 was under the control of Russian-led separatists, there are also photographs and videos of the Volvo and red low-loader under separatist control in the latter half of 2014.

Right: The Volvo and red low-loader in Makiivka in August 2014. Below: Two screenshots from a video showing the same red low-loader without the yellow placard, hauling a piece of separatist military equipment in August 2014

The three vehicles that were filmed escorting the Buk were likely driven by forces loyal to Igor “Strelkov” Girkin and the Russian-led separatist forces of Donetsk. Two days before the downing of MH17, these vehicles were part of a convoy that transported four T-64 tanks, three self-propelled howitzer Gvozdika systems, a BTR-80 armored personnel carrier, and a Scania semi-truck carrying a trailer with unknown contents. This convoy reportedly started its trip by Donetsk, Russia, crossed the border to the separatist stronghold of Krasnodon, moved northwest to Luhansk, and then moved south towards Donetsk, Ukraine by way of Alchevsk, Debaltseve, Yenakieve, and Makiivka. The cities and roads taken by this convoy correspond to those taken by the Buk convoy on July 17, showing that they were known to be safely under Russian and separatist control.

Like the Buk, these pieces of military equipment reportedly crossed over the Russia-Ukraine border near Donetsk, Russia in the early hours of the morning. At 12:18am on July 15, reports came in from Krasnodon, Ukraine that the convoy had moved through town. At 7:50am the same morning, the convoy arrived in Luhansk. By the early evening, the convoy arrived in Donetsk. A similar route was used in the July 17 convoy, but at a much faster pace, as the Buk arrived in Donetsk at around 9:00am local time.



The route of the July 15, 2014 Russian-separatist convoy, with information sources including eyewitness testimonies, photographs, videos, and news reports. Russia-Ukraine border visible on the right

The three vehicles that escorted the Buk through Ukraine on July 15 (top), July 17 in Donetsk (middle), and July 17 in Makiivka (bottom)

For additional information on the Volvo truck and vehicles accompanying the Buk through eastern Ukraine, see the following investigations and presentations:

- Bellingcat: Tracking the Vehicle that Transported the MH17 Buk
- Bellingcat: Separatist Convoy Linked to MH17 Buk Transport
- JIT: MH17 Animation regarding the transport route and the launch site
- What Happened to Flight MH17: Recently discovered video clearly shows Volvo truck and low loader with phone number on yellow sign
- News.com.au: MH17 breakthrough: owner of Volvo truck that transported missile fears for his life

7

The Russian Buk

Buk 332 in Russia, from 2012

From studying the photographic and video materials of July 17 and 18, 2014, we can identify a number of features and details of the Buk missile launcher that downed MH17. For example, there are obscured numbers on the chassis of the Buk, distinctive signs of damage on the rubber side skirt over the caterpillar track, and distinctive locations with white symbols and marks. With these details in mind, we can resolve the question of where this Buk came from, and which country it belonged to.

The Buk missile launcher photographed and filmed in Ukraine on the day of the MH17 downing is a TELAR, or “transporter erector launcher and radar.” This Buk TELAR was

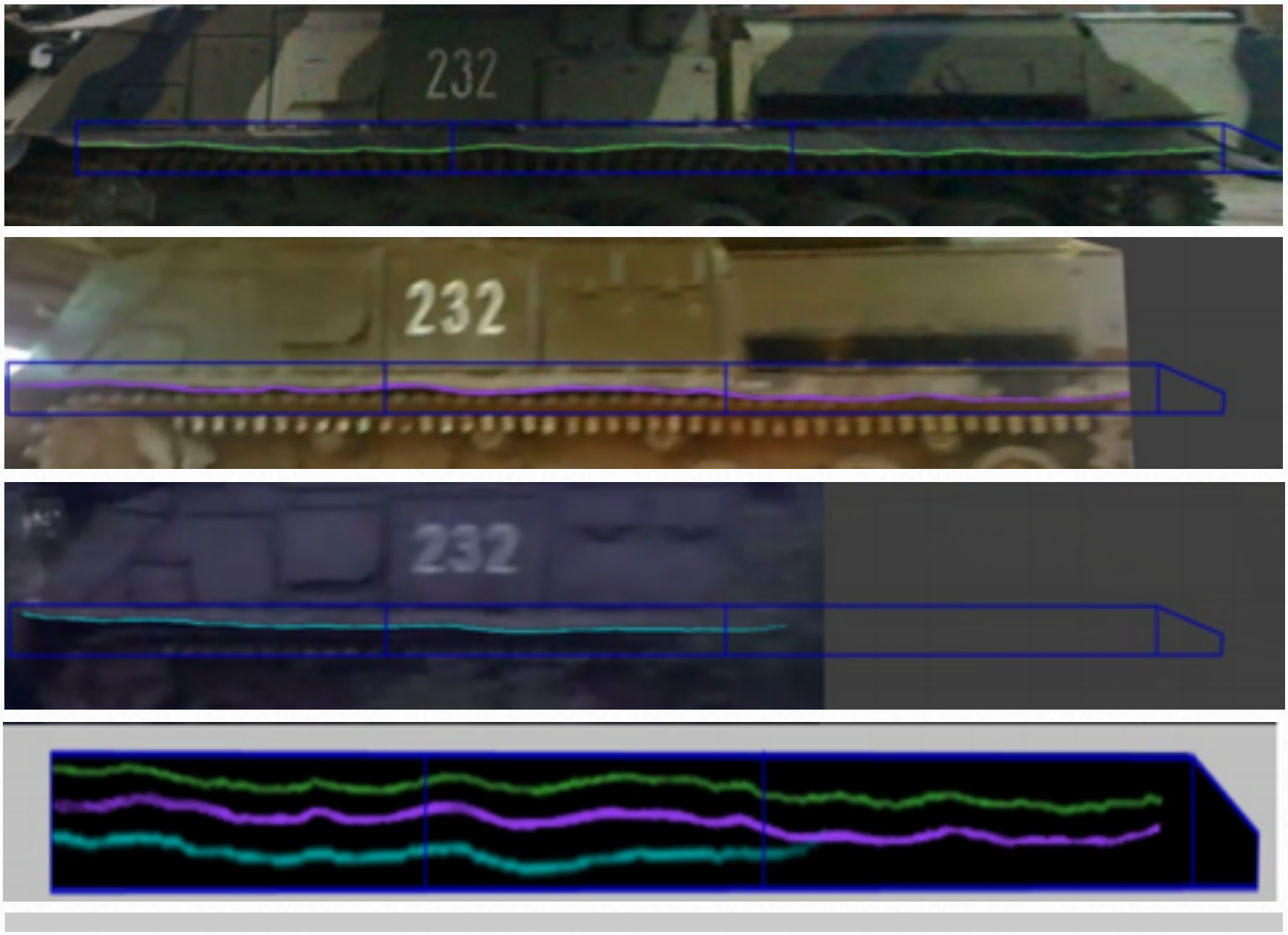
able to operate autonomously when it fired its missile south of Snizhne, as there is an incorporated radar system in Buk TELARs.

After the downing of MH17, members of the Bellingcat investigative team started their search for military convoys that included Buk missile launchers in the month before the downing. This task was particularly difficult at first, because a number of countries in the former Soviet Union use the Buk system in its arsenal, including Ukraine, Russia, Georgia, and Belarus.

After searching through numerous convoys in Ukraine and Russia, a particular Buk-M1 TELAR stood out, belonging to Russia's 53rd Anti-Aircraft Missile Brigade. This Buk left from Kursk, Russia on June 23 and traveled towards the Russia-Ukraine border, with a convoy last seen in Millerovo, Russia on June 25. This Buk, which was first dubbed "Buk 3x2" due to an obscured digit on the side of the chassis, has many similarities with the one seen in Ukraine on July 17. In particular, the remaining fragments of the digits of the Buk, the railway transport markings, center of gravity mark, white paint on the rubber side skirt, and other features were in the exact same positions and proportions for this Buk when it was in Russia and Ukraine. Since our initial investigation in late 2014, we have been able to determine that this Buk was originally numbered 332, after comparing the characteristics of the weapon from photographs and videos going back to 2010.

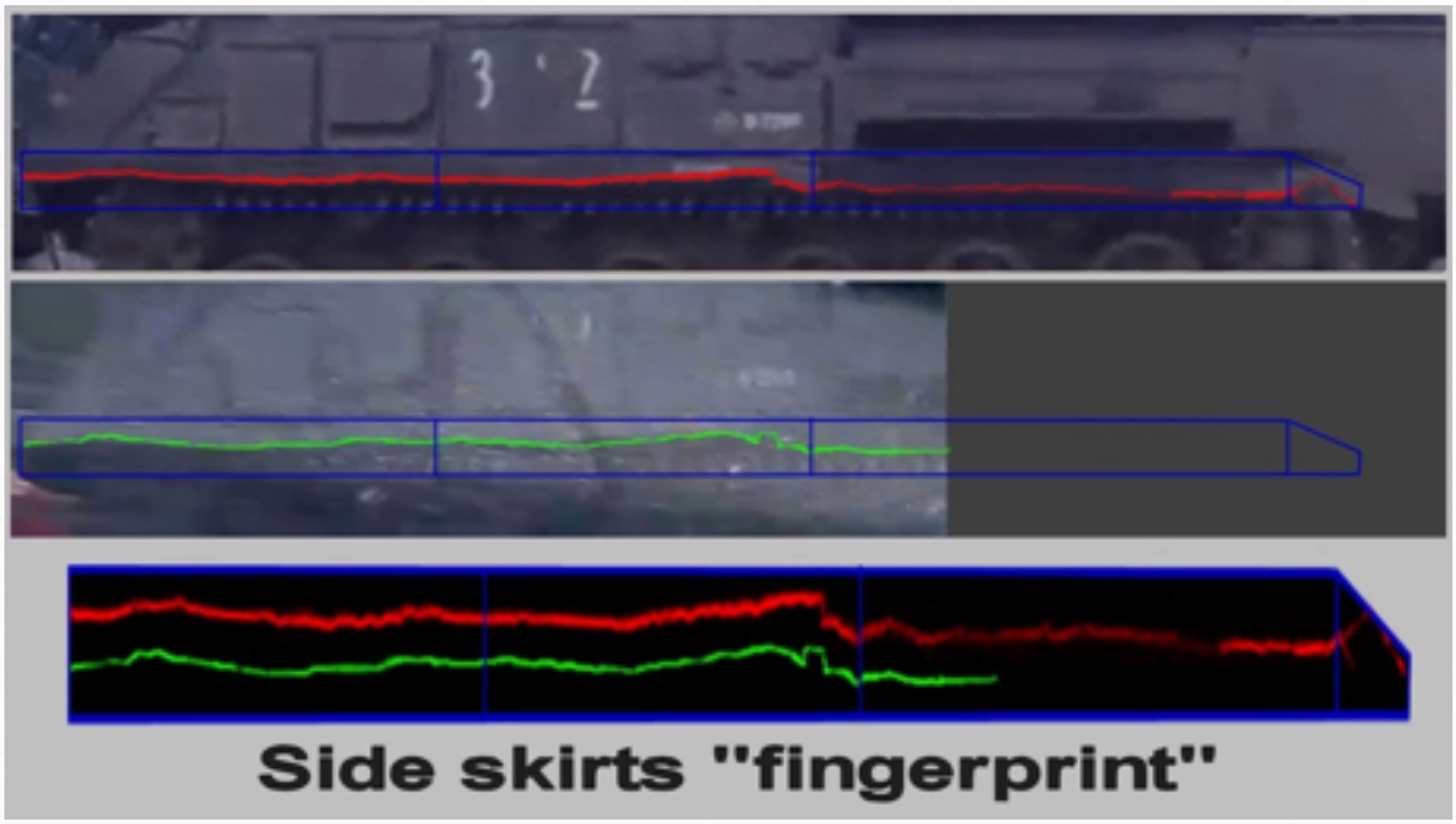
White mark on Buk 332 in Russia in June 2014 (left) and the same white mark on the Buk filmed in Torez from the JIT press conference (right)

Outside of these details being in the exact same locations on the two Buks, there is an additional, compelling method to compare the "identities" of the Buks. During our research into various Buk sightings, it became clear that the rubber side skirt above the caterpillar track sustains damage over time, creating a unique "fingerprint." Comparing these side skirt damage patterns, or "fingerprints," we can identify and match Buk missile launchers with one another. For example, below is a comparison of the side skirt fingerprints of a Russian Buk numbered 232. All three photographs were taken in the same year.



