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# IMPLEMENTING THE FUTURE DECLARATION ON EXPLOSIVE WEAPONS IN POPULATED AREAS: INFORMING CHANGES TO MILITARY POLICY AND PRACTICE

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Article 36 is a specialist non-profit organisation, focused on reducing harm from weapons.

## KEY MESSAGES

- ✗ The draft declaration provides a good basis for further discussion and has the potential to be an effective tool for strengthening the protection of civilians from the use of explosive weapons in populated areas.
- ✗ The central provision in the current draft would commit States to restrict the use of explosive weapons with wide area effects when the effects might be expected to extend beyond a military objective. This commitment could be strengthened by reflecting a clear presumption against the use of explosive weapons with wide area effects in populated areas, such as a commitment to avoid use. This would have the greatest impact in preventing and mitigating the pattern of harm to civilians resulting from the use of explosive weapons in populated areas.
- ✗ The current draft of the declaration would also commit States to ensure that their militaries take into account the direct and reverberating effects on civilians and civilian objects in the planning and execution of operations in populated areas. This is essential to preventing the broader range of harm to civilians that results from the use of explosive weapons in populated areas.
- ✗ Both commitments could be further strengthened by the inclusion of clear language that would guide States on the practical steps required for their implementation, in particular the establishment of policies and practices to:
  - Assess and understand the scale of area effects of different explosive weapons.
  - Assess and understand the generic urban context and how this influences weapon effects and the potential for harm to civilians and damage to civilian objects.
  - Assess in real-time the specific operational context and the potential for harm to civilians and damage to civilian objects.
  - Assess in real-time the impact on civilians and civilian objects of the use of explosive weapons in populated areas.

**Responding to the growing international concern** at the devastating harm resulting from the use of explosive weapons in populated areas, in November 2019, Ireland launched a process of consultations with States, the United Nations (UN), the International Committee of the Red Cross (ICRC) and members of the International Network on Explosive Weapons (INEW), to develop a political declaration to address this critical issue. Further consultations took place in February 2020 and March 2021. A final round of consultations to agree the final text of the declaration has been delayed by the COVID-19 pandemic and is expected to take place early in 2022.

Prior to and throughout the consultation process, Article 36 and other members of INEW, as well as the UN, ICRC and a broad range of States, have called for the future declaration to embody a presumption against the use of explosive weapons with wide area effects in populated areas, such as a commitment to avoid such use. This would have the greatest impact in preventing and mitigating the pattern of short- and long-term harm to civilians that has been widely documented to result from the use of explosive weapons in populated areas and which led to calls for the development of the political declaration.

The current draft declaration<sup>1</sup> lacks a sufficiently clear presumption against the use of explosive weapons with wide area effects in populated areas. However, it would commit States to ensure that their military forces restrict such use when the weapon's effects might be expected to extend beyond a military objective. It would also commit States to ensure that their militaries take into account the direct, indirect and reverberating effects on civilians and civilian objects which can be reasonably foreseen in the planning of military operations and the execution of attacks in populated areas. The problem of the "reverberating effects" of explosive weapons – such as the longer-term impacts on civilians resulting from the destruction of hospitals and water and power infrastructure – has been another key and long-standing concern for INEW, the UN and ICRC that should be addressed through the declaration.

The current text of both these commitments, as contained in paragraphs 3.3 and 3.4 of the draft declaration respectively, could be strengthened significantly, including through the inclusion of clear guidance to States on the practical steps required for their implementation, i.e., for determining when a weapon's effects might be expected to extend beyond a military objective; and for taking into account the possible direct and reverberating effects in the planning of operations and execution of attacks.

The purpose of this policy brief is to outline these steps and suggest how they could be reflected in the declaration text. It is based on the understanding that strengthening the protection of civilians from the use of explosive weapons in populated areas requires the following:

- × First, recognition of the direct link between the extent of area effects of explosive weapons and the risks they pose to civilians and civilian objects when used in populated areas, based on:
  - Prior, technical assessment of the scale of area effects of different explosive weapons.
  - Prior assessment of the generic urban context and how this influences weapon effects and the potential for harm to civilians and damage to civilian objects from direct, indirect and reverberating effects.
  - Real-time assessment of the specific operational context in which explosive weapons are to be used and the potential for harm to civilians and damage to civilian objects from direct, indirect and reverberating effects.
  - Real-time assessment of the impact on civilians and civilian objects of the use of explosive weapons in populated areas.
- × Second, incorporation of these technical, contextual and impact considerations into planning and decision-making in military operations and training.

- × Third, embedding these technical, contextual and impact considerations into existing or new military doctrine, policy, procedures and practice, including the establishment through policy of a presumption against the use of explosive weapons with wide-area effects in populated areas and the introduction of effective measures to anticipate, mitigate, and learn from incidents of civilian harm.

## 1. THE CURRENT DRAFT DECLARATION TEXT

The current draft text of the declaration is composed of two parts. Part one is the preamble and is divided into two sections. Section 1 describes the nature and challenges of contemporary armed conflicts in urban settings and, specifically, the humanitarian consequences resulting from the use of explosive weapons in populated areas. While it notes the existence of military policies and practices that are designed to mitigate civilian harm, it also notes that there is scope for practical improvements in the implementation of international humanitarian law (IHL). Section 2 reaffirms the relevance of IHL to the use of explosive weapons in populated areas and restates a number of key IHL obligations.

