



Airwars

**Death in the city:  
High levels of civilian harm  
in modern urban warfare  
resulting from significant  
explosive weapons use**



## Part One

Recent urban battles show a close correlation between intensity of munition use and population density, and negative outcomes for civilians



#### Cover page

A civil defence team searches for bodies in a destroyed Raqqa building, early Spring 2018. Image courtesy of Media Without Borders

#### Previous page

A man retrieves a child's body from the ruins of Eastern Ghouta, March 20th 2018. Image courtesy of Wael al Taweel

### Key findings

Several years of Iraq and Syria conflict monitoring by the London-based NGO Airwars has shown a direct correlation between the intensity of use of explosive weapons in urban areas and high levels of civilian harm. Similar outcomes are seen in both US-led Coalition and Russian interventions -- despite often significant differences in tactics and strategy.

The Coalition's claims of precision have been called into question by non combatant death tolls in the thousands between Raqqa and Mosul - the latter the scene of the most intense urban fighting since World War II, according to US officials. Civilian casualties from US-led strikes appear to be at their highest levels since Vietnam, and yet there is little or no official effort made to track the overall death toll from urban fighting.

The Coalition's civilian casualty assessment and investigation processes have also shown significant procedural weaknesses, and most members of the alliance - including the United Kingdom and France - have yet to admit a single casualty. Russia's brutal campaign in Syria has reportedly featured systematic violations of international law, including the alleged targeting of medical facilities. That the Coalition's own campaign has claimed a similar number of civilian lives speaks to the catastrophic consequences of using explosive weapons in urban areas - despite the extensive use of guided munitions, and a stated intent to minimise civilian harm.

Iraqi forces deploy IRAMs during intense urban fighting in Mosul, early 2017. Image via Haider Sumeri



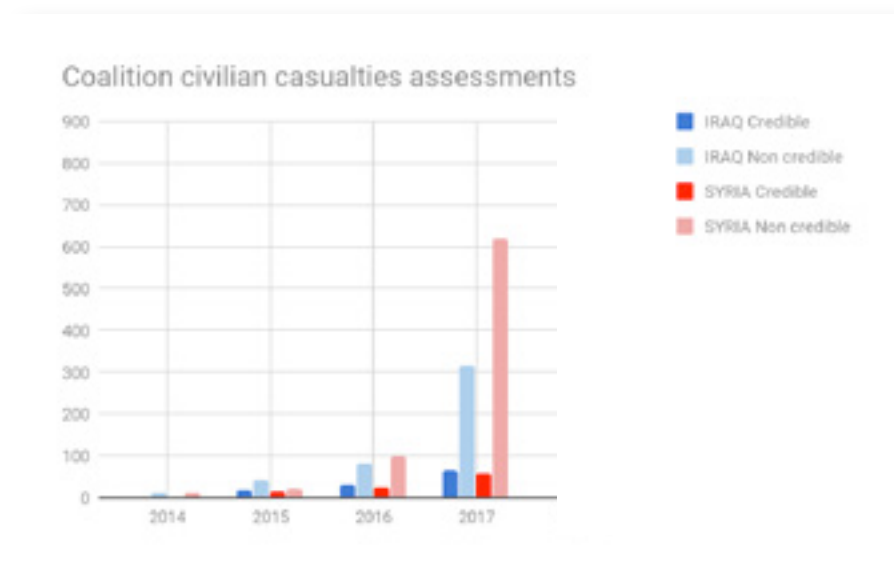
## Airwars and civilian harm monitoring in Iraq and Syria

Airwars is a London-based all-source monitor which tracks reports of civilian casualties from international military actions in Iraq, Syria, and more recently Libya. Those militaries tracked by researchers include the US-led anti-ISIS Coalition; Russia; and Turkey. Airwars then seeks to work with militaries to help them better understand the public reporting of civilian harm - and to bridge the often significant gap between military and credible public claims of harm. The organisation is the only external agency routinely cited as a referral point by the US-led Coalition in its own monthly casualty reports.<sup>1</sup>

In both Iraq and Syria - the countries where Airwars has primarily focused its conflict monitoring since 2014 - a clear and indisputable trend has emerged in recent years: once fighting involving the intense use of explosive weapons reaches urban areas, civilian casualties escalate dramatically.

A key determinant of civilian harm - based on Airwars modeling of recent urban bombing campaigns in both Syria and Iraq - is that population density, coupled with the intensity of bombardment, are key determinants of civilian harm. This observable pattern has been true for operations involving both the US-led Coalition fighting so-called Islamic State; as well as pro-regime offensives in Syria heavily featuring Russian attacks.

Figure 1: The growth of civilian casualty admissions made by the Coalition over time. Though acknowledgements grew during 2016 and 2017, they were heavily outnumbered by cases that the Coalition discarded as 'non-credible'. This dynamic has been particularly acute in the context of the battle for Raqqa (June-October 2017). Source: Airwars



There have been significant differences between these two campaigns - including the use of precision versus 'dumb' munitions; the reported deliberate targeting of civilians and civilian infrastructure by Assad government forces and by Russia; and the creation of escape corridors for civilians in Aleppo and Eastern Ghouta, though not in Mosul or Raqqa. Nevertheless, Airwars modeling indicates that the primary drivers of civilian harm in urban fighting remain the intensity of the assault; and population density, where high numbers of civilians are at risk of potential harm.

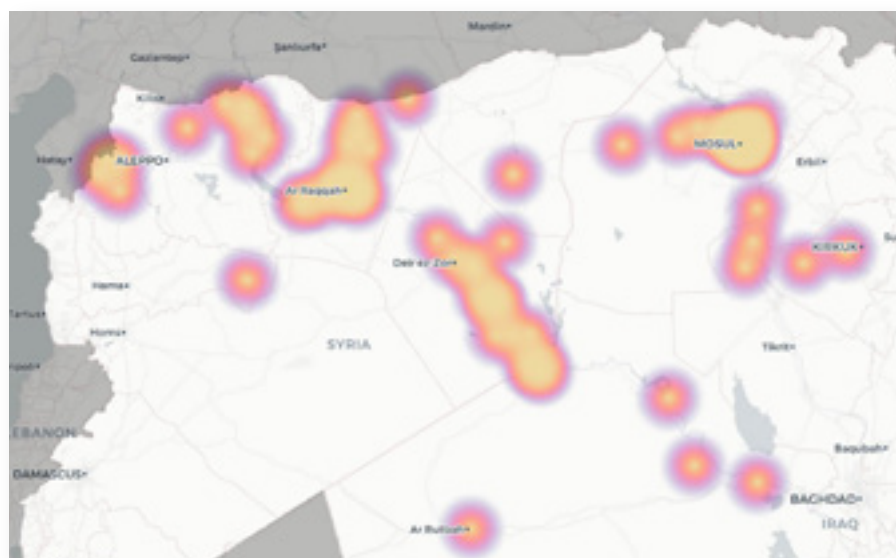
<sup>1</sup> See for example 'CJTF-OIR Monthly Casualty Report', April 26th 2018, in which Airwars is cited as the source for two of the three civilian casualty events conceded by the Coalition that month, at <http://www.inherentresolve.mil/News/News-Releases/Article/1504033/cjtf-oir-monthly-civilian-casualty-report/>



In downplaying reported civilian casualties from urban strikes (based against the public record), American, British and Coalition officials have repeatedly stressed the accuracy of their own weaponry and the care taken by their operators to minimise civilian harm. “There has been no military in the world’s history that has paid more attention to limiting civilian casualties and the deaths of innocents on the battlefield than the coalition military,” said US Defense Secretary James Mattis in August 2017, shortly after the fall of Mosul, where thousands were nevertheless credibly reported killed.<sup>2</sup> Responding to Airwars reporting the following month, outgoing Coalition commander Lt.G Stephen J. Townsend repeated this mantra, writing: “I challenge anyone to find a more precise air campaign in the history of warfare.”<sup>3</sup>

Airwars monitoring suggests otherwise – strongly indicating that ‘precision’ in and of itself does not lead to lower civilian harm in dense urban battlefields with high fire rates. In fact, monitoring and analysis of individual incidents suggest that it could lead to even greater harm in aggregate, as militaries grow overly confident deploying explosive weapons in large quantities within high population cities. That is very much what has been observed in recent years.