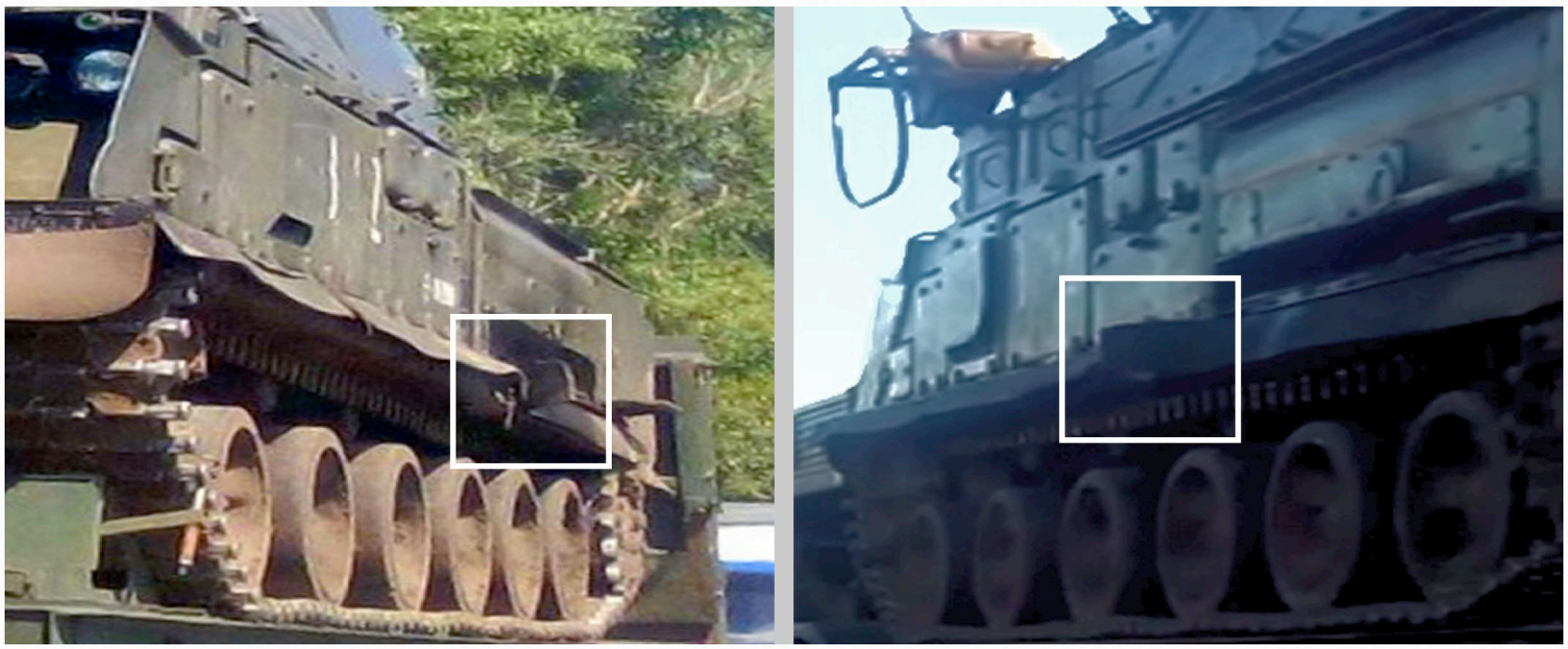
Comparison of the side skirt damage patterns on a Russian Buk with unit designation 232 over the period of a year

When comparing the side skirt profiles of Buk 332, the Russian Buk seen headed towards the Ukrainian border in late June, and the Buk photographed in eastern Ukraine on the day of the tragedy, there is a positive identification:



Side skirt comparison between June (above, in Russia) and July (below, in Ukraine) 2014

The strong “spike” in the waveform below the white marking (which reads “H-2200,” a code used for oversized railway cargo frequently found on Russian military equipment) can be identified by examining photographs of the Buk in Russia and Ukraine.



Damage to the side skirt visible on Buk 332 in Russia

Buk 332 in Russia, in the spring of 2013

This tear on the rubber side skirt can be identified in the exact same location on the Buk seen in Ukraine. Over the past three years, members of the Bellingcat investigation team have compared the features of Buk 332, seen both in Russia and Ukraine in the summer of 2014, with every other Buk photographed or filmed in 2013 and 2014 in Russia and Ukraine discovered by investigators. No other Buk has even half of the same details seen on this Buk, including the digits, placement and dimensions of the various white marks, the side skirt “fingerprint” profile, and other features. The censored video made public by the JIT showing Buk 332 further confirmed this identification and allows a match of the features of both sides of the Buk, rather than just the left side.

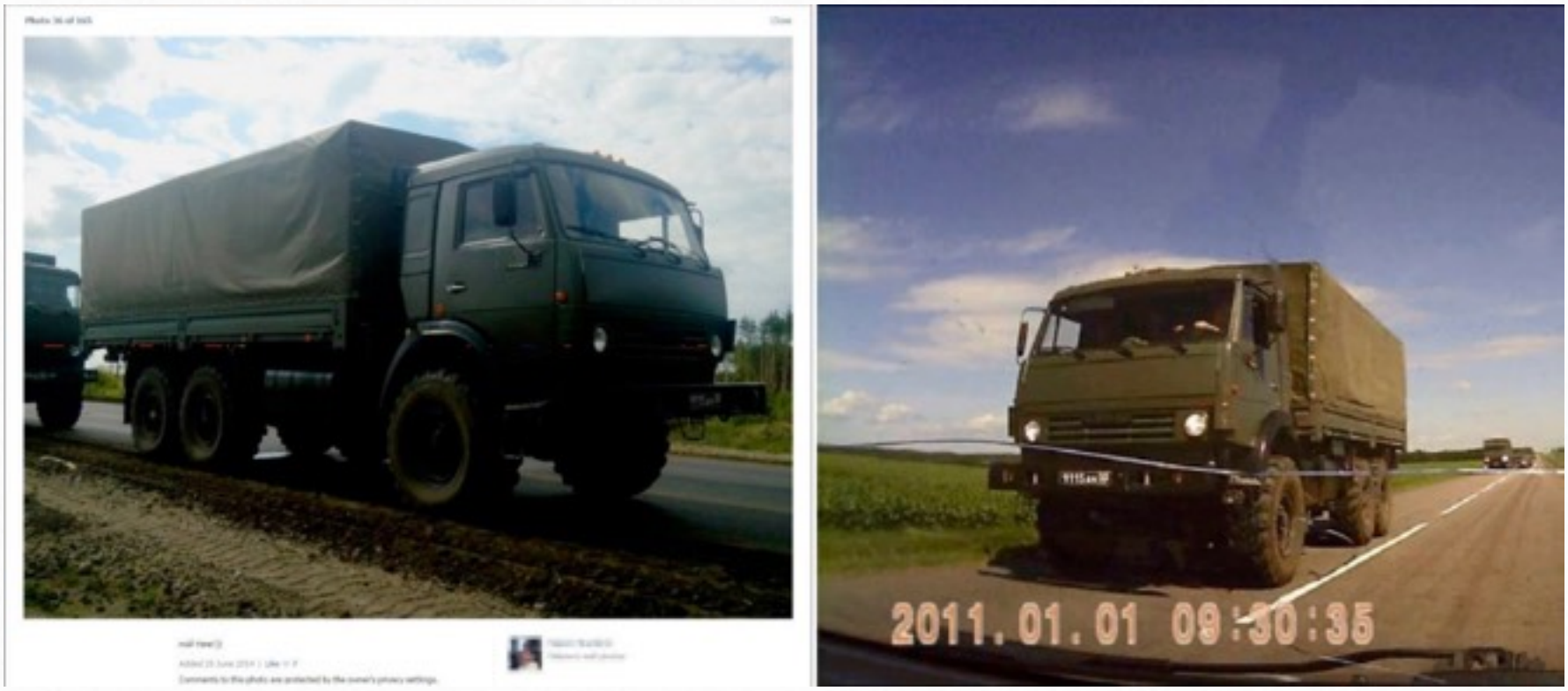
Russian Buk 332 of the 53rd Anti-Aircraft Missile Brigade shot down MH17 on July 17, 2014 after firing from a field south of the Ukrainian town of Snizhne. But how did it get there?

For additional information on the Buk that downed MH17 and its origin in Russia, see the following investigations and articles:

- Bellingcat: Origin of the Separatists' Buk
- Bellingcat: The Lost Digit: Buk 3x2
- Bellingcat: The Latest Open Source Theories, Speculations and Debunks on Flight MH17
- Bellingcat: Video Comparison Confirms the Buk Linked to the Downing of MH17 Came from Russia
- Bellingcat: MH17 Joint Investigation Team's New Video Brings New Facts to Light
- Bellingcat: Pre-MH17 Photograph of Buk 332 Discovered
- Novaya Gazeta: It was a "Buk-M1"

8

The June Convoy



Vehicle in the June 23-25, 2014 convoy on VK and dash cam

The full power of open source information gathering can be seen in the reconstruction of the convoy of the 53rd Anti-Aircraft Missile Brigade from their base near Kursk to the Russia-Ukraine border in June 2014. This convoy, which included Buk 332, was photographed and filmed by ordinary Russians who lived along this convoy's route. Each of the images and videos were geolocated to the exact location where it was captured, providing an accurate representation of the convoy's route.

It was possible to confirm which members and battalions of the 53rd Brigade were part of the convoy. Furthermore, Bellingcat's research into the convoy identified the military transport battalions involved in the convoy, including the identities of individuals who could have driven the vehicle transporting Buk 332. The information published on Bellingcat, and

additional unpublished information, has been provided to the Dutch-led Joint Investigation Team investigating the downing of MH17.