Part two is the "operative section" and is composed of sections 3 and 4. Section 3 includes specific commitments relating to the protection of civilians in urban warfare and the use of explosive weapons in populated areas. Section 4 lists commitments relating to international cooperation and assistance, data collection, victim assistance, support to the work of the UN, ICRC and other organizations, as well as follow-up to the declaration to promote effective implementation.

In terms of protecting civilians from the use of explosive weapons in populated areas, paragraphs 3.3 and 3.4 of Section 3 are key. As currently drafted, paragraph 3.3 would commit signatory States to:

Ensure that [their] armed forces adopt and implement a range of policies and practices to avoid civilian harm, including by restricting the use of explosive weapons with wide-area effects in populated areas when the effects might be expected to extend beyond a military objective.

Paragraph 3.4 would commit signatory States to:

Ensure that [their] armed forces take into account the direct, reverberating effects on civilians and civilian objects which can be reasonably foreseen in the planning of military operations and the execution of attacks in populated areas.

The commitment in paragraph 3.3 in particular could be strengthened. The UN, ICRC, INEW and a number of States have repeatedly called for the declaration to include an express commitment to avoid the use of explosive weapons with wide area effects in populated areas or to otherwise reflect a presumption against such use in some other text formulation, in order to convey the same meaning. This would have the

greatest impact in preventing and mitigating the pattern of short- and long-term harm to civilians that has been widely documented to result from the use of explosive weapons in populated areas and which led to calls for the development of the political declaration. In this connection, it should be noted that the draft declaration does not provide guidance on what explosive weapons with wide area effects are and, therefore, what, more precisely, should be restricted and how this should be assessed. While Article 36 and other organizations have presented an approach to and understanding of “wide area effects”, other actors in the declaration process have different understandings of this concept. The concept of wide-area effects is discussed further below. Importantly, both commitments could also be significantly strengthened by providing more specific guidance to States on the practical steps required for their implementation, as discussed below.

## 2. IMPLEMENTING THE COMMITMENT IN PARAGRAPH 3.3: RESTRICTING THE USE OF EXPLOSIVE WEAPONS IN POPULATED AREAS

Implementation of the commitment in paragraph 3.3 – to adopt and implement policies and practices to avoid civilian harm, including by restricting the use of explosive weapons with wide-area effects when the effects might be expected to extend beyond a military objective – would involve a number of practical steps, based on a recognition of the direct link between the extent of area effects of explosive weapons and the risks they pose to civilians and civilian objects when used in populated areas.

### 2.1 PRIOR ASSESSMENT AND UNDERSTANDING OF THE TECHNICAL CHARACTERISTICS OF EXPLOSIVE WEAPONS

First, militaries should undertake prior assessment of the technical characteristics of explosive weapons to ensure a proper understanding of the scale of area effects that are possible in different operational conditions.

Explosive weapons function by projecting blast, heat, and fragmentation (dispersal of pieces of the weapon or surrounding material) around the point of detonation. These primary explosive weapon effects originate directly from the munition itself. They can result in the death and injury of civilians and severe damage to or destruction of the built environment, including civilian objects such as housing, hospitals, schools, workplaces, and essential infrastructure such as water and power grids. The extent of damage depends upon a range of factors, including the energy output of the detonation, the location of the detonation relative to the affected structure (distance), the angle of attack, and the characteristics of the affected structure.

Secondary effects stem from weapon’s interaction with the immediate environment (including debris from concrete and glass from damaged buildings) and their assessment requires an understanding of the specific context in which the weapon will be used (see below). Tertiary or “reverberating effects” result from damage to infrastructure and services. Secondary and tertiary effects are discussed in more detail below.

### RELATIONSHIP BETWEEN THE SCALE OF AREA EFFECTS AND THE RISK OF HARM

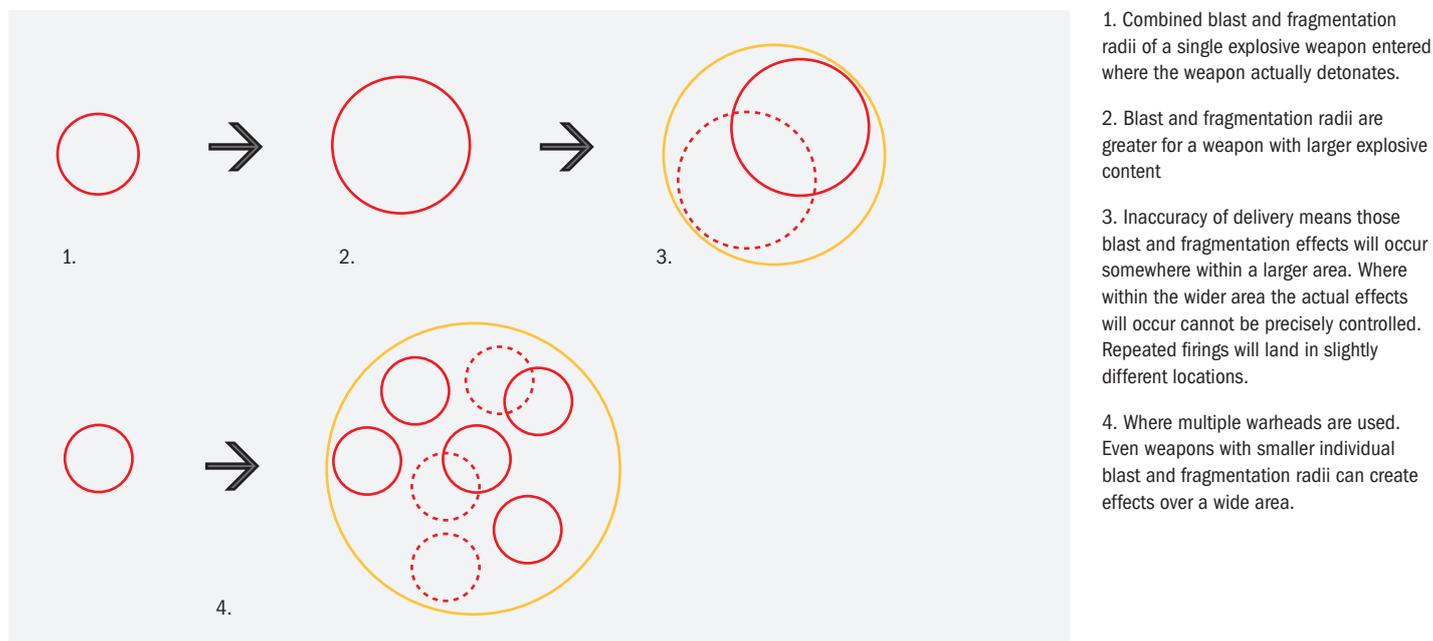
It is important to recognize that when explosive weapons are used in populated areas there is a direct relationship between the scale of area effects of the weapons and the likelihood of harm to civilians and damage to civilian objects. That is to say, in a populated area, the greater the distance at which the primary blast and fragmentation effects extend beyond the military objective, and the greater the area covered by explosive weapons (in the case of the use of multiple munitions against a military objective), the greater the likelihood of harm to civilians and civilian objects within the vicinity of the military objective. This is often referred to as “wide area effects”.