Figure 2: Heat map of Coalition-confirmed civilian casualty events since 2014, clustered around Raqqa, Mosul and the Euphrates River Valley. Source: Airwars



### Record urban casualty numbers

A review of the type and quantity of weapons fired in large urban areas including Mosul, Raqqa, Eastern Ghouta and Aleppo - coupled with reported non combatant harm on the ground - is illustrative, and offers significant clues to the rise in urban civilian casualties that is under consideration in Parliament. Since 2014, Airwars estimates

<sup>2</sup> ‘Secretary Mattis Media Availability with General Townsend and Special Envoy McGurk’, U.S. Department of Defense, August 22nd 2017, at <https://www.defense.gov/News/Transcripts/Transcript-View/Article/1286209/secretary-mattis-media-availability-with-general-townsend-and-special-envoy-mcgurk/>

<sup>3</sup> ‘Reports of Civilian Casualties in the War Against ISIS Are Vastly Inflated,’ Foreign Policy, September 15th 2017, at <https://foreignpolicy.com/2017/09/15/reports-of-civilian-casualties-from-coalition-strikes-on-isis-are-vastly-inflated-lt-gen-townsend-cjtf-air/>

that the Coalition is likely responsible for between 6,250 and 9,600 civilian deaths overall in the war against ISIS, out of more than 25,000 civilian fatalities alleged locally by Iraqis and Syrians.<sup>4</sup> Of those likely reported deaths, more than half took place either in the vicinity of Mosul<sup>5</sup> or of Raqqa<sup>6</sup>.

When used in urban areas, the heavy weaponry deployed in Iraq and Syria had unpredictable results, and drastically different outcomes when compared with more controlled environments. Measures such as delayed fuses, for instance, may lead to unintended results. In a city, there is often no way of knowing how each building is constructed, and which portions will fail structurally, nor who will be inside when it falls. Any explosions - or often secondary explosions - will have an unexpected effect in densely built environs. A narrow street will funnel the impact of a blast while collecting shrapnel in the built fabric, for example.<sup>7</sup>

In the context of recent fighting in Iraq and Syria, flawed and outdated intelligence, and the size of ammunition used, may also have undermined key benefits of 'smart bomb' technologies. The loosening of rules meant to limit those who can call in sorties likely exacerbated civilian harm. "There is a danger at the moment that we are conditioning ourselves to think in a certain way, that wars are bloodless and that we can carry out war in a nice way," noted former Deputy Commander of the RAF, Air Marshal Greg Bagwell. "Thinking war is bloodless is a mistake because we need to be aware that war is nasty and opting for it, must be the last resort. Thinking it can be done cleanly etc. is a mistake."<sup>8</sup>

### The battle for Mosul and reported civilian harm

The battle for Iraq's second city was described by American officials as the most intense urban fighting involving their forces since World War II. The civilian toll, meanwhile, grew to levels not seen in decades. Reported non combatant casualty rates from Western military actions, at both Mosul and Raqqa, reached levels last seen in Korea or Vietnam. Yet national and Coalition authorities have shown little interest in tracking the overall toll.<sup>9</sup>

During the fierce fighting for Mosul, which lasted from October 2016 until July 2017, the United States (as the principal Coalition member) employed a wide range of aircraft including B-52s, Reaper and

4 "To March 31st 2018 an overall total of between 17,383 and 25,839 civilian non-combatant fatalities had been locally alleged from 2,493 separate reported Coalition incidents, in both Iraq and Syria. Of these, Airwars presently estimates that a minimum of 6,259 to 9,604 civilians are likely to have died in Coalition actions." 'Summary findings on Coalition air and artillery strikes: August 8th 2014 to March 31st 2018', Airwars, at <https://airwars.org/civilian-casualty-claims/>

5 'Counting the dead in Mosul,' Airwars, April 5th 2018, at <https://airwars.org/news/counting-mosul/>

6 'Raqqa: a city destroyed then forgotten,' Airwars, March 12th 2018, <https://airwars.org/news/raqqa-a-city-destroyed-then-forgotten/>

7 See 'Characterisation of Explosive Weapons,' GICHD, accessed April 27th 2018 at <http://characterisationexplosiveweapons.org/>

8 'Interview of Air Marshal Greg Bagwell,' Drone Wars UK, August 1st 2018, at <https://dronewars.net/2018/01/08/thinking-war-is-bloodless-is-a-mistake-talking-drones-and-remote-war-with-air-marshal-bagwell/>

9 'Counting the dead in Mosul,' Airwars, April 5th 2018, at <https://airwars.org/news/counting-mosul/>

Predator drones, F-16s, F/A-18s and Apache helicopter gunships.

The size of US air-dropped munitions is unknown, but even in cases where the Coalition by its own account attempted to limit collateral damage it nevertheless chose to employ 500lb bombs. The US also fired several thousand artillery rounds in Mosul at a minimum – the exact number is unknown – and in addition deployed US ground troops with heavy mortars in support of Iraqi forces.

Based on modeling for the duration of the war against ISIS in Iraq, it is likely that the United States was responsible for approximately two thirds of Coalition airstrikes on Mosul. America's allies were also key contributors. The United Kingdom is known to have used its Reaper drones as well as Tornado and Typhoon aircraft at Mosul. Sir Michael Fallon MP, the then-Defence Secretary, would boast at the end of the Mosul campaign that "The RAF has struck more than 750 targets as part of the campaign to liberate Mosul - second only to the United States."<sup>10</sup>

Belgium, Australia and France have each reported that the majority of their own airstrikes were also concentrated on Mosul for the duration of the battle. In addition, France reported almost 1,200 artillery strikes on the city from its Task Force Wagram.

Overall, the US-led Coalition alone declared more than 1,250 airstrikes in the city between October 2016 and June 2017 (a strike often consists of many separate engagements) aimed at thousands of targets. This however significantly under-represents the intensity of the bombardment - with Coalition officials telling Airwars that in total, more than 29,000 munitions were fired by air and artillery units on the city, by the US and its international allies.<sup>11</sup>

Local Iraqi forces also heavily employed explosive weapons in Mosul, including their own air-dropped munitions and ground weapons. Government forces deployed F-16 jets; helicopter gunships; armed drones; tanks, artillery, heavy and medium mortars; and guided and unguided rockets. The Federal Police in particular were documented as firing low accuracy improvised rockets known as IRAMs into locations in the Western half of the city.

In addition, so-called Islamic State made extensive use of artillery and heavy mortars during the battle, and according to Coalition officials also deployed more than 700 vehicle borne IEDs, often with devastating results for civilians in the vicinity.

Though there are no reliable official fatality estimates for the battle for Mosul - a serious failure on the part of both the Iraqi government and the Coalition - an extensive survey involving mortuary records carried out by the Associated Press arrived at an estimated minimum total of between 9,000 and 11,000 civilians killed by all parties, at least a third due to Coalition or Iraqi attacks.<sup>12</sup>

<sup>10</sup> 'Sir Michael Fallon's Statement on Mosul', Ministry of Defence, July 9th 2017, at <https://www.gov.uk/government/news/defence-secretary-welcomes-iraqi-victory-in-mosul>

<sup>11</sup> 'Mosul's capture sees ISIS vanquished - but at a terrible cost,' Airwars, July 1st 2017, at <https://airwars.org/news/mosuls-capture-sees-isis-vanquished-but-at-a-terrible-cost/>

<sup>12</sup> 'Mosul is a graveyard: Final IS battle kills 9,000 civilians', Associated Press, December 21st 2017, at <https://www.apnews.com/bbea7094fb954838a2fdc11278d65460>

Airwars monitoring of civilian harm in Mosul was often rated as contested, reflecting both the confusion of reporting, and the number of actors operating and firing large weapons in the city. Out of between 6,000 and 9,000 alleged civilian deaths monitored by Airwars, researchers have conservatively estimated that between 1,066 and 1,579 civilians were killed by Coalition actions. These latter figures are most likely a considerable under-estimate, owing to difficulties in discerning responsible actors.