Route of the June 2014 convoy that transported Buk 332 from near Kursk, Russia to Millerovo, by the Russia-Ukraine border

	Combat Weapons			Combat Weapons		
Brigade	1st Battalion	Crew	No.	1st Battalion - 1st Battery	Crew	No.
	Command post (CP) 9S470M1-2	6	100	Missile launcher with radar (TELAR) 9A310M1-2	4	111
	Snow Drift radar (Kupol) 9S18M1-1	3	101	Missile launcher with radar (TELAR) 9A310M1-2	4	112
	BTR 80	3 + 7	993	Missile launcher with crane (TEL) 9A39M1	3	113
Hardware	Hardware System			Combat Weapons		
Mobile automated control and test station ACIS 9V930M-1	Car maintenance (MTO) 9V884M1			1st Battalion - 2nd Battery	Crew	No.
	Workshop maintenance MTO-ATG-M1			Missile launcher with radar (TELAR) 9A310M1-2	4	121
	Car repair and maintenance (MRTO)			Missile launcher with radar (TELAR) 9A310M1-2	4	122
	Transport machines for Missiles (TM) 9T243	8	Missiles	Missile launcher with crane (TEL) 9A39M1	3	123
	Transport machines for Missiles (TM) 9T243	8	Missiles	Combat Weapons		
	Transport machines for Missiles (TM) 9T243	8	Missiles	1st Battalion - 3rd Battery	Crew	No.
	Transport machines for Missiles (TM) 9T243	8	Missiles	Missile launcher with radar (TELAR) 9A310M1-2	4	131
	Compressor station UKS - 400V-P4M			Missile launcher with radar (TELAR) 9A310M1-2	4	132
	Mobile power PES - 100-T / 230-B / 400 A1RK1			Missile launcher with crane (TEL) 9A39M1	3	133
	Combat Weapons			Combat Weapons		
	2nd Battalion	Crew	No.	2nd Battalion - 1st Battery	Crew	No.
	Command post (CP) 9S470M1-2	6	200	Missile launcher with radar (TELAR) 9A310M1-2	4	211
	Snow Drift radar (Kupol) 9S18M1-1	3	201	Missile launcher with radar (TELAR) 9A310M1-2	4	212
	BTR 80	3 + 7		Missile launcher with crane (TEL) 9A39M1	3	213
	Hardware System			Combat Weapons		
	Car maintenance (MTO) 9V884M1			2nd Battalion - 2nd Battery	Crew	No.
	Workshop maintenance MTO-ATG-M1			Missile launcher with radar (TELAR) 9A310M1-2	4	221
	Car repair and maintenance (MRTO)			Missile launcher with radar (TELAR) 9A310M1-2	4	222
	Transport machines for Missiles (TM) 9T243	8	Missiles	Missile launcher with crane (TEL) 9A39M1	3	223
	Transport machines for Missiles (TM) 9T243	8	Missiles	Combat Weapons		
	Transport machines for Missiles (TM) 9T243	8	Missiles	2nd Battalion - 3rd Battery	Crew	No.
	Transport machines for Missiles (TM) 9T243	8	Missiles	Missile launcher with radar (TELAR) 9A310M1-2	4	231
	Compressor station UKS - 400V-P4M			Missile launcher with radar (TELAR) 9A310M1-2	4	232
	Mobile power PES - 100-T / 230-B / 400 A1RK1			Missile launcher with crane (TEL) 9A39M1	3	233
	Combat Weapons			Combat Weapons		
	3rd Battalion	Crew	No.	3rd Battalion - 1st Battery	Crew	No.
	Command post (CP) 9S470M1-2	6	300	Missile launcher with radar (TELAR) 9A310M1-2	4	311
	Snow Drift radar (Kupol) 9S18M1-1	3	301	Missile launcher with radar (TELAR) 9A310M1-2	4	312
	BTR 80	3 + 7		Missile launcher with crane (TEL) 9A39M1	3	313
	Hardware System			Combat Weapons		
	Car maintenance (MTO) 9V884M1			3rd Battalion - 2nd Battery	Crew	No.
	Workshop maintenance MTO-ATG-M1			Missile launcher with radar (TELAR) 9A310M1-2	4	321
	Car repair and maintenance (MRTO)			Missile launcher with radar (TELAR) 9A310M1-2	4	322
	Transport machines for Missiles (TM) 9T243	8	Missiles	Missile launcher with crane (TEL) 9A39M1	3	323
	Transport machines for Missiles (TM) 9T243	8	Missiles	Combat Weapons		
	Transport machines for Missiles (TM) 9T243	8	Missiles	3rd Battalion - 3rd Battery	Crew	No.
	Transport machines for Missiles (TM) 9T243	8	Missiles	Missile launcher with radar (TELAR) 9A310M1-2	4	331
	Compressor station UKS - 400V-P4M;			Missile launcher with radar (TELAR) 9A310M1-2	4	332
	Mobile power PES - 100-T / 230-B / 400 A1RK1			Missile launcher with crane (TEL) 9A39M1	3	333

Organizational structure for Russia's 53rd Anti-Aircraft Misile Brigade in 2014, showing the equipment in each battalion.

By combining information regarding the organization structure of Russia's 53rd Anti-Aircraft Missile Brigade (seen in the previous page), and identifying the vehicles filmed in the June 23 - 25, 2014 convoy, we were able to determine that the second battalion of the brigade was involved in transporting the Buk that downed MH17 from its Kursk base to near the Russia-Ukraine border. While Buk 332 has a unit designation for the 3rd battalion, it was with the 2nd battalion because it served as a replacement for Buk TELAR 222, which was not present in the convoy.

Therefore, in the case of the downing of MH17, the most important potential suspects or witnesses from the 53rd Anti-Aircraft Missile Brigade are most likely servicemen from the 2nd battalion, along with the driver-soldiers who were involved in the June 23-25 convoy.

For additional information on the convoy transporting Buk 332 from near Kursk to Millerovo, see the following investigations and articles:

- Bellingcat: Exploring Russia's 53rd Brigade's MH17 Convoy with Storymap
- Bellingcat: Images Show the Buk that Downed Flight MH17, Inside Russia, Controlled by Russian Troops
- Bellingcat: Geolocating the MH17 Buk Convoy in Russia
- Bellingcat: Video Comparison Confirms the Buk Linked to the Downing of MH17 Came from Russia

9

The Potential Suspects

Members of Russia’s 53rd Anti-Aircraft Missile Brigade from 2012

Bellingcat spent nearly one-and-a-half years investigating Russia’s 53rd Anti-Aircraft Missle Brigade, whose Buk downed MH17 in Ukraine. With over 200 soldiers’ social media profiles identified, it has been possible to confirm the identity and roles of many members of the 53rd Brigade and their involvement in the June 23-25 convoy that transported Buk 332 to the Russia-Ukraine border. Fewer than four weeks after the convoy reached its destination, this Buk shot down MH17.

The 53rd Brigade is made up of three battalions: the 1st, 2nd, and 3rd. The 1st and 2nd Battalions were active in the summer of 2014, while the 3rd Battalion was used for training. The 2nd Battalion was responsible for the transport of Buk 332, which replaced the 2nd Battalion’s missile launcher numbered 222 in the convoy.

53rd Anti-Aircraft Missile Brigade - Kursk

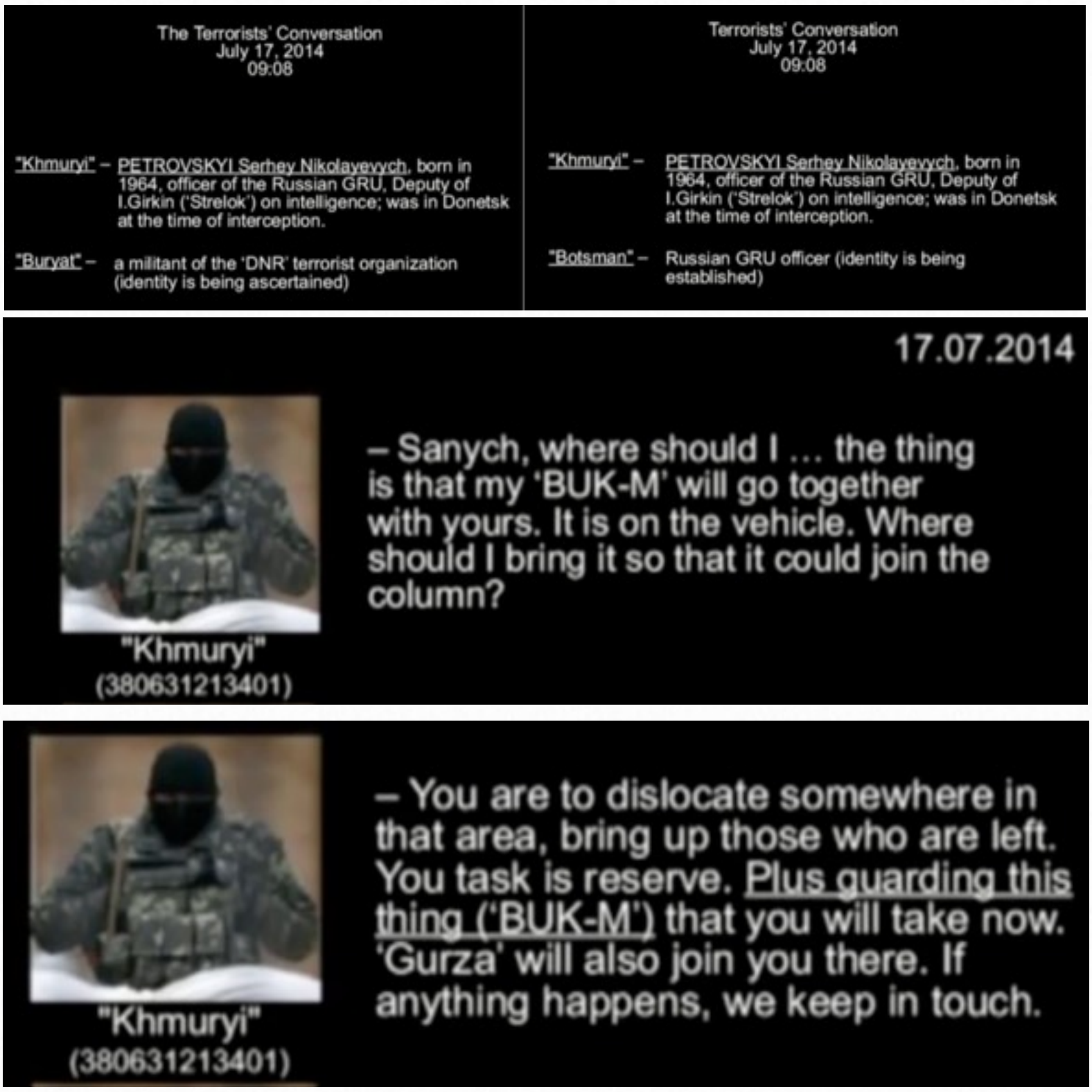
Command structure of the 53rd Brigade, including their commander, Sergey Muchkaev. Identities of the officers has been concealed for privacy.

Information regarding the commanders and soldiers of the 53rd Brigade can be found in Bellingcat's February 2016 report, Potential Suspects and Witnesses from the 53rd Anti-Aircraft Missile Brigade. A lengthier and uncensored version of this report, which reconstructed the leadership structure of the brigade and identified specific individuals who were most likely in command of Buk 332 and held decision-making power in sending a Buk into Ukraine, was provided to the Dutch-led Joint Investigation Team.

However, perhaps the most well-known potential suspect for the downing of MH17 is Sergey "Khmury" Dubinsky, a veteran of the Russian Armed Forces who served as the head of intelligence for Igor "Strelkov" Girkin's separatist forces in 2014.

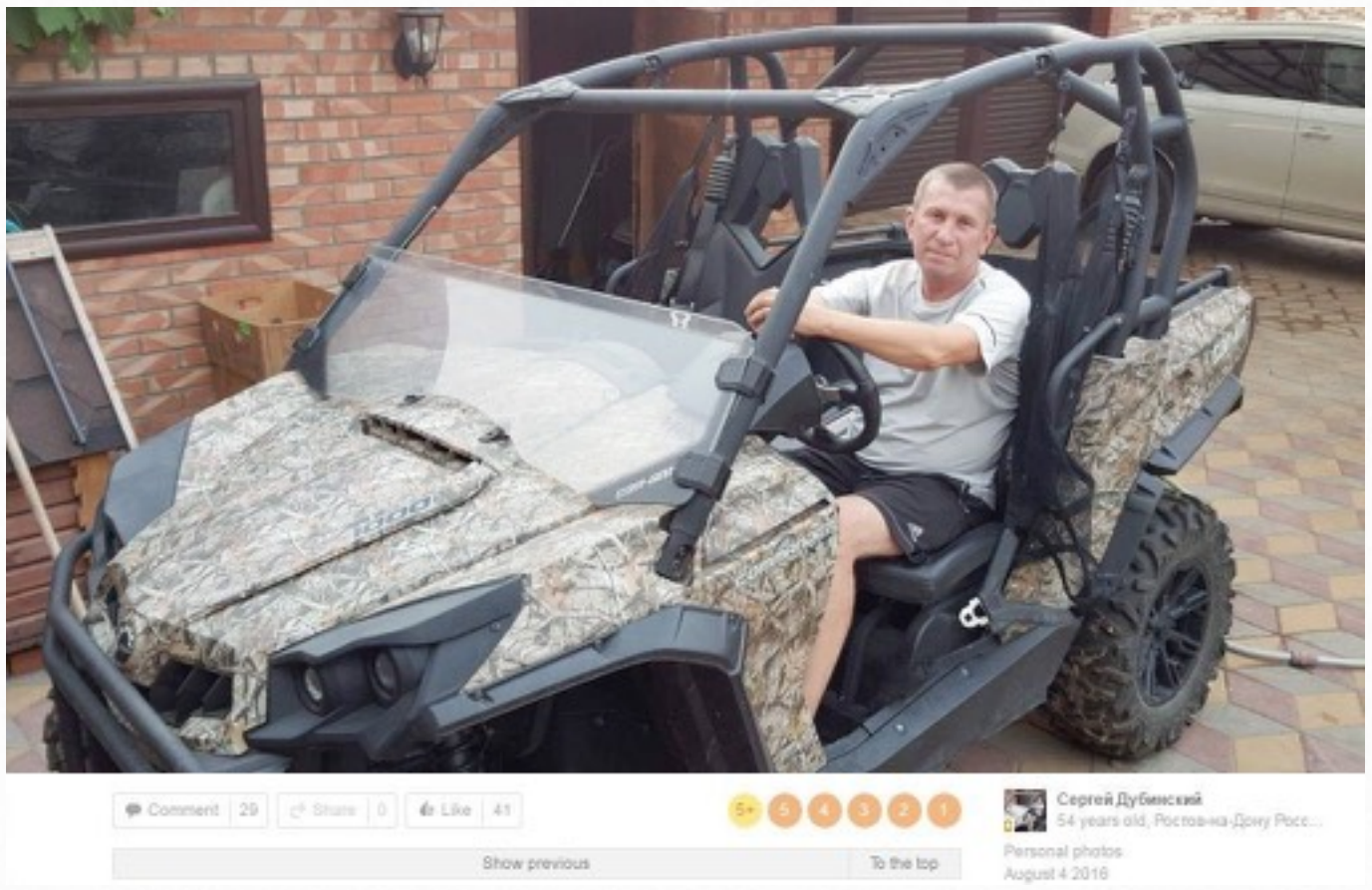
Sergey Dubinsky at a February 18, 2016 meeting of the "Union of Donbass Volunteers," which was also attended by Kremlin aide Vladislav Surkov