Military forces must factor the potential for wide area effects into their decision-making as to the use – or not – of explosive weapons in populated areas. The likelihood that area effects will extend beyond the military objective marks a threshold at which additional caution must be applied, including a presumption against the use of the weapon in those circumstances.

Generally speaking, by virtue of how they function, most explosive weapons have the potential to have wide area effects depending on the size of the military objective against which they are being used and its proximity to civilians and civilian objects. There is, however, particular concern over the use in populated areas of explosive weapons, either individually or in combination, that possess the following characteristics:

- ✘ A substantial blast and fragmentation radius resulting from a large explosive content, for example, large aircraft bombs.
- ✘ Inaccuracy of delivery, meaning that the weapon may land anywhere within a wide area and may need to be “walked” onto the target, for example, unguided indirect fire weapons such as artillery and mortars.
- ✘ Use of multiple firings or multiple warheads, which are sometimes designed to spread across an area, such as multi-launch rocket systems.<sup>2</sup>

It should also be noted that these effects are cumulative, with blast and fragmentation effects always present and inaccuracy of delivery and the use of multiple warheads, where applicable, extending those effects across a wider area (see Figure 1 overleaf).

FIGURE 1: BASIC STRUCTURE OF WIDE AREA EFFECTS<sup>3</sup>


The effects of blast and fragmentation dissipate at a distance from the point of detonation. Fragmentation typically affects a greater area than is reached by the blast effects (i.e., the shock wave and wind caused by the detonation). The fragments can still be deadly at great distances, but they are generally more dispersed so the likelihood of striking people decreases. Similarly, the power of the blast wave reduces as it spreads out, making its effects less severe.

#### TOOLS AND PROCESSES FOR ASSESSING AND UNDERSTANDING WEAPON EFFECTS

While an understanding of primary weapon effects is a prerequisite for complying with IHL, the level of understanding varies between different military forces. Article 36 of Additional Protocol I to the 1949 Geneva Conventions imposes an obligation on the High Contracting Parties, and arguably all States, to prevent the use of weapons, means or methods of warfare that violate international law by employing a review process that determines the lawfulness of any new weapon, means or method of warfare before it is used in an armed conflict.<sup>4</sup> This requires reviewing the technical characteristics of the weapon, including its means of destruction, damage or injury; its technical performance, including the accuracy and reliability of the targeting mechanism (which includes failure rates, sensitivity of unexploded ordnance, etc.); the area covered by the weapon; and whether the weapons' foreseeable effects are capable of being limited to the target or of being controlled in time or space, including the degree to which a weapon will present a risk to the civilian population *after* its military purpose is served.<sup>5</sup>

In addition to Article 36 reviews, some militaries employ different tools and processes for understanding the primary effects of weapons. In the United States, for example, the Joint Technical Coordinating Group for Munitions Effectiveness (JTJCG/ME) has joint weaponeering tools - known as Joint Munition Effectiveness Manuals (JMEMs) - that are used to estimate the appropriate number and types of weapons required to achieve a desired lethal effect on a target while also mitigating collateral damage. JMEMs rely on:

- ✘ Data to accurately capture the performance of weapons against adversary targets.
- ✘ Physics-based models and analytical methods to estimate weapons effects for a wide range of engagement conditions.
- ✘ User-friendly and secure software that permits mission planners to predict and visualize weapons effects, while also estimating the potential for civilian casualties.<sup>6</sup>

#### CONCEPTUALISING WEAPON EFFECTS IN TERMS OF RISK

For some militaries, the primary effects of their weapons are conceptualised in terms of the level of risk presented at specific distances, with different levels of risk being used for different purposes. The following terms are often used:

- ✘ Lethal radius or "kill radius" or "lethal bursting area" which refers to the area in which any person is likely to be incapacitated or killed (see figure 2 overleaf).<sup>7</sup>
- ✘ Casualty-producing radius: a wider area within which casualties can be expected.