Even so, Airwars monitoring and investigations have helped to illustrate *how* explosive weapons - including air dropped munitions - have played a significant role in causing civilian harm.

### **Intensity of bombardment at Mosul a key determinant of civilian harm**

The most widely covered civilian casualty incident in Mosul – a March 17th US attack in the western al Jadida neighborhood – highlighted several troubling characteristics. In an official investigation of the strike, the US said it had deployed a 500lb delayed fuse munition to limit damage while targeting rooftop snipers. Even so, the strike resulted in the confirmed deaths of at least 105 civilians. Airwars has documented numerous other instances - including airstrikes prior to the start of operations inside the city - involving the targeting of lone or small numbers of gunmen, that also resulted in additional significant civilian harm.

In December 2016, the administration of US President Barack Obama loosened rules of engagement and allowed for personnel further down the command chain to call in airstrikes.<sup>13</sup> Airwars does not know if this applied to the entire Coalition or just to the US; it coincided, however, with significantly increased civilian casualty totals in the following weeks. During their groundbreaking field study for the New York Times, Khan and Gopal noticed an immediate change. “The number of cases we documented in East Mosul, just within 15 days, it was like night and day, so it was a real change on the ground,” Gopal told Airwars.<sup>14</sup>

Having defeated ISIS in eastern Mosul in early 2017, Iraqi ground forces backed by Coalition strikes then began moving into the city’s more densely populated western half. According to UN estimates, between 750,000 and 800,000 civilians were still trapped in this portion of Mosul.<sup>15</sup> Yet despite this higher population and building density, far higher munition use and fighting tempos were recorded. Whereas well-trained counterterrorism forces had taken the lead in the fight for East Mosul, Iraqi forces - more often now less well trained and more reckless - led with their own explosive weapons. In June, Human Rights Watch reported that Iraqi forces were launching “locally fabricated rockets,” into West Mosul. The group also cited US and Iraqi forces for firing “mortars and unguided rockets” into that half of the city.<sup>16</sup>

13 ‘Measuring the cost of Iraq’s victory over ISIS,’ Airwars, December 16th 2017 at <https://airwars.org/news/iraq-price-of-victory/>

14 ‘Counting the Uncounted: Azmat Khan and Anand Gopal on their groundbreaking civilian casualty study,’ Airwars, December 2nd 2017, at <https://airwars.org/news/the-uncounted/>

15 ‘Many Families in Western Mosul Are Already In Trouble,’ UNICEF Iraq, February 18th 2017, at [https://www.unicef.org/iraq/media\\_11881.html](https://www.unicef.org/iraq/media_11881.html)

16 ‘Iraq/US-Led Coalition: Weapons Choice Endangers Mosul Civilians,’ Human Rights Watch, June 8th 2017, at <https://www.hrw.org/news/2017/06/08/iraq/us-led-coalition-weapons-choice-endangers-mosul-civilians>



By the time fighting reached the densely packed Old City - the area of ISIS's last stand - Federal Police were documented as lobbing large quantities of unguided ground fired munitions into areas packed with civilians. According to local officials, more than 1,400 bodies were recovered by civil defense personnel in West Mosul by December 2017.<sup>17</sup>

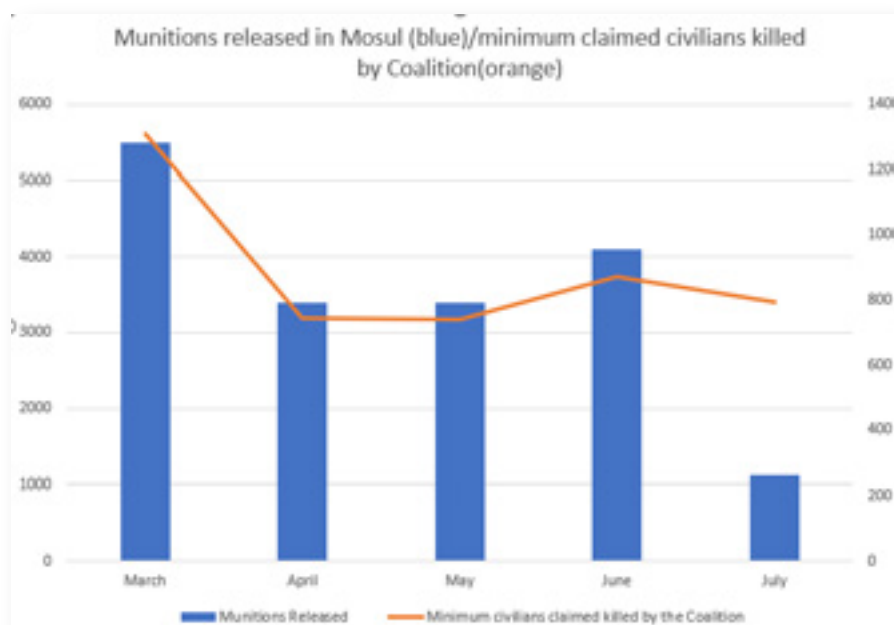
"The battle [for Mosul] illuminated a misconception of modern warfare with the precision paradox – the proposition that the employment of precision weaponry can make war antiseptic and devoid of collateral damage or civilian casualties," wrote Major Amos C Fox, who earlier served as a planning officer with Operation Inherent Resolve. "The Battle of Mosul, a nine-month slog, blending U.S. and coalition precision weapons with Iraqi frontal attacks against an ensconced and determined enemy, precisely leveled the city one building at a time. The result: upwards of 900,000 displaced people, billions of dollars needed for reconstruction, and the city largely in ruins."

In Mosul, the allure of precision strike was overcome by the traps of urban warfare and the Islamic State group's tenacity, said Fox. "Precision weaponry did not spare the people of Mosul, nor did it spare the city's infrastructure."<sup>18</sup>

### Supporting data

Records of Coalition munition use at Mosul illustrate that civilian harm rose and fell as the intensity of fire increased and decreased. Though Airwars was only able to obtain munitions data for March 2017 through to the end of fighting in July, the variations within that data set were reflected closely in local allegations of civilians killed by the Coalition.

Figure 3: Airwars saw a strong correlation between munitions released during the Mosul campaign and claimed civilian deaths. For example, in April, the number of munitions released fell by 38% on March and the number of claimed deaths decreased by 43%.



<sup>17</sup> 'More Civilians Than ISIS Fighters are Believed Killed in Mosul Battle,' NPR, December 19th 2017, at <https://www.npr.org/sections/parallels/2017/12/19/570483824/more-civilians-than-isis-fighters-are-believed-killed-in-mosul-battle>

<sup>18</sup> "Precision Fires Hindered By Urban Jungle," Association of the United States Army, April 16th 2017, at <https://www.ausa.org/articles/precision-fires-hindered-urban-jungle>

In March, for example, the Coalition reported firing 5,500 munitions; in the same month, local reports alleged 1,308 civilians were killed by Coalition actions.

The following month, the Coalition reported 3,400 munitions released, a drop of 38 percent. Also in April, the minimum number of civilians claimed killed in local reports fell by similar proportions - down to 743, a drop of 43 percent. In May, 3,400 munitions were again reported and civilian fatality allegations stayed flat, dropping only marginally to 740 reported killed.

June then saw Coalition munition use on Mosul increase by 20 per cent, and allegations rose by a similar 18 percent. The two figures diverged only in July, as munitions use fell significantly to 1,113 (a drop of 73 percent) but claimed deaths only to 796 (a decrease of only nine percent). This may be partially explained by the ferocity of fighting in the final areas of the Old City; and additional confusion over which forces were firing into increasingly small areas.