Dubinsky operated under the call-sign “Khmury” while he was in the Donbas, where he served under Igor Girkin, spending most of his time in Sloviansk and Donetsk. The Ukrainian Security Services (SBU) have published a number of intercepted telephone conversations from July 17, 2014 with Dubinsky (Khmury) speaking about organizing the transport of a Buk through separatist-controlled territory. In the calls, he is listed as Sergey Nikolaevich Petrovsky, reflecting his real first name and patronymic (Sergey Nikolaevich), and a pseudonym he used while in the Donbas (Petrovsky).



Screenshots from intercepted telephone conversations published by the SBU

Throughout the intercepted calls, it is clear that Dubinsky is one of the key figures in the procurement and transport of the Buk missile launcher that downed MH17. He tells the separatist soldiers where to take the Buk, which fighters should be in the convoy with it, and so on. Multiple sources have confirmed that this voice is indeed Dubinsky, including a Novaya Gazeta investigation that cooperated with Swedish experts in audio and voice analysis. Sergey Dubinsky is currently living comfortably near Rostov, Russia.



Sergey Dubinsky at his home in Rostov, Russia in 2016

For additional information on Sergey Dubinsky and the Russia's 53rd Anti-Aircraft Missile Brigade, see the following investigations and articles:

- Bellingcat: Potential Suspects and Witnesses from the 53rd Anti-Aircraft Missile Brigade
- Bellingcat: Origin of the Separatists' Buk
- Bellingcat: The Role of Sergey Dubinsky in the Downing of MH17
- InformNapalm: Detailed information about general-major of the Russian Federation suspected in the MH17 case
- Novaya Gazeta: "Hmuriy's" Voice
- What Happened to Flight MH17: Dutch TV: Seraching for Sergey Dubinsky

10

The Russian Response: July 2014

Russian Ministry of Defense spokesperson at its July 21 press conference

In the three years since the downing of MH17, the Russian government and the government-owned defense manufacturer Almaz-Antey have promoted a series of contradicting claims. However, there is a common element in these claims - Ukraine, not Russia, was responsible for the downing.

The following two chapters will focus on those claims coming from entities with direct ties to the Russian government, including state officials, state-owned companies, and state-funded media outlets. This chapter will focus on the claims from Russia immediately after the shootdown, with a focus on the Russian Ministry of Defense (MoD)'s July 21 press conference. Later Russian claims are considered in Chapter 11. Claims regarding MH17 from sources that are not tied to the Russian government are discussed in Chapter 12.

On July 21, 2014, the Russian MoD gave a press conference in which they presented a number of claims on MH17, all of which proclaimed or implied Ukrainian guilt. While all of their claims pointed towards Ukraine, there was little consistency between the claims, simultaneously implying that Ukraine used a fighter jet and an anti-aircraft missile system to down the passenger jet. In this press conference held four days after the tragedy, the Russian MoD made four primary claims:

- The video published by the Ukrainian Ministry of Interior showing a Buk in separatist-controlled Luhansk from July 18, 2014 was actually filmed in government-controlled Krasnoarmeysk
- MH17 changed its course significantly just before being shot down
- Radar imagery shows an aircraft that was close to MH17 shortly after it was shot down, implying that this aircraft was a Ukrainian fighter jet (likely a Su-25)
- Satellite imagery shows Ukrainian Buk missile launchers missing from their base and were deployed dozens of kilometers away in supposedly government-controlled territory on July 17 in eastern Ukraine

All of these claims are demonstrably false, and in some cases included deliberately fabricated evidence from the Russian Ministry of Defense.

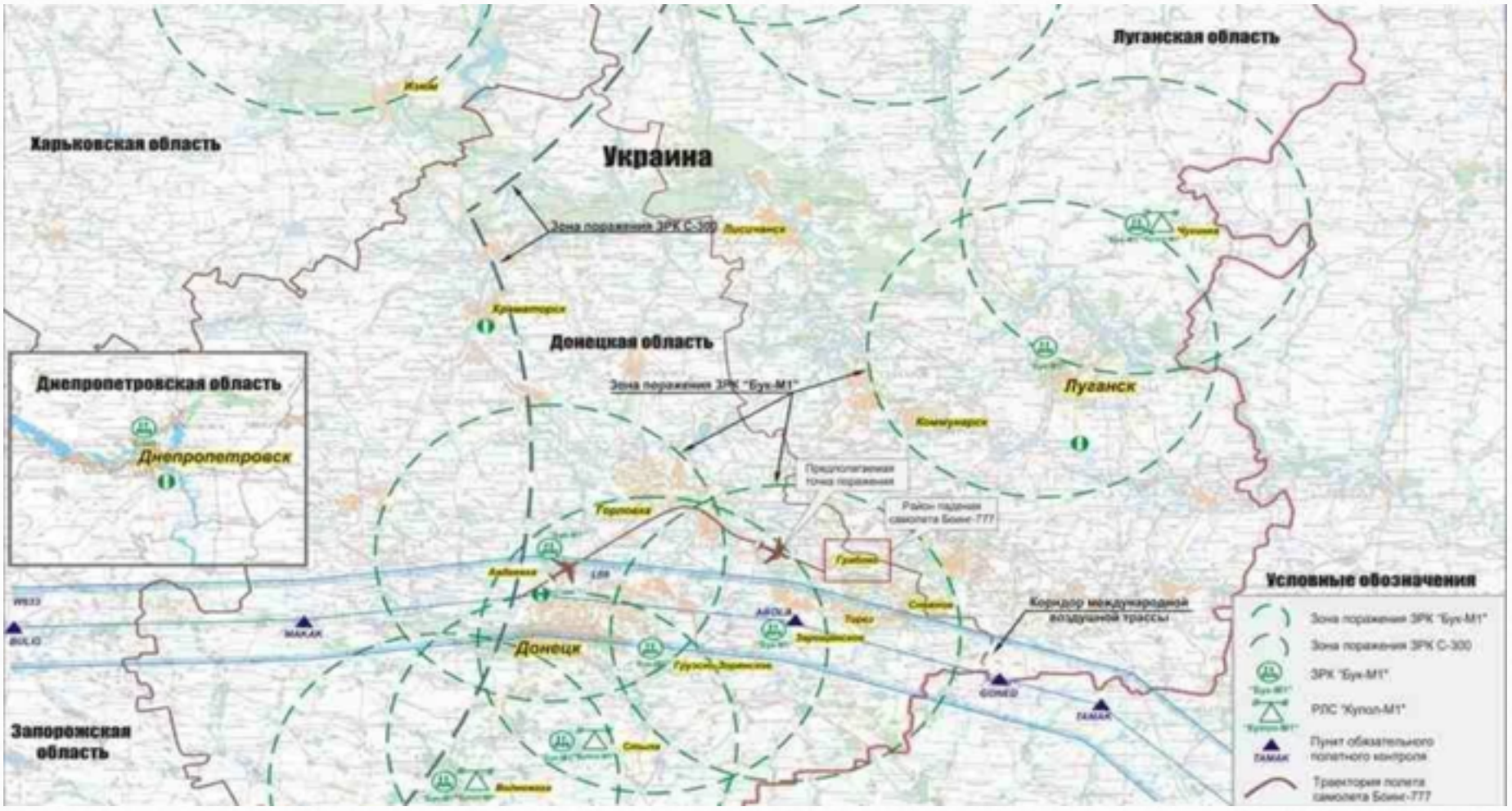
The first claim is tied to the Luhansk video, which was detailed in Chapter 5 of this report. While it has become an indisputable fact that the video was filmed in Luhansk since July 2014, at the time the matter was not completely clear. Russian Ministry of Defense spokesperson General Igor Konashenkov explicitly said that this video was filmed in government-controlled Krasnoarmeysk, about 160 kilometers from separatist-controlled Luhansk. As Konashenkov said in the July 21 press conference:

"For example, media circulated a video supposedly showing a Buk system being moved from Ukraine to Russia. This is clearly a fabrication. ***This video was made in the town of Krasnoarmeisk, as evidenced by the billboard you see in the background, advertising a car dealership at 34 Dnepropetrovsk Street****. Krasnoarmeisk has been controlled by the Ukrainian military since May 11."*

Screenshot from the Russian MoD's July 21 press conference (top) and photograph taken by a Luhansk local (bottom)

The Russian MoD's evidence for this claim was deliberately fabricated, including an "address" supposedly on a billboard visible in the Luhansk video. According to the Russian MoD, there was text on this billboard that listed an address for the Bogdan car dealership at the address of Dnepropetrovskaya 34 in the government-controlled city of Krasnoarmeysk. However, soon after the Luhansk video was published, locals found the exact location where it was filmed, photographing this billboard. A number of Ukrainian and international journalists have visited the site and verified that it is the same as the one seen in the Buk video. As seen in the bottom half of the image above, the text highlighted by the Russian MoD does not exist. Instead of an address in Krasnoarmeysk (г. Красноармейск, ул. Днепропетровская, 34), the text on the billboard actually says "National autodealer" (Національний автодилер) in Ukrainian. Nowhere on this billboard is there any address for Krasnoarmeysk, rather there was one elsewhere on the billboard for a location in Luhansk, meaning that the evidence presented by the Russian MoD was fabricated.

The Russian MoD's second claim was that MH17 took a significant change in its course shortly before being shot down, implying that Ukrainian air traffic controllers purposefully guided the passenger plane into danger. At the July 21 press conference, the Russian MoD presented the map below which supposedly shows the flight path of MH17.



Alleged MH17 flight path from the July 21 press conference

The Russian MoD gave the following description for this map (provided times are for the Moscow time zone, one hour ahead of local time in the Donbas):

"On the scheme you can see the international airway. The Boeing-777 was supposed to fly on this airway. Draw your attention to the fact that the aircraft followed inside the specified air-corridor to Donetsk, then it deviated from the route to north. Meanwhile the maximum distance from the left border of the air-corridor was 14 kilometers. Then we can see that the Boeing-777 turned back to the borders of the specified air-corridor. Nevertheless Malaysian aircrew didn't succeed the maneuver. At 17.20 we entered the event of the aircraft rate reduction, at 17.23 the aircraft's point blinked off on the radar. Why did the aircraft cross the border of the air-corridor? Was it the navigation mistake, or the aircrew followed the Dnepropetrovsk ground control orders? We will find the answers after "black boxes" and communication decoding."