FIGURE 2 – SCALE REPRESENTATION OF THE “LETHAL BURSTING AREA” OF US MORTAR ROUNDS<sup>8</sup>



Military forces also refer to such concepts as:

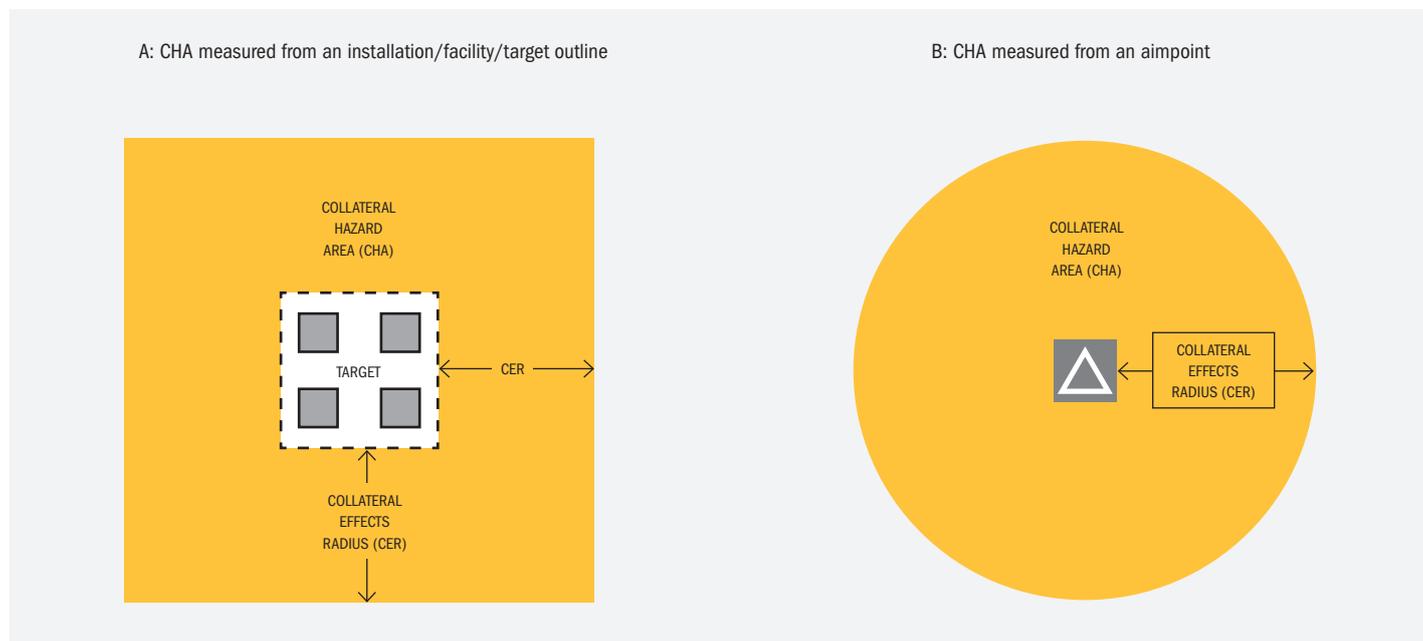
- ✗ Minimum safe distance (MSD): the distance, usually expressed in metres, at which the risk from munitions is considered negligible for military personnel during training exercises.<sup>9</sup>
- ✗ Risk-estimate distance (RED): expressed in meters and used in combat based on the probability of incapacitation of protected or unprotected military personnel. Distances might be given at which 0.1% (1 in 1,000) and 10% of such personnel are expected to be incapacitated. Figure 3, on the right, provides a list of MSDs and REDs for a number of explosive weapons currently in use.

An understanding of weapons effects is also central to the process of estimating the collateral damage that might be expected to result from a specific attack. Collateral damage estimation (CDE) is an important step in the targeting process for a number of military forces and may, in some cases, involve the use of a sophisticated, computer-based methodology to predict and mitigate collateral damage from attacks with explosive weapons<sup>11</sup> but which also has some important limitations.<sup>12</sup>

Collateral damage estimates are based on a number of factors, including the collateral effects radius (CER) of a given weapon. This is defined as a radius representing the largest collateral hazard distance for a given warhead, weapon, or weapon class based on predetermined thresholds for levels of collateral damage that are considered acceptable and that are established for each of the five levels of analysis used in the CDE process.<sup>13</sup> The CER is used as the basis for establishing the collateral hazard area (CHA) of a weapon. This is an area formed by measuring a CER from either the edge of a target, the aimpoint for a point target, or the edge of an engagement zone or artillery sheaf<sup>14</sup> for an area target (see figure 4 Overleaf).<sup>15</sup>

FIGURE 3 - MSDS AND REDS FOR COMMON WEAPON SYSTEMS<sup>10</sup>

Weapon System	MSD (Training)	RED (Combat)	
		0.1 PI	10PI
60mm mortar (M224)	250m	175m	65m
81mm mortar (M252)	350m	230m	80m
120mm mortar (M120/M121)	600m	400m	100m
105mm artillery (M102/M119)	550m	275m	90m
155mm artillery (M109/M198)	725m	450m	125m
155mm artillery (DPICM)	725m	475m	200m

FIGURE 4 – EXAMPLES OF THE RELATIONSHIP BETWEEN THE CER AND CHA<sup>16</sup>


By specifically stipulating the need for prior assessment of the technical characteristics of explosive weapons, including their area effects, the declaration would act as an important vehicle for improved understanding across all military forces of the primary effects of their explosive weapons.<sup>17</sup> This is essential for helping to determine when the use of a given explosive weapon is likely to have area effects that extend beyond the military objective – marking a threshold at which additional caution must be applied, including a presumption against the use of the weapon in those circumstances.