Overall then, Airwars modeling shows a strong correlation between the intensity of urban bombardment and negative outcomes for civilians trapped on the ground. While this may appear axiomatic, the available evidence for Mosul would appear to be uncontested. Yet few of these lessons learned by the Coalition at Mosul would be applied in their next urban assault.

### **The battle for Raqqa and reported civilian harm**

As a result of Syria's fractured governance resulting from the civil war, the Coalition was unable to partner with national Syrian forces for the retaking of Raqqa - so-called Islamic State's self-proclaimed capital.

Instead, the US-led alliance partnered with relatively poorly equipped fighters from the Kurdish dominated SDF militia, and relied to a greater extent on both air and artillery strikes to aid their advances on the ground. As BBC journalist Quentin Sommerville put it to Airwars: "In Mosul artillery and airstrikes were in most cases a last resort. In Raqqa, they seemed like they were used first."<sup>19</sup>

The assault on Raqqa was almost exclusively an American operation. While the UK reported striking 215 targets, and France declared 50 airstrikes on the city, all other air and artillery strikes were by US forces, totalling at least 20,000 munitions fired.

Among the aircraft employed by the United States were B-52 bombers, F-15s and F-16s, as well as Reaper drones. According to US Air Force officials, A-10 Warthog ground attack aircraft - which are capable of firing high-intensity explosive rounds - were responsible for around 44 percent of weapon use during the first half of fighting in Raqqa. Commanders acknowledged that such use in an urban area was unprecedented.<sup>20</sup>

<sup>19</sup> 'They're Still Pulling Bodies Out of ISIS' Capital', Daily Beast, March 12th 2018 at <https://www.thedailybeast.com/theyre-still-pulling-bodies-out-of-isis-capital>

<sup>20</sup> 'Moody's Flying Tigers Wrap-Up Intense Deployment Fighting ISIS,' Air Force Magazine, January 11th 2018, at <http://www.airforcemag.com/Features/Pages/2018/January%202018/Moodys-Flying-Tigers-Wrap-Up-Intense-Deployment-Fighting-ISIS.aspx>

US Marines unload artillery rounds in Syria prior to the battle for Raqqa. The munitions at the rear of the vehicle featuring a white stripe are understood to be precision-guided rounds. Image by Lance Cpl. Zachery Laning/ USMC, March 24th 2017



### Extensive use of US artillery

At Raqqa, the extensive use of heavy artillery on the city in particular stood out. Though the Coalition reported more than 20,000 weapons fired between June and October in the Raqqa campaign, some US officials have suggested even higher figures. “In five months,” said John Wayne Troxell – a senior non-enlisted adviser to the Joint Chiefs of Staff, US Marines stationed near Raqqa “fired 30,000 artillery rounds on ISIS targets.”<sup>21</sup>

While imagery released by USMC during the fighting indicated that a small proportion of artillery shells used new GPS guidance systems, most rounds fired into the city appeared to have been of a non-precision type.

Civilians in Raqqa described artillery as especially terrifying, and particularly deadly. In an August 2017 investigation, Amnesty International reported “consistent testimonies of residents who fled the city indicate that salvos of unguided artillery shells have been fired into the city’s residential neighborhoods, targeting areas of hundreds of square metres rather than specific pinpoint targets - which, if true, would constitute not only disproportionate but also indiscriminate attacks.”

“Artillery shells are hitting everywhere, entire streets,” Ahmed Mahmoud, a man injured in a June strike, told Amnesty.<sup>22</sup>

The death toll in a city where as many as 100,000 civilians remained trapped at the start of operations was both steady and grim.<sup>23</sup> Though ISIS did not generally employ vehicle borne explosive devices (VBIEDS) as it did in Mosul, the city was heavily mined, and the terror group’s fighters put civilians in danger as a matter of policy.

<sup>21</sup> Facebook Live Broadcast, Senior Enlisted Advisor to the Chairman, January 23rd 2018, at <https://www.facebook.com/SEAC.JCS/videos/1822475634443381>

<sup>22</sup> ‘Civilians Trapped in Battle for Raqqa - Syria,’ Amnesty International, August 23rd 2017 at <https://www.amnesty.org/en/documents/mde24/6945/2017/en/>

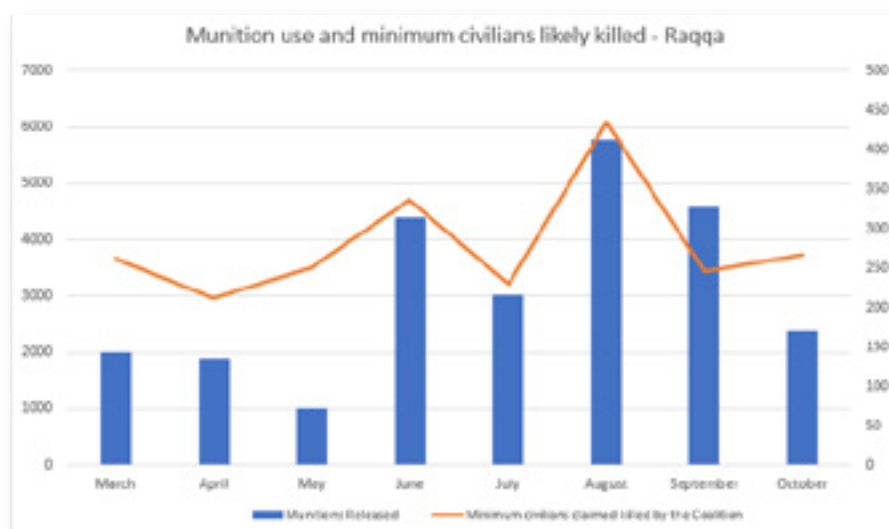
<sup>23</sup> ‘Syria: Civilians trapped in Al-Raqqa in urgent need of protection,’ OHCHR, June 28th 2017, at <http://www.ohchr.org/EN/NewsEvents/Pages/DisplayNews.aspx?NewsID=21810>



In Raqqa, local monitors have placed the civilian death toll at upwards of 2,000, with many bodies still being recovered. Airwars research shows a likely toll of at least 1,400 civilian fatalities tied to Coalition actions - although the Coalition itself has so far admitted to just 25 deaths. Even so, both munitions modelling and reports from the ground strongly indicate that most deaths in the city were the result of incoming Coalition fire. The UN estimates that over two-thirds of the city's structures were either damaged or destroyed<sup>24</sup>, and six months after its capture, says that it remains uninhabitable due to the risk of IEDs and unexploded ordnance.

As the graphic below demonstrates, as with Mosul, the number of civilians credibly reported killed in Raqqa often closely tracked intensity of weapons use, until the very end of fighting.

Figure 4: Airwars again tracked a strong correlation between munitions fired on Raqqa and minimum likely deaths during 2017. For example, in July there was a 32% fall in munitions fired on Raqqa on June - and a 32% decrease in minimum civilians likely killed.



Before the assault on Raqqa had begun in June 2017, the US-led Coalition had been made aware of the high reported civilian toll at Mosul - with Airwars for example publicly highlighting rises and falls in reported civilian harm which were closely tracking munition use. Not only were these lessons not subsequently applied by the alliance - but the intensity of bombardment at Raqqa (given its relatively smaller size, and the shorter duration of the battle) actually worsened. UN officials recently told the Associated Press that the city was the most devastated of any during all of Syria's seven-year civil war.<sup>25</sup>

The patterns monitored by Airwars are clear: urban battles with heavy use of explosive weapons unsurprisingly inflict large numbers of civilian casualties, despite the precision nature of many of those bombs and shells. Coalition officials, however, have yet to acknowledge that there was any fault in their approach to city warfare, or shortfalls in relying on precision munitions in a context in which it was often impossible to determine where local civilian populations were hiding. For thousands of affected family members - and for the militaries involved - these are no small questions.