Section 2.1 of the Dutch Safety Board's report answered the questions posed by the Russian MoD, showing that MH17 had been on a different course than that which was claimed in the July 21 press conference and had not changed course in the way described in the Russian MoD's map. Unlike other parts of the Dutch Safety Board report, the Russian government did not challenge the Dutch Safety Board's claims regarding the flight path. In the image below, we highlighted the maps provided by the Russian MoD to focus on the flight paths provided in two Russian MoD press conferences - one in 2014, and the other in 2016. The supposed "significant change" in MH17's flight path can be seen in the sharp turn towards the northeast. There was a non-major change earlier in Ukraine due to weather. The actual flight path, seen on the right, shows that this sharp turn towards the northeast never took place, and MH17 was on a largely straight course at the time of the downing.

The Russian MoD's radar data from both July 21, 2014 and September 26, 2016. In the bottom-left, the supposed flight path of MH17 is shown from the 2014 press conference. On the right, MH17's flight path is presented by the same Russian MoD in 2016, showing a completely different path. The middle graphic shows the two paths overlaid, illustrating the divergent paths

For the third claim in the July 21 press conference, the Russian MoD presented radar data supposedly from the time immediately after MH17 was downed. In this radar data, a Russian official claimed that a Ukrainian fighter jet was detected shortly after the downing of MH17:

“Russian system of air control detected the Ukrainian Air Force aircraft, purposed Su-25, moving upwards toward to the Malaysian Boeing-777. The distance between aircrafts was 3-5 kilometers.”

Chief of Staff of the Air Force Lieutenant-General Igor Makushev was then invited to comment on the radar data:

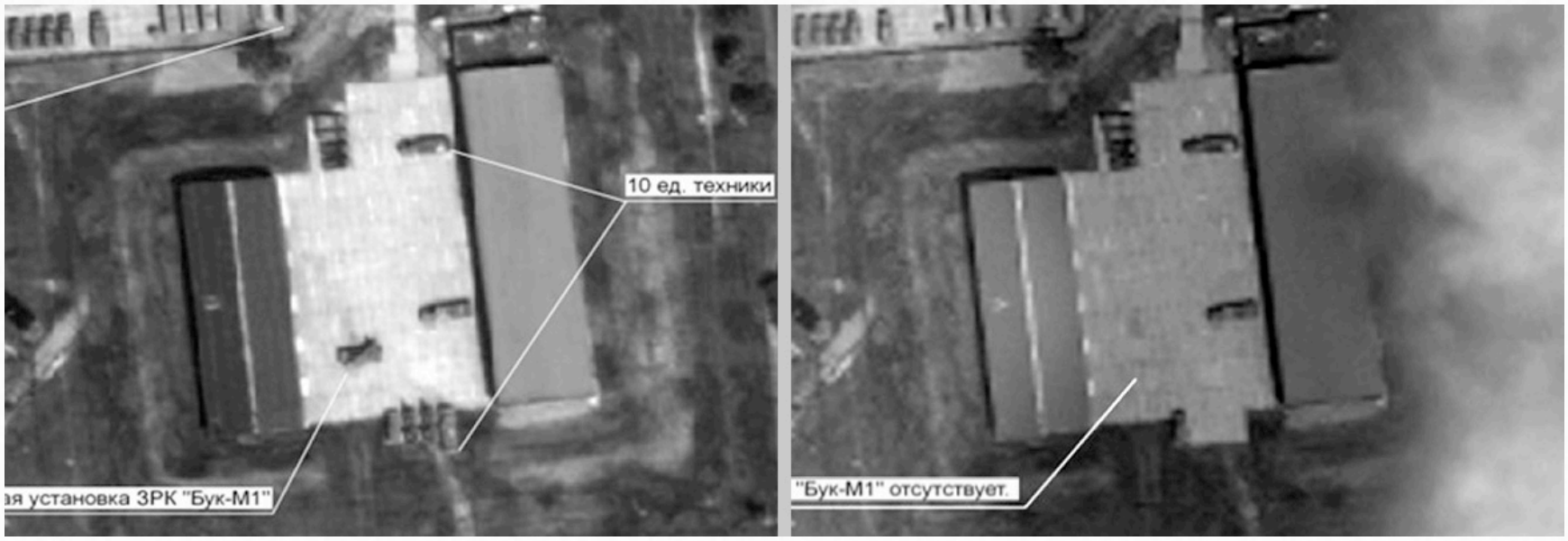
“The aircraft was steadily monitored by radar stations of Ust-Donetsk and Butirinskoe during 4 minutes period. Air control officer having enquired the characteristics of newly appeared aircraft couldn’t possibly get them because it is in all likelihood that the aircraft had no secondary deduction system amounted on it, which is put typically for military aircraft. (…) The detection of the aircraft turned out to be possible as the aircraft ascend it.”

However, radar experts were interviewed by a number of news organizations who gave a different opinion, with Dutch NOS news asking four experts to give their opinions. Comments included, “it is really impossible for [it to be] a fighter,” “no aircraft was in the vicinity of flight MH17,″ “it seems likely that the signals are the wreckage of MH17,″ and “falling debris are the most likely explanation.” The BBC documentary *The Conspiracy Files, Who Shot Down MH17?* included the former air accident investigator David Gleave, who stated:

"I've seen a lot of radar data in my time as an investigator and when aircraft break up in mid-air some of the time they can continue to transmit radar data on the way down. They may well change direction, because they've lost the tail or something like that, so they don't the stability to carry on in a straight line."

The Dutch Safety Board also stated had “explicitly ruled out…the presence of military aircraft in the immediate vicinity of flight MH17” and “within 30km of flight MH17 no (military) aircraft were present at the time of the crash.” Russia’s 2016 press conference confirmed this finding.In other words, in 2014 Russia either misinterpreted or fabricated the radar data presented in the press conference.

The fourth and final claim made by the Russian MoD was in a set of satellite imagery showing two Ukrainian military bases and a field outside of the town of Zaroshchenske at coordinates 47.983031, 38.450387. In two images shown by the Russian MoD of the A-1428 military base outside of Spartak, near Donetsk, then controlled by the Ukrainian Armed Forces, a Buk missile launcher is present on July 14, 2014, then is gone on July 17, 2014. The clear implication is that Ukraine deployed this Buk missile launcher and shot down MH17. However, the satellite images provided by the Russian MoD are both misdated and fabricated. In the satellite image supposedly taken on July 14, a patch of vegetation is present on the left part of the image. However, this patch of vegetation was already removed in June.



Sections of the Russian MoD's satellite imagery showing the positions of a Buk missile launcher on July 14 (left) and July 17 (right)

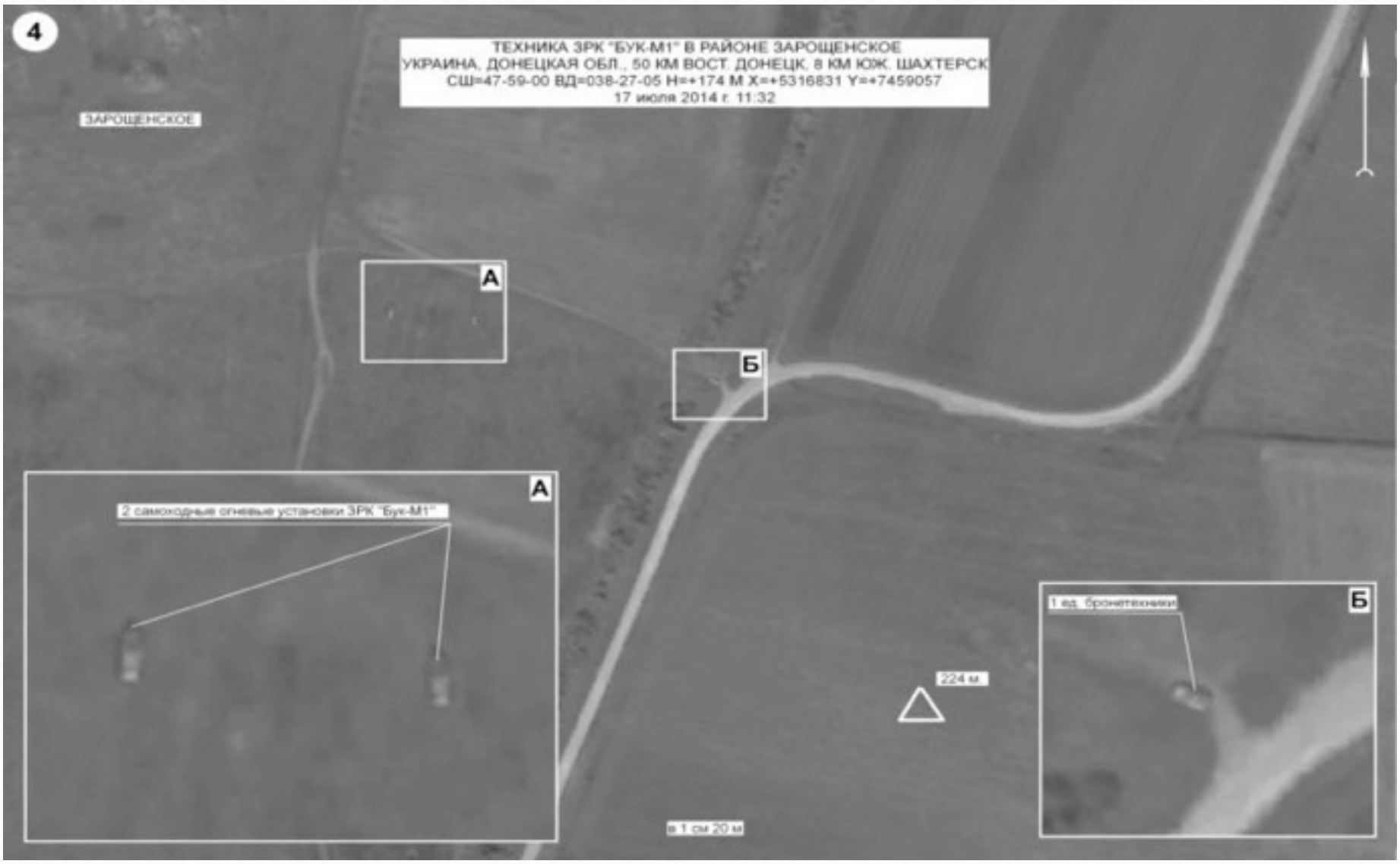
Comparison of vegetation on Digital Globe satellite images, compared to the July 14 image provided by the Russian MoD (far-right)

This is not the only discrepancy between the satellite imagery published by the Russian MoD and satellite imagery of the same location freely accessible on Google Earth. There is also an area where patches of grass were worn away in May 2014, but regrew by July 17. In the Russian MoD satellite imagery supposedly taken on July 14 and 17, this area strongly resembles satellite imagery taken on May 30, and looks nothing like that of July 17.

Comparison of satellite imagery from Digital Globe of May 30, 2014 with the July 14 and 17 imagery published by the Russian MoD

Comparison of satellite imagery from Digital Globe of July 17, 2014 with the July 14 and 17 imagery published by the Russian MoD

The Russian MoD also published a satellite image supposedly taken outside of the village of Zaroshchenske, showing two Buk missile launchers in a field on July 17, 2014, at 11:32am. Before even considering the validity of the image, there is a clear issue with this timeline. Digital Globe satellite imagery from July 17, 2014, taken at 11:08am local time, shows that the Buk missile launcher that supposedly left the base on the same day was still present. If this missile launcher reached Zaroshchenske by 11:32am, as implied by the Russian MoD, it would have had to travel over 70 kilometers in 24 minutes, through separatist-controlled territory. It is safe to state that neither this Buk or a truck carrying it could travel move at a speed of over 150 kilometers per hour (93 mph) through separatist-controlled territory, not even considering the time required to load and unload the vehicles.