#### AREAS FOR FURTHER CONSIDERATION

While some militaries employ weapons reviews and other tools and processes to assess and understand the primary effects of their weapons, the effectiveness and reach of such tools and processes could be strengthened through further consideration of a number of related areas:

- ✗ The various tools and processes for assessing weapon effects, and the data collected, are primarily aimed at assessing the application of kinetic effects on a target. To what extent could they also be used to assess the likely risk of harm to civilians and civilian objects in different operational contexts?
- ✗ It would be useful to have clearer understanding of how weapon effects are measured, by whom, according to what metrics, to what end, and with what degree of accuracy.<sup>18</sup> This would help to ensure that the expected effects of different weapons are comparable and support effective decision-making as to the use – or not – of particular types of explosive weapons in populated areas.
- ✗ Assessments of weapon effects are spread across a range of tools and processes. Is it possible to ensure that these assessments are comprehensively applied and taken into account in all circumstances?
- ✗ Can assessments of weapon effects take into account the cumulative effects resulting from the use of multiple warheads across an area, again with a view to supporting more effective decision-making in terms of the use – or not – of particular types of explosive weapons in populated areas?
- ✗ Some military forces utilize sophisticated, computer-based, CDE methodology to anticipate and prevent civilian harm and damage to civilian objects in military operations. To what extent could this methodology be made more widely available to other military forces? What steps could be taken to overcome the known limitations of the existing methodology?<sup>19</sup> And how can military forces ensure more thorough CDE in dynamic (unplanned), as opposed to *deliberate* (pre-planned), attacks?<sup>20</sup>
- ✗ In the context of the sale or transfer of explosive weapons to States or non-State armed groups, is data concerning weapon effects provided to the recipients; and are those weapons subject to an Article 36 review by the recipient States that are also party to Additional Protocol I?<sup>21</sup>

## 2.2 EVALUATE THE CONTEXT OF USE AND ITS POTENTIAL IMPACT ON WEAPON EFFECTS

Given the well-documented risks posed by the use of explosive weapons in populated areas, in addition to prior evaluation of the technical characteristics and area effects of explosive weapons, military forces should also evaluate the context of use and its potential impact on weapon effects. There are two aspects to this:

- ✘ First, prior assessment of the *generic urban context* and understanding how the urban environment influences weapon effects and the potential for harm to civilians and damage to civilian objects from direct, indirect and reverberating effects.
- ✘ Second, real-time assessment of the *specific operational context* in which explosive weapons are to be used, how this will likely influence weapon effects and the potential for harm to civilians and damage to civilian objects from direct, indirect and reverberating effects.

As indicated, some military forces have some understanding of the primary effects of their explosive weapons. Moreover, they can control these to some extent through “weapon engineering” which is the process of determining the quantity of a specific type of lethal or non-lethal means required to create a desired effect on a given target.<sup>22</sup> Mitigating collateral damage is a key element of weapon engineering. The effects of the weapon chosen may depend on a number of variables, including but not limited to target composition and construction, population density, soil type and density, time of attack, angle of attack, weather, number of munitions employed, warhead and fuze setting. Some of these variables, such as fuze setting, angle and time of attack, can be controlled by the attacker in order to reduce potential collateral damage.<sup>23</sup>

### THE BUILT ENVIRONMENT AND ITS IMPACT ON EXPLOSIVE WEAPONS

Such techniques notwithstanding, the urban or built environment, as opposed to more open areas, presents significant challenges in both predicting and controlling the scale and nature of area effects of a weapon. For example, in a built-up area, the blast wave can be reflected and amplified by structures and the hard surface of the ground around the detonation site. Especially dense urban streetscapes do not permit the blast energy to radiate spherically away from the detonation. Tall buildings and narrow streets can concentrate and significantly enhance blast pressure in some places, channeling the blast through “urban canyons”. As a result, blast damage can be more extensive over much wider areas than if the same explosive weapon had been detonated in an open space. Due to the complex interaction of the blast wave with reflecting surfaces, the extent and severity of blast damage to the built environment can be very difficult to accurately predict.<sup>24</sup> This difficulty is particularly pronounced in situations involving the use of indirect fire weapons or multiple launch systems where the precise point of impact of the weapon (or each weapon in the salvo) cannot be accurately predicted.<sup>25</sup>

In addition, building and other materials such as glass, cement, steel and other debris add to the fragmentation effect of the weapon, increasing the likelihood of death and injury to people and destruction

or damage of civilian objects – again in ways that are difficult to accurately predict. The CDE methodology referred to earlier – which is perhaps the most sophisticated methodology of its kind – specifically states that the effects of blast induced debris are not characterised, even though such debris has been operationally observed to be a “significant hazard to non-combatant personnel”.<sup>26</sup> It also notes that “weapons effects may vary in different environments” and that, in general, “the CDM and supporting weapon effectiveness data use a combination of flat terrain, rolling hills, and soft soil as the base environment and terrain” rather than urban environments.<sup>27</sup> Recent NATO guidance on the protection of civilians notes that among the factors affecting the ability of anti-ISIS coalition forces to mitigate civilian harm in Iraq and Syria was insufficient understanding of the urban terrain to anticipate the net effect from weapons on old structures, as well as secondary explosions from ISIS booby traps.<sup>28</sup>

In order to ensure more effective protection of civilians from the use of explosive weapons in populated areas, it is essential that military forces have a comprehensive understanding of the ways in which the built environment can influence weapon effects. This is both in a general sense as well as in relation to the specific context of use. This will support informed decision-making as to the use – or not – of particular types of explosive weapons based on their anticipated impact on civilians and civilian objects.