<sup>24</sup> 'UN: Syria's Raqqa Devastated, Largely Uninhabitable,' Voice of America, April 4th, 2018, at <https://www.voanews.com/a/united-nations-says-syria-raqqa-devastated-largely-uninhabitable/4332919.html>

<sup>25</sup> 'Syrians in Raqqa afraid, angry, frustrated as they rebuild,' Associated Press, April 8th 2018, at <https://apnews.com/fc9da57f2c15465abab7a40f868e7bdf>

## Russia's role in the battles for Aleppo (2016) and Eastern Ghouta (2018)

Tracking Russian weapon use since the start of Moscow's operations in Syria in September 2015 has at times proven difficult. However, several trends are clear. Compared to the Coalition, Russia has employed a far greater percentage of unguided 'dumb' bombs. Assessments of statements and open-source imagery released by the Russian Ministry of Defence suggest that perhaps five per cent of Russian munitions have been 'smart' - versus approximately 95% of Coalition air released munitions.<sup>26</sup>

Two decades after the Russian government levelled Grozny during the conflict in Chechnya, Moscow is once more employing similarly punitive and large scale bombings in cities. The Russian Air Force along with the Syrian regime has been extensively documented as targeting civilian infrastructure including hospitals. They have fired incendiary and cluster munitions within urban areas; Russia has been cited by local monitors for at least 7,000 civilian deaths in Syria - with some estimates as high as 11,000. Tracking Russian strikes is burdensome and at times inconclusive because they operate in the same spaces as regime jets, sometimes in tandem, sometimes separately. The government also operates Russian-made jets, adding to the confusion.

Nevertheless, in the first 12 months of bombing, Airwars tracked more than 1,300 alleged incidents involving Russian aircraft. According to Airwars monitoring, the first three months of the campaign likely led to the deaths of at least 1,783 civilians.<sup>27</sup> Unlike the US-led Coalition, Russia makes no attempt to track civilian casualties caused by its strikes, and often denies outright the possibility, claiming it only attacks 'terrorists'.

During urban operations, the Russians - unlike the Coalition - may stop and start bombing, sometimes due to local ceasefires. The end results, however, are similar reported deaths tolls to those caused by the Coalition, again indicating that the key drivers of civilian harm in urban fighting are population density and intensity of bombardment.

In November 2016 Airwars tracked 215 incidents and over 1,000 alleged civilian deaths tied to Russian forces in Syria, roughly two-thirds of which were in Aleppo.<sup>28</sup> By the time eastern Aleppo was ceded to the government, there were no serviceable hospitals.

"Repeated bombardments, lack of warnings and the absence of military presence in the vicinity of the health-care facilities strongly suggest the deliberate and systematic targeting of medical infrastructure as part of a strategy to compel surrender, amounting to the war crime of intentionally targeting protected objects," wrote the UN Commission of Inquiry for Syria in its special report on the battle for Aleppo, in reference to pro-regime strikes.<sup>29</sup>

<sup>26</sup> The use of unguided munitions can be verified, for example, by assessing open source imagery and video released by the Russian Ministry of Defense since 2015.

<sup>27</sup> 'A year of Russian airstrikes leaves thousands dead,' Airwars, September 29th 2016, at <https://airwars.org/news/a-year-of-russian-airstrikes-has-left-thousands-of-syrians-civilians-dead/>

<sup>28</sup> 'Alleged civilian casualties from Russian airstrikes in Syria,' Airwars, at <https://airwars.org/russian-civcas/>

<sup>29</sup> 'Report of the Independent International Commission of Inquiry on the Syrian Arab Republic,' United Nations, February 2nd 2018, at <https://reliefweb.int/sites/reliefweb.int/files/resources/G1702663.pdf>

Several Russian Air Force aircraft types were clearly documented in use during several of the deadliest urban assaults. During the siege and bombing of eastern Aleppo in 2016, Russian Su-34 and Su-35 variants were recorded in local reports and on social media. In eastern Ghouta two years later, the same aircraft were filmed being used, as well as Mi-28 attack helicopters.

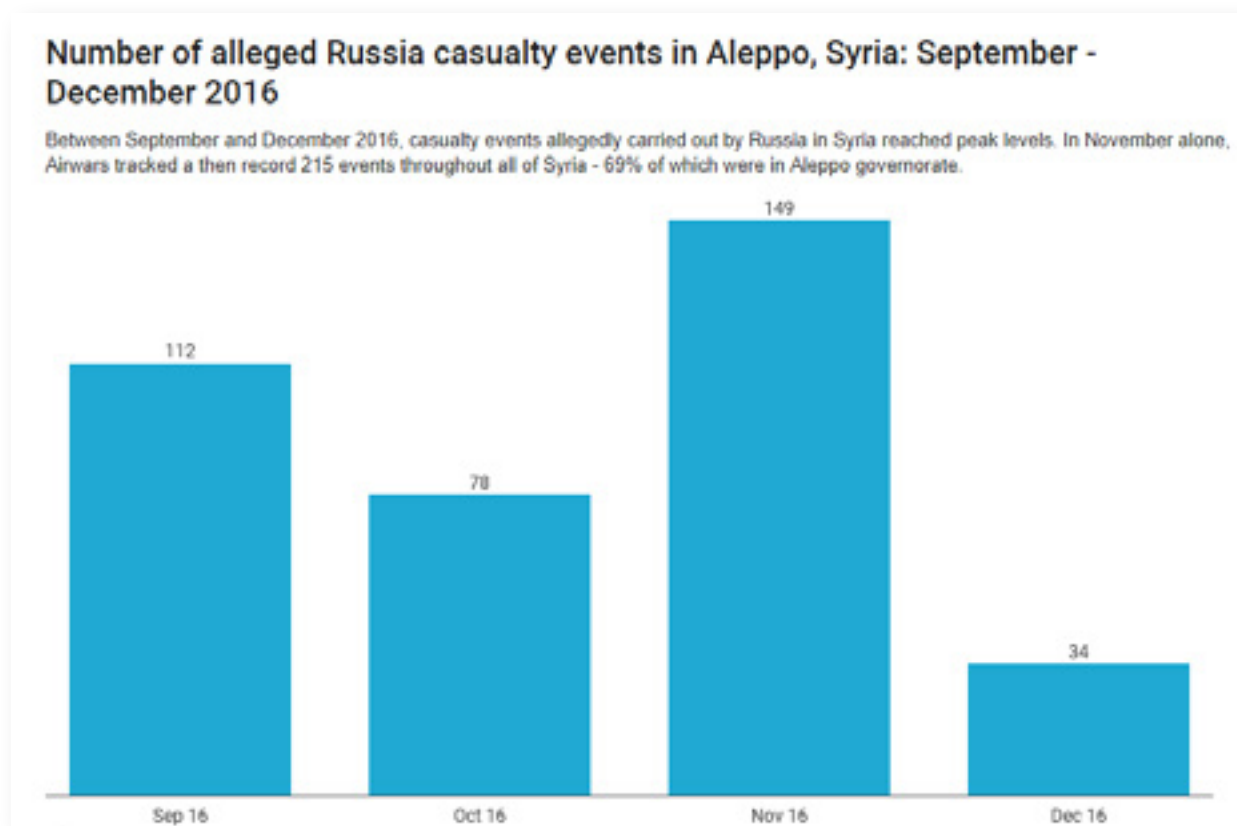


Figure 5: Alleged Russian civilian casualty incidents September to December 2016 monitored by Airwars

Fifteen months after Russia and the Assad government's campaign in Aleppo, the two allies (supported by Iran) began employing similar tactics in eastern Ghouta, the rebel-held enclave on the outskirts of Damascus. In the week leading up to a February 24th 2018 UN Security Council resolution calling for a country-wide ceasefire, Airwars monitored 78 alleged Russian civilian casualty events in Syria (74 of them in eastern Ghouta) representing the most intense bombing period from regime and Russian actions since Aleppo.