Satellite image provided by the Russian MoD near Zaroshchenske

Even if we give the Russian MoD some leeway and allow that these two Buks near Zaroshchenske had nothing to do with the base A-1428 base, there are plenty of other questions surrounding this image. The forensic issues with this satellite image are explained later in this chapter, while the question of what happened, or more specifically what *did not* happen, in Zaroshchenske on July 17, 2014 is answered the subsequent chapter.

Clearly, there are some problems regarding when the satellite imagery provided by the Russian MoD was taken, as geographical features point to the A-1428 images supposedly taken on July 14 and 17 actually being from June. However, even if these features are discounted, there are two professional analyses into the Russian MoD's satellite images demonstrating that they were fabricated and misdated.

In Spring 2016 Bellingcat contacted the Geospatial Technologies Project at the American Association for the Advancement of Science (AAAS) with a request to independently review the satellite images provided by the Russian MoD on July 21, 2014. AAAS tasked two analysts who each independently reviewed these images, and the AAAS responded to Bellingcat with details of their findings. They found that the shadows of two objects (seen below) on the Russian MoD's satellite images do not correspond with the given dates provided by Russia, meaning that either the time, date, or both time and date of the satellite image are incorrect.

Image highlighting the object used to measure solar azimuth

Additionally, on the second anniversary of the MH17 downing, Jeffrey Lewis and his colleagues at the James Martin Center for Nonproliferation Studies at the Middlebury Institute of International Studies conducted a detailed forensic analysis of the Russian MoD's satellite imagery with the tool Tungstène, originally developed for the French Ministry of Defense. Regarding the July 17 satellite image of A-1428, showing that a Ukrainian Buk missile launcher was absent from the base, Lewis and his colleagues found that:

"Even with the low quality of the image, we can assess this image to have been so heavily manipulated that it lacks any credibility as evidence. These modifications involve the alteration or addition of one, and possibly both, clouds. Russia should provide the original, unaltered image to the Joint Investigation Team for examination."

A similar conclusion was reached with the Zaroshchenske image. In this image, Lewis and his colleagues found that the two Buk missile launchers in the field were digitally added:

"There are a range of explanations for why the Buk surface-to-air missile launchers might have been altered. It is possible that they were digitally manipulated in order to look better. It is also possible that someone took a real image of two Buk surface-to-air missile launchers from some other image and pasted it into the satellite image dated 17 July 2014…

…Even with the low quality of the image, we can assess this image to have been so heavily manipulated that it lacks any credibility as evidence. These modifications involve the alteration or addition of the two alleged Buk surface-to-air missile launchers that Russia asserts were present on the day of the shoot-down."

For additional information on the Russian MoD's July 21 press conference, please see the following investigations and articles:

- RT: Russian military unveil data on MH17 incident over Ukraine (FULL)
- Bellingcat: The Russian Defence Ministry Presents Evidence They Faked Their Previous MH17 Evidence
- Arms Control Wonk: MH17 Anniversary

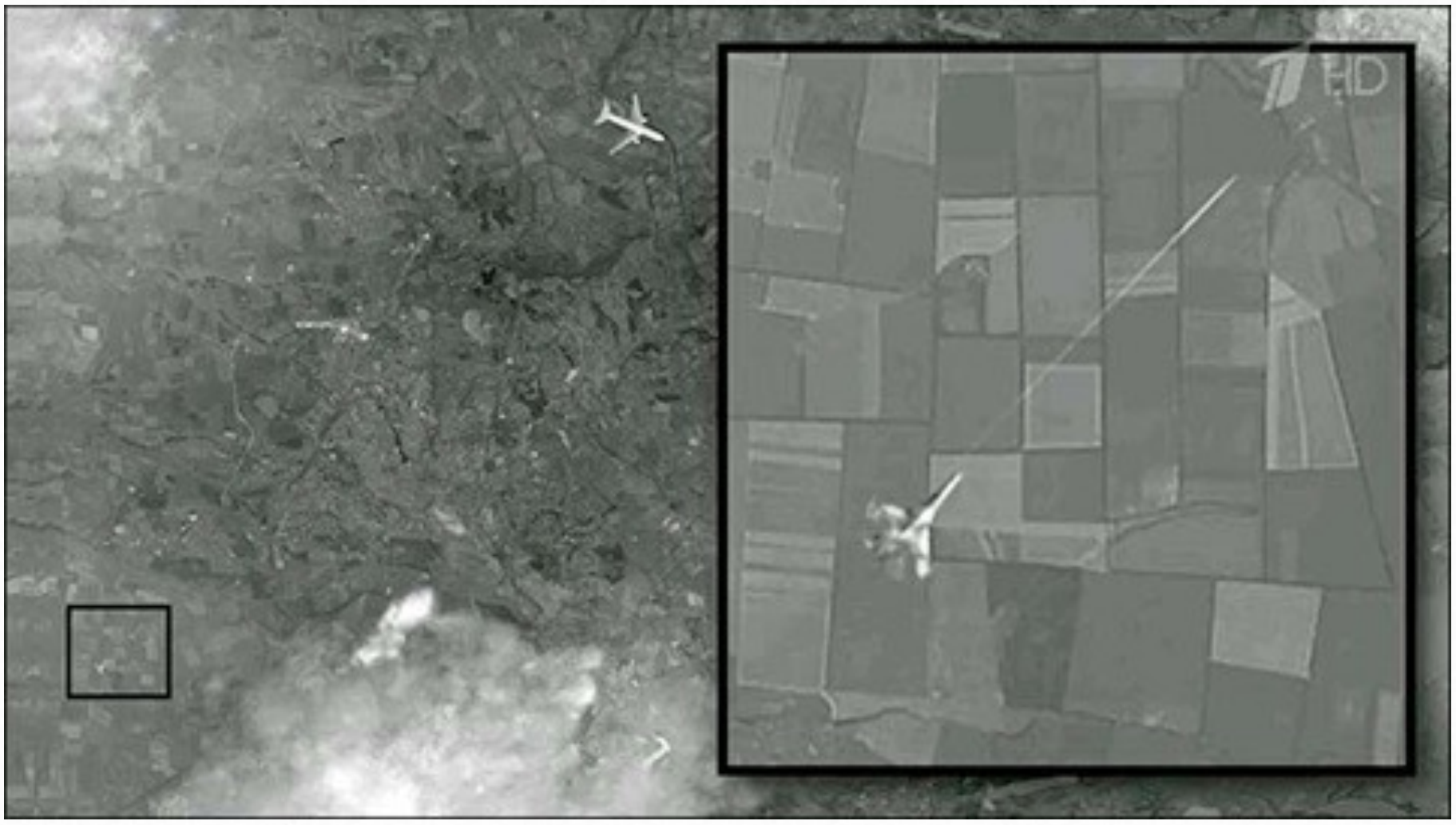
11

The Russian Response: After July

The first Almaz-Antey presentation

All four of the primary claims made by the Russian Ministry of Defense during its July 21, 2014 press conference were incorrect. Since July 2014, there has been a flurry of claims from the Russian government, state-funded media, and the state-funded defense company Almaz-Antey, which manufactures Buk missiles.

Most famously, state-funded Russian television channel Channel One published an explosive report showing an unearthed satellite image depicting a fighter jet downing a passenger jet. This segment aired on November 14, 2014 on Mikhail Leontiev's "Odnako" program, and the findings were immediately shared elsewhere on Russian state-funded media, including its main news agency TASS.



Screenshot from Channel One program showing “shoot down” of MH17

TASS RUSSIAN NEWS AGENCY

Russian Politics & Diplomacy | World | Business & Economy | Military & Defense | Science

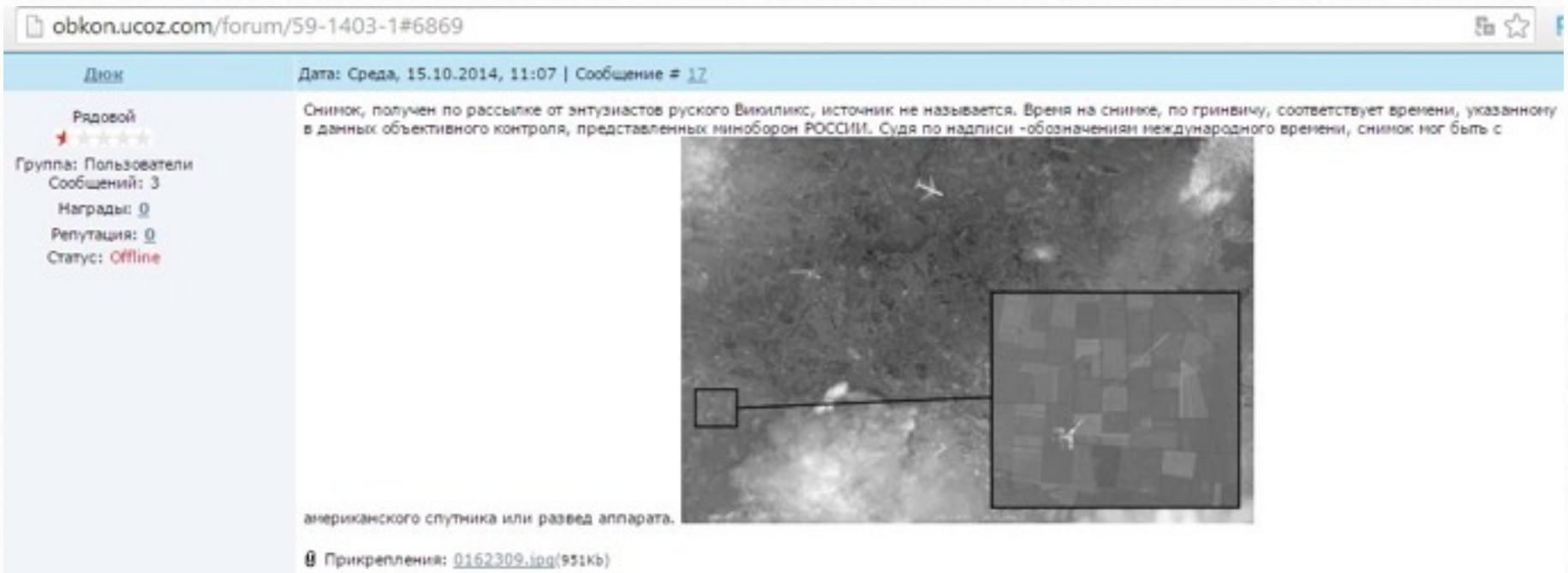
Russia’s Channel One show satellite photo evidencing MH17 was downed by fighter jet

World November 14, 2014, 23:38 UTC+3

First, the Boeing came under gun fire and then the cockpit was hit by an air-to-air missile, its right engine and the right wing were hit by a heat-seeking missile

Screenshot of TASS article covering the Channel One story

The “satellite image” was almost instantly debunked. The jet was the wrong model, and the two aircrafts were of the wrong scale by an exponential scale. If the satellite was at a normal height when taking this image, it would have meant that the Boeing passenger jet was over a mile long, with its length to scale in the satellite image. It turns out that the satellite image was a crudely made fake posted on an online message board in October 2014, which was then turned into an “exclusive” discovery by Mikhail Leontiev and his news program.