### CONTEXT OF USE AND DYNAMIC ATTACKS

A general understanding of weapon effects and how these are influenced by the built environment is especially important for effective decision-making in the context of dynamic (unplanned) attacks.<sup>29</sup> As US Air Force targeting doctrine notes, due to the reduced planning time available, dynamic targets may be engaged with less consideration given to such variables as fuze settings or axes of attack – both of which can influence the extent of collateral damage. In some cases, assets may be diverted to prosecute dynamic targets with munitions that are not ideal for the task. These considerations may carry increased risk of collateral damage requiring that commanders weigh the potential benefits from prosecuting the target quickly.<sup>30</sup> They also underline the importance of military forces possessing a general understanding of how weapon effects are influenced by the built environment in order to make minimally-informed judgements as to the likelihood of possible direct, indirect and reverberating effects in the context of dynamic attacks.

With these various considerations in mind, military forces should:

- ✘ Undertake prior assessment of the generic urban context and how this influences secondary effects of explosive weapons and the potential for harm to civilians and damage to civilian objects, including from direct, indirect and reverberating effects.
- ✘ Assess in real-time the actual operational context in which the weapons will be used and how this will influence the secondary effects of explosive weapons and the potential for harm to civilians and damage to civilian objects, including from direct, indirect and reverberating effects.

- ✗ Ensure that analysis gleaned from battle damage and other assessments concerning the performance and impact of explosive weapons on civilians and civilian objects is used to inform refined understandings of weapons effects.

Again, the need to assess the context, in both a generic and specific sense, should be articulated in the declaration so as to provide clear direction to signatory States and their military forces on the steps required for its implementation.

### 3. IMPLEMENTING THE COMMITMENT IN PARAGRAPH 3.4: ANTICIPATING THE DIRECT, INDIRECT AND REVERBERATING EFFECTS ON CIVILIANS AND CIVILIAN OBJECTS

The commitment in paragraph 3.4 of the draft declaration requires signatory States to ensure that their armed forces take into account the direct (death and injury of civilians and damage to or destruction of civilian objects) and longer-term reverberating effects on civilians and civilian objects which can be reasonably foreseen in the planning of military operations and the execution of attacks in populated areas.

This is critically important. As US military doctrine on urban operations notes: “[a]n overriding aspect of the urban environment is that of density—density of structures, density of people, and density of infrastructure.” It goes on: “Structural density can create complex social and political interactions by compressing large numbers of people into a small geographic area. Critical infrastructures (physical, economic, governmental, social, etc.) are in such close proximity and, in most areas, so intertwined that even minor disruptions by military operations can cause significant repercussions.”<sup>31</sup>

More specifically, urban environments contain a density of civilians and different types of civilian objects, some of which are essential to the survival of the civilian population. They are typically characterised by commercial and residential buildings alongside schools, hospitals and other civic institutions. Servicing these structures are networks of water, sanitation, power, communications and transport infrastructure critical to the local population. When explosive weapons with wide area effects are used in such environments, even in attacks directed at legitimate military targets, there is an elevated risk of harm to the civilian population and damage to civilian objects.

Damage to or destruction of civilian objects, including essential infrastructure, can have important third order or reverberating effects. For example, damage to housing can render civilians homeless while damage or destruction of electricity and water supply systems, as well as of hospitals and clinics, deny conflict-affected populations (in a broad sense) access to basic services and emergency and other forms of healthcare, often forcing people to leave their places of residence in search of such services. The damage or destruction of schools and places of work undermine education and livelihoods, again forcing populations to become displaced. The widespread destruction caused

by the use of explosive weapons in populated areas, particularly when that use is protracted, has significant implications for post-conflict reconstruction requirements – and the associated costs – and undermines progress towards the Sustainable Development Goals. Contamination of urban centres with explosive remnants of war (ERW) compound the challenges of reconstruction and act as an ongoing barrier to the safe return of displaced persons.

Conducting military operations in urban and other populated areas requires considerable and often very detailed information which can be difficult to obtain.<sup>32</sup> This is especially the case in situations in which attacking forces do not have personnel on the ground which limits their access to information. Information requirements span a broad range of areas, from information on the civilian population itself to information pertaining to particular buildings, to communications, energy, water and sanitation, food distribution, and medical infrastructure, as well as subterranean infrastructure such as tunnels, sewage systems and utility lines.<sup>33</sup> While some of this infrastructure is visible and identifiable from the ground or the air – at least to the trained eye – some such as water, sewer and electricity lines may be underground, their precise location unknown to attacking forces. The detailed layout of a given service system is often only known by the staff of the service provider that operates the service (typically at the municipal level), even if the original layout is sometimes recorded in as-built plans or standard operating procedures. Irrespective of whether an attack is planned or dynamic, “access to this level of information is not likely to be readily available”.<sup>34</sup> It has been recommended that resource personnel can and should be used wherever possible to gain knowledge of the basic layout and functioning of essential services.<sup>35</sup> The alternative is to rely on the expert opinion of engineers specialized in a particular urban service (i.e., water supply, waste-water collection and treatment of power supply).<sup>36</sup>