Despite the Security Council vote, attacks soon resumed at significant levels. During March 2018, Airwars tracked 250 civilian casualty events in Syria attributed locally to Russia - mostly in Eastern Ghouta.<sup>30</sup> Between 712 and 1,229 civilians were allegedly killed in bombings tied to Russian forces - the highest number of reported casualties and events observed in a single month since Airwars monitoring of Moscow's campaign began in September 2015. Just as in Eastern Aleppo, civilian infrastructure and medical facilities were heavily targeted at Ghouta.<sup>31</sup>

<sup>30</sup> 'Airwars monthly assessment: March 2018', Airwars, April 23rd 2018, at <https://airwars.org/news/assessment-march-2018/>

<sup>31</sup> 'Civilian casualties from alleged Russian airstrikes reach record levels,' Airwars, March 2nd 2018, at <https://airwars.org/news/civilian-casualties-from-alleged-russian-air-strikes-reach-record-levels-in-eastern-ghouta/>

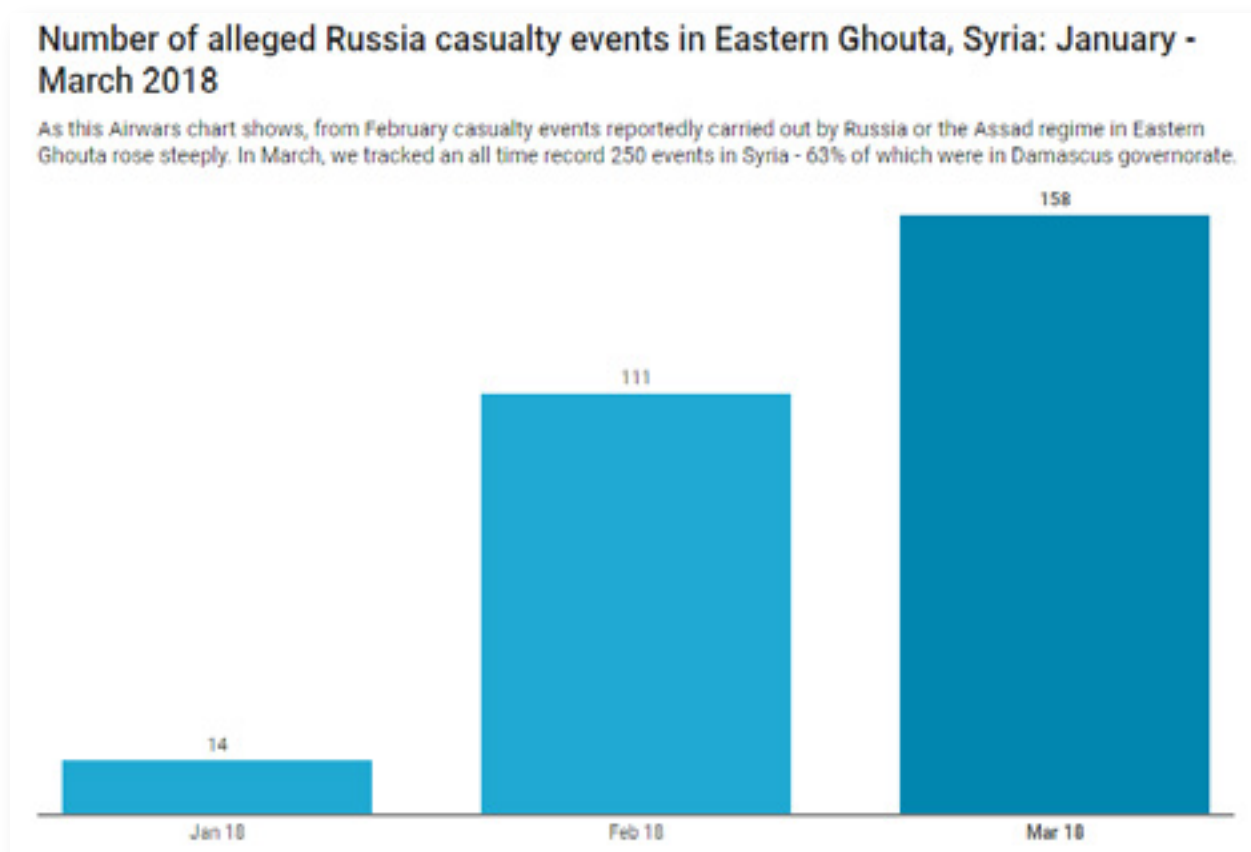


Elsewhere in Syria, Russia has been accused of deploying controversial or internationally banned munitions. Between June 5th and August 10th 2016 for example, Human Rights Watch reported that incendiary weapons were used at least eighteen times on targets in the opposition-held areas of Aleppo and Idlib provinces. In the words of HRW's report, "For at least a few weeks in mid-2016, incendiary weapons were used almost every day in attacks on opposition-held areas."<sup>32</sup> Russian bombers have meanwhile been filmed at their main Syrian airbase carrying cluster munitions.

Yet it has been the heavy and punitive Russian strikes on urban areas, primarily using conventional bombs, which have caused the most reported damage and civilian suffering.

32 'Time to Act against Incendiary Weapons,' Human Rights Watch, December 12th 2016, at <https://www.hrw.org/news/2016/12/12/time-act-against-incendiary-weapons>

Figure 6: Airwars monitored record claims of Russian casualty events in Eastern Ghouta, Syria, January - March 2018.



### Military failings in understanding urban civilian harm

The US-led Coalition has made key improvements over time to the way it has both assessed and reported on incidents of civilian harm in the war against so-called Islamic State - for example accepting referrals from external agencies such as Airwars, and publishing monthly civilian harm estimates.

Even so, Airwars understands that the Coalition almost never conducts field investigations, relying instead heavily upon remote analysis, including post strike video assessment where available.<sup>33</sup>

Figure 7: Coalition-confirmed civilian casualty incidents in the war against ISIS, 2014-2018

Incident year	IRAQ	SYRIA	TOTAL
2014	0	2	2
2015	18	15	33
2016	33	26	59
2017	64	58	122
2018	0	1	1
	115	102	217

### Weakness of military casualty modeling

Airwars modeling of Coalition assessments has revealed a strong bias towards certain classes of strikes potentially being assessed as credible. Events taking place out in the open - where any casualties may be observable - feature heavily in Coalition-confirmed events. An example would be strikes targeting road and vehicle positions, where post-strike video analysis can more likely show a civilian entering the target area after the munition was released.

However, in the context of urban fighting, most civilian harm is by its nature unobservable - with non combatants generally sheltering within structures. Such events - even when well documented on the ground - are far less likely to be confirmed by the US-led Coalition due to an absence of visual confirmation. With strikes on buildings, the footage may show the extent of the damage but not whether it housed ISIS fighters, or sheltering families inside. As Air Marshal Bagwell has noted, "We cannot see through rubble."

This inability of the Coalition properly to model 'unobservable' civilian harm in urban fighting - even though this is likely how most non combatant deaths and injuries occur - is in the view of Airwars likely to be a key reason why the Coalition continues significantly to undercount civilian harm. Some allies even claim perfection in their actions, a statistical impossibility given the intensity of fighting, in the view of Airwars. With the exception of the US, Australia and the Netherlands, no other Coalition member has admitted to killing or injuring a single civilian in either Iraq or Syria. That includes the UK, which is one of the three most active members of the alliance, having conducted more than 1,600 airstrikes.