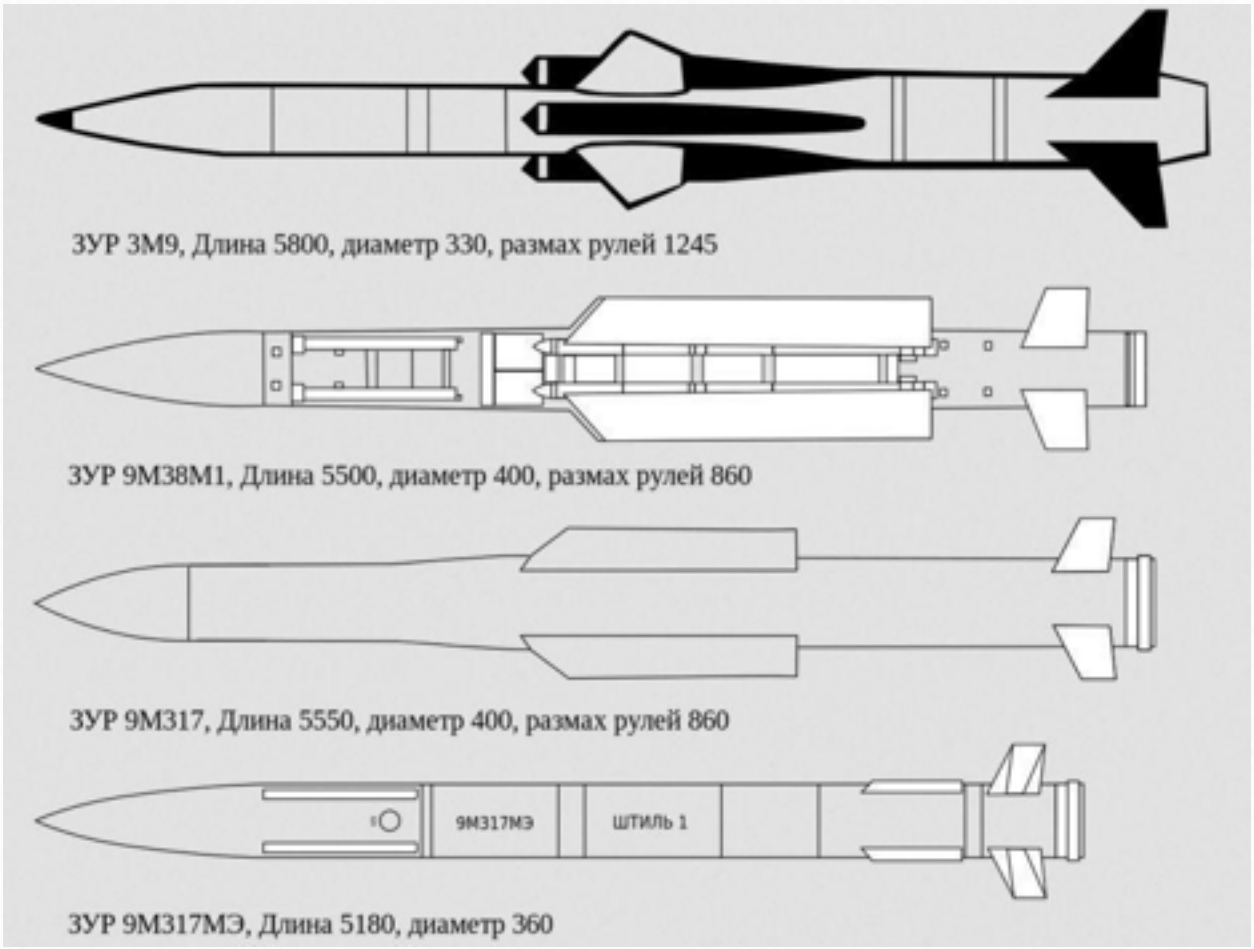
Message board post with the satellite image later shared by Channel One

The Vice President of the “Russian Union of Engineers” told Leontiev that “We can assume that the photograph was taken by an American or British satellite. We have studied the photograph in detail and found nothing suggesting that it is fake.”

The state-owned Russian arms company, Almaz-Antey, manufactures Buk missile systems, and was directly affected by sanctions placed on Russia. In response, this arms manufacturer has given two inconsistent presentations related to the downing, in which two different missiles types are presented as having downed MH17, and a flashy experiment in which the position of the missile was supposedly determined. On June 2, 2015 Almaz-Antey presented evidence claiming to show the specific type of missile used to shoot down MH17 in Ukraine. They were quoted as stating:

“If a surface-to-air missile system was used [to hit the plane], it could only have been a 9M38M1 missile of the BUK-M1 system. (…) Production of BUK-M1 missiles was

discontinued in 1999, at the same time Russia passed all such missiles that were left to international clients."



Comparison of surface to air anti-aircraft missiles

The clear implication was that the Buk missile used to shoot down MH17 could have not come from Russia. The most obvious visual difference between the 9M38M1 missile, and the newer 9M317, which was allegedly used, is the length of the fins, with the 9M38M1 having longer fins, as visible above.

Despite these longer fins being visible on Buk missiles loaded onto launchers at Russia's Victory Day Parade in Chita, the Almaz-Antey's head, Yan Novikov claimed "that only the newer BUK-M2 systems with 9M317 missiles take part in modern parades," adding, "even an untrained eye can tell the two apart." Despite this claim, internet users came across numerous images of what seemed to be 9M38M1 missiles in military service in Russia.

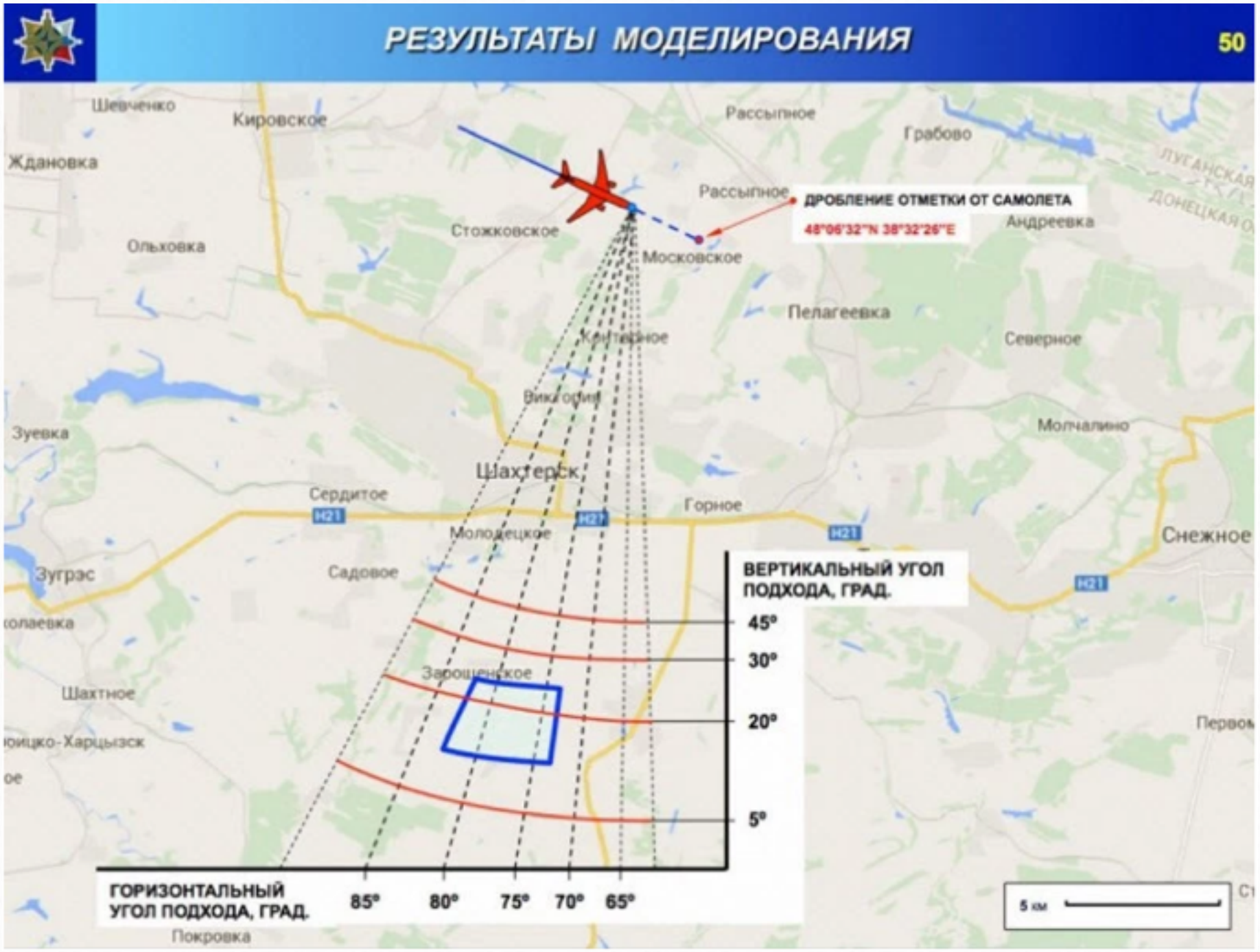
Reuters photographs taken on a road near Kamensk-Shakhtinsky, dated August 16, 2014, shows Russian military vehicles heading toward the town, close to the Ukrainian border. Trucks in the photographs are carrying a number of missile crates, and their markings give a clear indication of their likely contents.

Magnified sections of photographs taken at Kamensk-Shakhtinsky in August 2014 (Source - Reuters)

These crates are marked 9M38M1, and it was also possible to identity two vehicles in the Reuters' photographs as being part of the June 23-25, 2014 53rd Brigade convoy transporting Buk 332. It is also possible to identify missiles in videos of the 53rd Brigade convoy as having the long tail fins associated with the 9M38M1 missile.

In its two press conferences, Almaz-Antey has given two different, but similar, launch locations for a 9M38M1 missile that downed MH17. Both are closest to the village of Zaroshchenske, and while there is no documented pro-Russian military presence in the village itself, the area south of the village was under pro-Russian control.

In their July 21, 2014 press conference, Russian MoD pointed to the first launch site proposed by Almaz-Antey as evidenced in their fabricated satellite images showing Buk missile launchers deployed in a field just outside of the village on July 17, 2014.



Almaz-Antey's first proposed missile launch site, near Zaroshchenske

Before examining much of the evidence surrounding the claims of the Russian MoD and Almaz-Antey, the most direct and obvious evidence should be considered: witness accounts from the village of Zaroshchenske. While there are dozens of witness accounts, photographs, and videos of a Buk missile launcher between Donetsk and Snizhne on July 17, we do not have a single witness account – reliable or otherwise – of a Buk missile launcher or launch near Zaroshchenske on July 17. Multiple media outlets, including the Russian newspaper Novaya Gazeta, the BBC, the Dutch television station NOS, and the German investigative group Correct!v, all interviewed locals in and around Zaroshchenske – not a single person saw or heard anything resembling a missile launch.

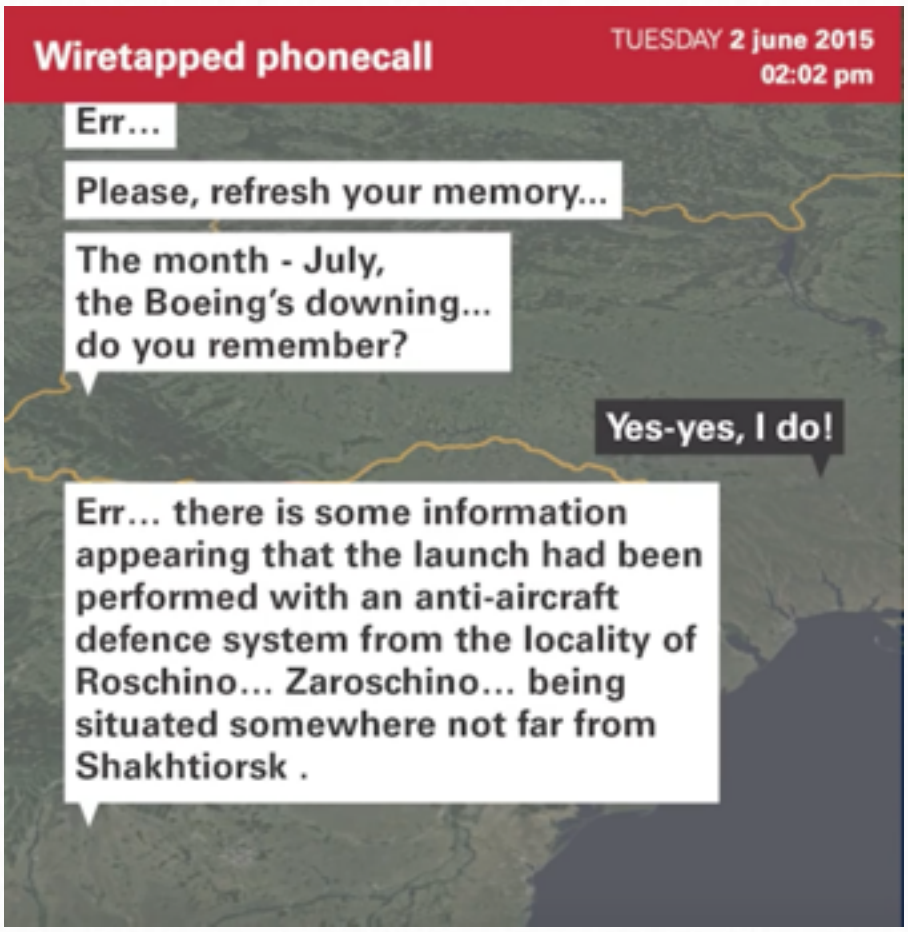
These witness accounts alone go far in disputing the Russian Defence Ministry and Almaz-Antey accounts. However, if one believes that the witnesses were mistaken, or just

happened to miss a missile launch in their sleepy village that had been largely untouched by war, then there is additional evidence to consider.