The existing military doctrine, policy and practice of a number of States recognizes the need to protect civilians in the conduct of military operations, including in ways that may go beyond the minimum requirements of IHL. This reflects a broader recognition among some militaries that protecting civilians is not only a moral imperative and an obligation under IHL but also an important strategic objective.<sup>37</sup> The policy and practice of some States and organizations also recognizes the need to consider and mitigate unintended and second and third-order or reverberating effects of military operations on the civilian population, again for both legal and strategic reasons.<sup>38</sup> For example, the NATO’s *Handbook on Protection of Civilians* states that the targeting process should include legal and engineering considerations and take into account second and third order effects that can negatively affect the civilian population for a longer time.<sup>39</sup> It also notes more generally that military forces need to take into account the negative wide area effects of explosive weapons in populated areas, including foreseeable second and third order effects.<sup>40</sup>

With military operations frequently taking place in urban and other populated areas, and given the increased awareness of the severe and long-term impact that the damage and destruction of infrastructure has on civilian populations<sup>41</sup>, militaries should ensure strengthened analysis and understanding of possible direct, indirect and reverberating effects and the risk thereof in a given context and work to avoid them. This could include taking operations outside populated areas whenever feasible.

With these considerations in mind, the practical implementation of the commitment in paragraph 3.4 would require that militaries take the following steps:

### 3.1 REVISE EXISTING OR DEVELOP NEW OPERATIONAL POLICIES AND PROCEDURES TO ENSURE THAT CIVILIAN PRESENCE AND DIRECT, INDIRECT AND REVERBERATING EFFECTS ARE FACTORED INTO OPERATIONAL PLANNING, DECISION-MAKING AND EXECUTION.

Regarding civilian presence, militaries should in particular review and, as necessary, revise:

- ✘ Baseline assumptions that they make concerning the possible presence and behaviour of civilians and the presence of civilian objects in the urban environment, including following warnings and evacuation orders, and err on the side of caution and assume the presence of civilians unless confirmed otherwise.<sup>42</sup>
- ✘ Processes for positively identifying military objectives on the one hand, and on the other, for identifying and monitoring civilian presence, including pattern of life analyses, and the location of civilian objects, including essential infrastructure, in urban areas and, in particular, within the vicinity of potential military objectives.
- ✘ Processes that facilitate an understanding of the value and significance of civilian objects, including critical infrastructure, for the civilian population.
- ✘ Processes to ensure that the presence of civilians and civilian objects, including those that have particular value and significance for the civilian population, is incorporated into the targeting process (including through the participation of subject-matter experts such as engineers, urban planners, etc.) in order to avoid or mitigate harm to civilians and civilian objects in the context of both deliberate and dynamic attacks.
- ✘ Processes for ensuring that the presence of civilians is accounted for up to the point at which the strike takes place; and when there is doubt, for delaying or aborting the strike.

Regarding reverberating effects, militaries should review and, as necessary, refine:

- ✘ Current thinking in terms of what constitutes reasonably foreseeable third order, or reverberating effects, taking into account the existing (and expanding) research base that has significantly improved understanding of the foreseeability, nature and scope of reverberating effects.
- ✘ Their understanding and ability to anticipate reverberating effects resulting from both individual and, importantly, cumulative attacks.
- ✘ The extent of consultation with subject-matter experts (urban planners, civil engineers, water and sanitation engineers, public

health experts, etc.) in the targeting process to inform understandings of the role and significance of civilian infrastructure and anticipation of possible secondary and reverberating effects.

- ✘ The extent to which this analysis feeds into and informs a civilian object's protected status and inclusion on the no-strike list (NSL); and the extent to which its inclusion on the NSL and any subsequent changes are communicated to the civilian population.
- ✘ Available weaponeering and other options that can be used to mitigate reverberating effects.

### 3.2 UNDERSTAND AND LEARN FROM THE IMPACT ON THE CIVILIAN POPULATION AND CIVILIAN OBJECTS OF MILITARY OPERATIONS AND THE USE OF EXPLOSIVE WEAPONS.

In addition to anticipating and seeking to avoid or minimize the direct, indirect and reverberating effects of the use of explosive weapons in populated areas, it is essential that militaries have policies and procedures in place to understand the impact of their operations and the use of explosive weapons on civilians and civilian objects, both during and after the conduct of operations. This is necessary for a range of purposes, from informing operational changes and broader policy development in support of more effective protection of civilians, to helping to identify possible civilian harm incidents, including potential violations of IHL, that require further investigation and accountability for perpetrators and redress for victims.

The establishment of civilian casualty tracking mechanisms was a critical component of broader efforts by the International Security Assistance Force in Afghanistan to protect civilians from the effects of military operations.<sup>43</sup> Despite its proven utility, however, military forces do not routinely track or investigate civilian harm resulting from their operations. One recent study of the US military, for example, found inconsistencies as to when and how investigations and assessments into civilian harm are conducted, with instances of investigations being concluded on the basis of incomplete or inadequate internal information and a failure to sufficiently incorporate external evidence, such as witness interviews or site visits.<sup>44</sup>

Some military forces/coalitions have begun to release limited data on civilian casualties resulting from their operations. For example, beginning in 2019, the US Department of Defense (DOD) issues an annual report on civilian casualties which lists all US military operations, including each specific mission, strike, engagement, raid, or incident, during the year covered by the report were confirmed, or reasonably suspected, to have resulted in civilian casualties.<sup>45</sup> In 2021, a Belgian Parliamentary resolution approving the deployment of Belgian warplanes to participate in US-led Combined Joint Task Force-Operation Inherent Resolve (CJTF-OIR) requested the federal government "to communicate publicly, after investigation and taking into account military and security considerations, about possible civilian casualties as a result of Belgian military operations and to ensure active cooperation and exchange with external monitoring groups and human rights organizations."<sup>46</sup>