<sup>33</sup> "After a review of available information and strike video it was assessed that there is insufficient evidence to find that civilians were harmed in this strike," is the common wording in non-credible assessments. For example, see: 'CJTF-OIR Monthly Civilian Casualty Report,' Operation Inherent Resolve, April 26th 2018, at <http://www.inherentresolve.mil/News/News-Releases/Article/1504033/cjtf-oir-monthly-civilian-casualty-report/>

This omission has drawn criticism from some, including senior personnel previously involved in running Britain's air campaign. "I think it's unfortunate that we continue to maintain a pure 100% argument," Air Marshal Bagwell has noted. "Although we do our utmost to both prevent civilian casualties and conduct post-strike analysis to confirm, I don't think it is credible to the average listener that we have not caused civilian casualties just because you have got no evidence to the contrary. It is almost unbelievable that someone, somewhere, has not been killed by accident; although we have not been presented with such a case yet."<sup>34</sup>

### A failure to investigate on the ground

Ahead of large scale urban operations, the Coalition generally 'shaped' the battlefield with strikes which sometimes reportedly caused civilians harm. Military investigations, understandably, could only be conducted remotely at the time. However, once an area was captured, the Coalition had access to locations where allegations of civilian harm had been lodged. Yet even in these scenarios, the Coalition appears to have made almost no effort to follow up on the ground once control had been taken of an area where civilian deaths were reported.

Journalists who covered both the assaults on Mosul<sup>35</sup> and Raqqa<sup>36</sup> and who spoke with Airwars described how they were themselves able to interview airstrike victims with relative ease - in some cases leading to Coalition admissions. On other occasions there was not enough time to take down the accounts of affected civilians. Likewise, non governmental organizations such as Human Rights Watch<sup>37</sup> and Amnesty International<sup>38</sup> have been able to speak with witnesses and victims either remotely or in person in both cities. The UN's Commission of Inquiry has also gathered by telephone interview numerous accounts that contradict the Coalition's own version of events<sup>39</sup>.

The most glaring example of this disparity concerns a March 2017 strike that hit a school near Raqqa. The UN Commission - in the wake of a field investigation by HRW that found dozens of civilians were killed in a confirmed Coalition attack - determined that 150 civilians died in the attack, while the Coalition continues to maintain that number as zero. The means and methods to carry out similar on the ground investigations are available to the Coalition, but it has routinely chosen not to avail itself of them.

34 'Interview of Air Marshal Greg Bagwell,' Drone Wars UK, August 1st 2018, at <https://dronewars.net/2018/01/08/thinking-war-is-bloodless-is-a-mistake-talking-drones-and-remote-war-with-air-marshall-bagwell/>

35 'Counting the dead in Mosul,' Airwars, April 5th 2018, at <https://airwars.org/news/counting-mosul/>

36 'Raqqa: a city destroyed then forgotten,' Airwars, March 12th 2018, at <https://airwars.org/news/raqqa-a-city-destroyed-then-forgotten/>

37 'Civilians Trapped in Battle for Raqqa,' Amnesty International, August 23rd 2017, at <https://www.amnesty.org/en/documents/mde24/6945/2017/en/>

38 'At Any Cost: The Civilian Catastrophe in West Mosul, Iraq,' Amnesty International, July 10th 2017, at <https://www.amnesty.org/en/latest/campaigns/2017/07/at-any-cost-civilian-catastrophe-in-west-mosul-iraq/>

39 Report of the International Commission of Inquiry on the Syrian Arab Republic,' UN Human Rights Council, September 6th 2017, at [http://www.ohchr.org/Documents/HRBodies/HRCouncil/ColSyria/A\\_HRC\\_36\\_55\\_EN.docx](http://www.ohchr.org/Documents/HRBodies/HRCouncil/ColSyria/A_HRC_36_55_EN.docx)





*The UK reported striking more than 750 targets during the fierce battle for Mosul - yet still improbably claims zero civilian harm. Image via MoD.*

The only known instance of Coalition investigators travelling to the site of an attack occurred after a strike in Mosul's al Jadida neighbourhood, also in March 2017, which claimed the lives of more than 100 civilians.

The Coalition's own account – that a 500-pound bomb set off ISIS explosives inside the building – was questioned by locals. Even taking the explanation at face value, the investigation showed the limits of what pilots and other Coalition personnel could know about a target, and the number of civilians in the area. “I can't see into houses,” was how one helicopter pilot described the situation to Stars and Stripes.<sup>40</sup> In the al Jadida investigation, the Americans made clear they had no idea that civilians were present inside the building during the attack. Strikes may hit their intended target with a great deal of precision, but the nature of the urban battlefield neuters much of the claimed value of such actions.

This failure properly to investigate incidents is, in the view of Airwars, a key contributor to the gulf between military and public estimates of civilian harm from urban fighting. To date, the Coalition has admitted 883 civilian fatalities in its war against so-called Islamic State - a fraction of the more than 6,250 fatalities found by Airwars to have been likely caused by international forces.

<sup>40</sup> ‘Islamic State-held human shields in Mosul complicate coalition strikes,’ Stars and Stripes, March 25th 2017, at <https://www.stripes.com/news/islamic-state-held-human-shields-in-mosul-complicate-coalition-strikes>

## Inconsistent Coalition assessments and investigations

In November 2017, journalists Azmat Khan and Anand Gopal published in a New York Times Magazine an extensive field investigation into the Coalition's civilian casualty review process.<sup>41</sup>

In certain areas of northern Iraq, the journalists found that select Coalition strikes during 2016 had resulted in civilian death tolls that were more than 31 times higher than official estimates - estimates that had been made based on the limited intelligence available, including surveillance videos. The Coalition was found in one prominent case to have misidentified residential buildings as ISIS-controlled, and had subsequently killed civilians in precision strikes. It would take 18 months for the alliance publicly to admit its mistake.

The award-winning investigation identified major inconsistencies in the Coalition's assessment and investigatory processes - inconsistencies which in turn were leading to major undercounts of civilian harm.

Airwars modeling of Coalition-confirmed casualty events at both Mosul and Raqqa also show a worrying recent deterioration in the willingness to admit civilian harm. Nine months after the start of operations in Mosul, the Coalition had conceded responsibility in 43 percent of the 101 total completed civilian casualty assessments it had conducted. In comparison, nine months after the start of operations in Raqqa - and more than four months after it was captured - the Coalition had acknowledged responsibility in just 13 strikes, or 11 percent of the 121 cases it said it had assessed. The rest were found by Coalition investigators to be 'non-credible' allegations. There is no evidence that Coalition personnel have investigated any of these allegations on the ground, in person, or have spoken with those directly affected - for example survivors or local rescue services.<sup>42</sup>

The US-led alliance does at least have a formal investigatory system - and routinely stresses its focus on minimising civilian harm. Russia has no formal investigative process, and often denies any involvement in civilian deaths, even where its presence and actions have been clearly documented. During the bombing of Eastern Ghouta in March, for instance, video footage posted to social media showed Russian planes overhead.<sup>43</sup> Russia should institute more regular and accurate reporting of where it is striking, and also provide civilians with the results of casualty investigations, as well as offering restitution payments where appropriate.

41 'The Uncounted,' New York Times Magazine, November 16th 2017, at <https://www.nytimes.com/interactive/2017/11/16/magazine/uncounted-civilian-casualties-iraq-air-strikes.html>

42 'Raqqa, a city destroyed then forgotten, Airwars, March 12th 2018, at <https://airwars.org/news/raqqa-a-city-destroyed-then-forgotten/>

43 Twitter Post - @QalaatAlMudiq, March 14th 2018, at <https://twitter.com/QalaatAlMudiq/status/973978834885398528>

### Humanitarian and post-conflict concerns

During the most intense periods of urban battle in Iraq and Syria, medical and humanitarian workers struggled to treat all those who required treatment or aid. In all of the examples under consideration here – Aleppo, Mosul, Raqqa and Eastern Ghouta – civilians were faced with impossible choices about whether to flee under a hail of heavy weapon fire and airstrikes; or to stay put and attempt to wait out an assault. In each of these urban areas there were reports of restrictions on the movement of civilians. In ISIS controlled areas, civilians were used as human shields, and residential areas were often rigged with explosives to deter movement. Coalition and associated forces instructions to locals were often confusing, and even contradictory.<sup>44</sup>

Meanwhile, evacuation corridors were missing in both Mosul and Raqqa, exacerbating the plight of civilians trying to flee violence. In Aleppo and Eastern Ghouta, egress was allowed to other parts of the country, but only after deals were reached with local rebel groups. Corridors to government controlled areas were however at times left unused by besieged residents, both out of fear of the local opposition groups, but also for what might subsequently befall them.