Satellite images captured on July 16 and 21, 2014 show no signs of any track marks from the movements of large vehicles or burn marks from missile launches at the site shown in the Russian MoD satellite imagery. In addition, satellite imagery analysis by Dr. Jeffrey Lewis using the Tungstene forensic imagery analysis software shows the Russian MoD imagery of the area close to Zaroshchenske are heavily modified, with the Buk missile launchers features apparently pasted into the image (see page 56 for more details).

Russian MoD's proposed missile launch site, near Zaroshchenske

In their September 28, 2016 press conference, the JIT shared an intercepted telephone call between two separatist fighters discussing the town of Zaroshchenske. This call was made on June 2, 2015, on the same day as the Almaz-Antey press conference in which this village was discussed as the likely launch site for a Ukrainian Buk missile launch. Throughout the call, the separatists discuss how this village was not under Ukrainian control at the time, let alone a potential launch location for a missile, as no one saw or heard anything happen. These statements mirror the witness accounts from residents of Zaroshchenske, who were certain that there was no missile launch near the village on July 17, 2014.



Selection from the transcript published by the JIT showing the telephone conversation between two separatists approximately a year after the downing of MH17, in which the two men talk about Zaroshchenske

The Almaz-Antey launch sites were based on their estimation of the terminal orientation of the missile that downed MH17. The preceding paragraphs already documented that there is no open source evidence supporting these proposed launch sites. Furthermore, the estimated terminal orientation calculated by Almaz-Antey strongly differs from the terminal orientation estimate provided to the DSB; moreover, the Almaz-Antey launch site was considered to be the most unlikely scenario considered by the experts tasked by the DSB.

The overlapping counter-narratives of the Russian MoD and Almaz-Antey regarding a Ukrainian Buk and a launch site near Zaroshchenske are nonsensical when considering both direct and circumstantial evidence. From the start, the launch site itself was not controlled by Ukrainian forces on the day of the tragedy, and there are no traces of a missile launch in either witness accounts or satellite evidence.

Along with the Russian state-funded First Channel and missile manufacturer Almaz-Antey, the Russian Ministry of Foreign Affairs (MFA) has also issued questionable claims regarding the downing of MH17. In particular, Bellingcat initiated a correspondence with the Russian MFA, leading to a bizarre incident of plagiarism and recycled conspiracy theories.

On April 6, 2016 Russian MFA spokesperson Maria Zakharova made a statement about the work of Bellingcat, containing the allegation that “acting jointly with the current Ukrainian authorities, they [Bellingcat] continue to use all possible ‘fakes,’ to create quasi-evidence to blame Russia.” Bellingcat contacted the Russian MFA with a request for clarification of this statement, along with any evidence supporting it. The Russian MFA responded that “when she mentioned a group cooperating with the current Ukrainian Authorities, Maria Zakharova did not refer to Bellingcat, but to the Joint Investigation Team investigating the MH17 tragedy in the skies over Ukraine.”

Bellingcat responded, asking the Russian MFA to clarify they were accusing the criminal investigation into the downing of MH17 of working with the Ukrainian authorities and “using all possible fakes to create quasi-evidence.” In response, the Russian MFA did not answer the question, but rather sent a document with various attacks on Bellingcat’s work and the open source evidence. However, it quickly became apparent that the Russian MFA had plagiarized the criticism in the document from a popular pro-Kremlin blog, in some cases copying entire paragraphs from the original source without citations.

Since the July 21 press conference, the Russian MoD has only offered new radar data as original evidence supporting their alternative narrative surrounding the downing of MH17 - and even this evidence was in direct contradiction to other evidence that they have provided.

For additional information on Russia's state-sponsored response to the downing of MH17 after the July 21 press conference, please see the following investigations and articles:

- Bellingcat: Russian Ministry of Foreign Affairs Plagiarizes LiveJournal Posts in MH17 Response
- Bellingcat: Zaroshchens'ke Launch Site: Claims and Reality
- Bellingcat: Zaroshchens'ke Revisited: Almaz-Antey's New Launch Areas
- Bellingcat: Revelations and Confirmations from the MH17 JIT Press Conference
- Bellingcat: Evidence the Russian Military Supplied the Type of Missile Used to Shoot Down MH17
- Bellingcat: Quantum of Obfuscation

12

The Alternatives

Screenshot from segment filmed by Ukrainian Military TV showing a Ukrainian Buk, aired on July 16, 2014

Not all of the “alternative theories” regarding the downing of MH17 have been from official Russian state organs, such as its defense companies, foreign ministry, and majority state-owned media outlets. MH17 conspiracy theories have had a wide reach - for an idea of just how popular they are, search for information about MH17 on YouTube, where many of the most popular results are conspiracy theories. This report will not consider the more far-fetched conspiracy theories, such as a report published by a Russian propagandist that the United States planted a bomb on board MH17, or a range of theories tying the disappearance of MH370 with the downing of MH17. Instead, this chapter will consider the more reasonable ideas that deserve evidence-based consideration.

One of the most common alternative theories about the downing of MH17 online is the claim that a Ukrainian Buk with the number 312 was responsible for the tragedy, and not Russian Buk 332 of the 53rd Anti-Aircraft Missile Brigade. Much of this idea is rooted in a mistake made by the SBU on July 19, 2014, showing both the Buk that downed MH17 in Luhansk, and a Buk numbered 312 being hauled by a similar-looking truck.

Image shared by the SBU on July 19, 2014. On the top is Buk 332 in Luhansk on July 18, and on the bottom is Ukrainian Buk 312 on March 19, 2014 near Donetsk.

These Buks are completely different and have little in common. The Ukrainian Buk 312 was filmed at the Yasinovatsky post, just north of Donetsk, Ukraine, on March 19, 2014. This video was filmed while the Ukrainian Armed Forces were evacuating their military equipment during growing unrest in the country's east. This Buk 312 was transported to the airfield in Kramatorsk, where it was later photographed and seen in satellite images. There is no evidence that Buk 312 was ever deployed anywhere near the frontline or in separatist-held territory at or near July 17, 2014.

Another Ukrainian Buk in question is the one filmed during a segment aired by Ukrainian Military TV on July 16, 2014 - the day before the downing of MH17. In this video segment, Ukrainian equipment at an undisclosed location "in the ATO zone" (referring to the territory of the Anti-Terrorist Operation) is shown, along with an interview with military officials. Many raised questions about this deployment of Buk anti-aircraft missile systems, especially considering the timing of the video and the downing of MH17.

Buk systems in Dovhenke, Ukraine from Ukrainian Military TV footage

In fact, this video was filmed at the "Luna" military camp at Dovhenke, about 130 kilometers northwest of the MH17 crash site. The location is technically in the Kharkiv Oblast, putting it quite a distance away from the frontline of the conflict. Therefore, there is no evidence that the Buks in this television segment had anything to do with MH17, as there are no indications that they were deployed anywhere near the MH17 crash site or separatist-controlled territory.

Map of the Ukrainian Buks at Dovhenke (top-left) and the MH17 crash and launch site (bottom)

A similar concern was raised about photographs shared on July 15, 2014 by a chaplain of the Ukrainian Armed Forces. He uploaded a handful of photographs that showed a Buk missile launcher in a field, with a geotag that indicated that he was near the frontline in the Donetsk Oblast. However, the photographs were eventually geolocated: they were actually taken at the Myrohorod military base in the Poltava Oblast, and the chaplain likely uploaded the pictures onto Vkontakte while he was near the frontlines, automatically adding a geotag for the location of the upload rather than where they were snapped.

Additionally, there are numerous videos available showing the transport of Buks from Ukraine's 223rd Anti-Aircraft Regiment and other military equipment to the Myrhorod base in April 2014.

Photograph of a Buk missile launcher uploaded by a Ukrainian chaplain on July 15, 2014

Satellite images of Buk systems deployed at the Myhorod air base, including on August 2014

There is a common thread for these alternative scenarios for the downing of MH17: there is only an isolated photograph or video clip, without greater contextual evidence regarding these Ukrainian Buks. With Russian Buk 332, there is a wealth photographic and video evidence placing the missile launcher in Russia before the downing, in Ukraine on July 17, and satellite imagery of the convoy on July 17, and launch site showing signs of a launch immediately after the downing of MH17. With Ukrainian Buk 312, or the ones in Myhorod or Dovhenke, there is no additional evidence of these systems being present in the Donbas on July 17, or satellite images showing an accompanying convoy, or witness accounts about a launch site or transport.

In short, alternative theories regarding MH17 only exist as far as single photographs or videos can be unexplained. As soon as they are explained, either through geolocation or putting a reliable time and date to the material, there is no longer any link to MH17.

For more information on alternative scenarios regarding the downing of MH17, please see these investigations and articles:

- Bellingcat: Photographs of Ukrainian Buks Geolocated in Poltava Oblast, Nearly Three Years Later
- Bellingcat: Is this Ukrainian Buk a Clue in the MH17 Investigation or a Red Herring?
- Bellingcat: Ukrainian Buk Footage from July 16, 2014 Geolocated
- Bellingcat: The Weird World of MH17 Conspiracy Theories

13

Conclusion

Based on available open source information, it is possible to draw the following conclusions regarding the downing of MH17:

- Between June 23-25, 2014, Russia's 53rd Anti-Aircraft Missile Brigade transported vehicles within Russia to positions close to the Russian border with Ukraine. This includes Buk 332, later photographed and filmed in Ukraine on July 17 and 18, 2014.
- On July 17, 2014, Buk 332 was in Ukraine, and arrived in Donetsk in the morning. From there, while loaded onto red low-loader, it traveled eastwards through separatist-held territory, and eventually reached the town of Snizhne in the early afternoon.
- After arriving in Snizhne, Buk 332 was unloaded and drove under its own power southward, out of town.
- Buk 332 arrived at a field south of Snizhne and fired a missile that resulted in the destruction of flight MH17.
- Buk 332 was next filmed traveling east through the separatist-controlled city of Luhansk on the morning of July 18, 2014 missing one missile. Intercepted communications indicate that the missile launcher was taken into Russia shortly after this video was filmed.
- On July 21, 2014, the Russian MoD presented a series of fabricated and misleading information about the flight path of MH17, radar data, the location of the July 18, 2014 Luhansk video, and the inclusion of misdated and heavily edited satellite imagery.
- Almaz-Antey presented data that was not reflected by witness statements on the ground, any open source information, or the technical assessments made by the DSB.
- No credible evidence has been presented that shows any operational Ukrainian Buk missile launcher was near a position in range of downing MH17 on July 17, 2014.
- The only credible candidate for the missile launcher that downed MH17 is Russian Buk 332, of the 53rd Anti-Aircraft Missile Brigade.