*Bodies pulled out from under the rubble in Raqqa's al Ta-wassouiy'a neighbourhood in February 2018. The mostly unidentified remains are reportedly those of people killed in a Coalition airstrike four months earlier. Image via Media Without Borders*

44 'Civilians face conflicting instructions as Coalition and SDF assault Raqqa,' Airwars, June 9th 2017, at <https://airwars.org/news/civilians-face-conflicting-instructions-as-coalition-and-sdf-move-to-take-raqqa/>





## Part Two

Improving civilian protections - what key policy and procedure changes can governments and agencies make to better protect and support victims of explosive violence in urban fighting?



Previous page  
 US ground forces fire 120mm  
 mortars in support of Iraqi  
 ground forces during the 2016  
 battle for Mosul. Image via  
 Department of Defense

## Counting the dead and reviewing urban warfare

We are presently experiencing the highest reported levels of urban civilian harm from military actions in decades. It is imperative that both Russia and the US-led Coalition (as well as domestic forces) properly assess civilian harm resulting from recent assaults on Mosul and Raqqa, Aleppo and Eastern Ghouta - and the effects of employing significant numbers of explosive weapons within the confines of these cities.

First and foremost this must involve an attempt properly to understand the overall non-combatant casualty toll in each city, and suitably independent and thorough studies must be commissioned.

Belligerents must also review the broader outcome of recent fighting, and determine whether this met expectations of their campaigns - or if those expectations were unrealistic. The United Nations has reported that Raqqa remains mostly uninhabitable six months after its capture; and several thousand non combatants were credibly reported killed in the assault. Was this an acceptable outcome for an urban military operation?

Belligerents should additionally consider the impact of any changes to rules of engagement or other restrictions that were lifted or loosened before or during recent urban operations. And reviews should be undertaken into the use of specific munitions in urban contexts (eg 500lb and 1,000lb bombs), and whether available munitions suites (for example guided versus unguided) are fit for purpose. The intensive use of unguided artillery in urban warfare in particular should be examined.

These reviews should be formalized, and their findings made public without exception. As noted in Part One, belligerents themselves have repeatedly stressed just how significant the recent urban fighting has been. The outcomes of those fights should therefore be met with equally weighty reviews and reflection.

The ruins of a family home,  
 destroyed in the fighting for East  
 Mosul in 2016. Image courtesy of  
 Amnesty International



### Fixing the Coalition's investigative process

The US-led Coalition should continue to work through its sizable backlog of civilian casualty allegations - the majority relating to the use of explosive weapons in an urban context. However, the present bias towards the observable - when most urban civilian harm is by its nature unobservable - must be addressed. This gulf between the observable and the unobservable is a key contributor to significant underreporting of civilian casualties, and belligerent modeling of harm should better reflect on the ground reporting from affected civilians themselves.<sup>45</sup>

While the Coalition has increased the number of cases reviewed and judged recently, it is finding an increasing proportion of such cases to be 'non-credible' - even where the weight of public evidence suggests otherwise. This risks undermining the trustworthiness of the Coalition's casualty monitoring process. Individual member states including the United Kingdom should therefore additionally call on Coalition authorities to improve their civilian harm monitoring processes.

Of specific concern is the Coalition's steadfast refusal to visit the sites of alleged incidents, or at the very least to speak with local witnesses. As it discards an increasing number of cases - particularly those alleged in the vicinity of Raqqa - this problem grows in scope. The Coalition and individual members states should therefore undertake thorough investigations which are not limited to available video evidence. Every effort should be made to reach out to witnesses and victims of alleged strikes.

### Coalition partner admissions

As outlined in Part One, no Coalition members besides the US, Australia and the Netherlands have admitted to causing civilian harm in either Iraq or Syria, in almost four years of fighting - despite more than 25,000 civilian fatalities being alleged locally. Clearly implausible, this contention is made all the more absurd by the US's own determination that at least 80 civilian deaths have resulted from its partner's strikes - deaths which no nation will claim responsibility for.<sup>46</sup>

The UK, as a principal Coalition partner, should redouble efforts to investigate all strikes in which it took part. However, present UK monitoring - which appears incapable of detecting civilian casualties - is not presently fit for purpose in the view of Airwars, and is in urgent need of recalibration.

<sup>45</sup> See also this opinion piece by a former US Department of Defense adviser: 'The Pentagon Needs a Better Way to Count Civilian Casualties', Dr Ryan Goodman, New York Times, April 26th 2018, at <https://www.nytimes.com/2018/04/26/opinion/civilian-casualties-pentagon-military.html>

<sup>46</sup> 'US officials confirm their Coalition allies have killed 80 civilians - but none will accept responsibility,' Airwars, May 26th 2017, at <https://airwars.org/news/80-coalition-al-ly-deaths/>



## Russia

Airwars recommends that Russia follows those good practice standards established by the US-led Coalition since 2014. These include publishing regular reports on the dates, numbers and locations of its airstrikes in Syria, so that claims of Russian responsibility for civilian harm can be checked against the public record.

In addition, Russia should undertake transparent and comprehensive investigations into claims that its airstrikes have likely resulted in thousands of civilian fatalities, and examine whether its own weapons suite is suitable for urban conflict. Russia must also cease targeting civilian infrastructure, and in particular medical facilities.

## Funding for reconstruction

International powers involved in operations in Mosul, Raqqa, Aleppo, Eastern Ghouta and other cities should provide substantial funding both for their reconstruction and for the removal of unexploded remnants of war. In March 2018, US President Donald J. Trump ordered the suspension of more than \$200 million in funds for recovery efforts in Syria.<sup>47</sup> This is particularly troubling in light of the ongoing death toll in Raqqa, where the UN reports that 50 people are still being wounded or killed weekly after triggering mines, IEDs or unexploded ordnance in the city. In late April, a UN funding conference for Syria fell \$5 billion short of its target, and saw no pledges from the United States.<sup>48</sup>

## Victim compensation and solatia payments

Though policies vary by nation, belligerents should strongly consider payments to victims and their affected families in the event that civilian harm is reasonably determined.

To date, no Coalition member is known to have made any such payments, despite almost 900 conceded deaths in 220 confirmed events since 2014.

Prior to the anti-ISIS campaign, no fault solatia payments were made regularly by the US and others in both Iraq and Afghanistan - a practice which demonstrably eased local tensions. That practice should be resumed with some urgency.

<sup>47</sup> 'Trump Orders State Dept. to Suspend Funds for Syria Recovery,' New York Times, March 30th 2018, at <https://www.nytimes.com/2018/03/30/world/middleeast/syria-us-coalition-deaths.html>

<sup>48</sup> 'Trump administration under fire for not contributing to Syria donors conference,' Guardian, April 26th 2018, at <https://www.theguardian.com/world/2018/apr/26/un-syria-donors-conference-trump-under-fire>

## About this report

This report comprises written evidence submitted by Airwars to the United Kingdom Parliament's All Party Parliamentary Group on Explosive Threats. The paper addresses a dramatic reported recent rise in civilian casualties in urban areas - namely in Mosul, Raqqa, Aleppo and Eastern Ghouta - due to the extensive use of explosive weapons.

The lead author is Samuel Oakford, chief investigator at Airwars. Alex Hopkins, Sophie Dyer, Abdulwahab Tahhan and Kinda Haddad assisted with research, while Eeva Sarlin also provided design assistance.

The report was published in May 2018.

*This undated image released by the Russian Ministry of Defence shows its Syrian-based aircraft equipped with non precision munitions.*