The CJTF-OIR itself issues monthly strike and civilian casualty reports.<sup>47</sup> The former provides a very basic summary of strikes conducted during

the month but does not provide information on the number or type (or nationality) of aircraft employed in a strike, the number of munitions dropped in each strike, or the number of individual munition impact points against a target. Since early 2019, these reports have also excluded the near location and target of strikes – a critical contributor to the efforts of external actors to reconcile strikes with alleged incidents of harm to civilians. The civilian casualty reports provide a global number of civilians “unintentionally killed” by CJTF-OIR since the beginning of the operation. It also provides an overview of cases of allegations of civilian casualties that are being investigated and cases that have been deemed non-credible. Interestingly, it is generally NGOs, in particular Airwars, that are the primary source of reports of possible civilian casualties. Few investigations seem to be instigated as a result of concerns identified by CJTF-OIR itself – reinforcing existing concerns over the extent to which militaries properly understand and analyse the impact of their own operations on civilians.<sup>48</sup>

Assessing civilian casualties is not always included in the assessment stage of the targeting cycle. Some militaries conduct battle damage assessments (BDAs) after an attack to assess the effect or degree of damage inflicted on the target and to make recommendations for additional strikes, which is the principle function of such assessments. However, BDAs are not always undertaken due to the lack of capacity to do so. Nor do they always consider the impact of the attack on civilians and civilian objects. To the extent that they do, due to reasons of security and access, militaries may rely on aerial platforms to provide video assessments of damage and civilian casualties. However, these assessments provide an incomplete picture of civilian harm as aerial platforms cannot see beneath rubble and inside collapsed buildings. Moreover, victims and witnesses of attacks may not be interviewed, undermining the ability to construct a comprehensive picture of events from which lessons could be learned.<sup>49</sup> The UN Secretary-General has repeatedly called on States to establish specific capabilities to track, analyze, respond to and learn from incidents of civilian harm and damage to civilian objects. The lack of civilian casualty analysis feeding back into the system has been noted as an important flaw in the collateral damage methodology used by the US and other States.<sup>50</sup>

With these considerations in mind, militaries should consult with the UN and civil society actors with relevant expertise to:

- ✘ Identify the types of data needed to understand the impact of their operations, including the use of explosive weapons, on civilians and civilian objects.
- ✘ Establish standing capabilities to track, analyze, and learn from, incidents of harm to civilians and civilian objects and that would provide the basis for regular, public reporting.
- ✘ Institute processes to ensure that analyses, findings and lessons-learned routinely inform operational changes and broader policy development in support of more effective protection of civilians.

A conscious and concerted effort to understand the impact of military operations on civilians and civilian objects, including from the use of explosive weapons, is vital in order to ensure accountability and redress, learn lessons and continuously work to strengthen the protection of civilians over time.

## 4. CONCLUSION: PROPOSED CHANGES TO THE CURRENT DRAFT DECLARATION TEXT

The current text of the draft declaration provides a good basis for further discussion among States, the UN, ICRC and civil society and has the potential to be an effective tool for strengthening the protection of civilians from the use of explosive weapons in populated areas. But realizing that potential will require further strengthening of the text, in particular by including specific guidance to signatory States and their military forces on the steps required to implement the declaration.

This is especially the case as concerns the commitments contained in paragraphs 3.3 and 3.4 of the draft text. While the former falls short of a sufficiently clear presumption against the use of explosive weapons with wide area effects in populated areas (and could be strengthened accordingly), it would commit States to ensure that their military forces restrict the use of such weapons when the weapon’s effects might be expected to extend beyond a military objective. Paragraph 3.4 would commit States to ensure that their militaries take into account the direct, indirect and reverberating effects on civilians and civilian objects which can be reasonably foreseen in the planning of military operations and the execution of attacks in populated areas.

As demonstrated above, the text of both these commitments could be strengthened through the inclusion of guidance to States on the practical steps required for determining when a weapon’s effects might be expected to extend beyond a military objective; and for taking into account the possible direct and reverberating effects in the planning of operations and execution of attacks. More specifically, the declaration could guide States and their militaries on the establishment of the necessary policies, procedures and practices that would allow them to:

- ✘ Assess and understand the scale of area effects of different explosive weapons.
- ✘ Assess and understand the generic urban context and how this influences weapon effects and the potential for harm to civilians and damage to civilian objects from direct, indirect and reverberating effects.
- ✘ Assess in real-time the specific operational context in which explosive weapons are to be used and the potential for harm to civilians and damage to civilian objects from direct, indirect and reverberating effects.
- ✘ Assess in real-time the impact on civilians and civilian objects of the use of explosive weapons in populated areas.

To this end, the current draft text should be revised as follows (additions in *italics*):

3.3 Ensure that our armed forces adopt and implement a range of policies and practices to avoid civilian harm *[and damage to civilian objects]*, including by ~~restricting~~ *[avoiding]* the use of explosive weapons with wide-area effects in populated areas, ~~when the effects might be expected to extend beyond a military objective.~~ *[To this end, we will:*

*(a) Assess the technical characteristics of explosive weapons to ensure an understanding of the scale of area effects possible in different operational conditions.*

*(b) Evaluate the operational context, including both the generic urban environment and the specific context of use, and how this will influence the scale and nature of area effects.*

*(c) Review, and further develop as necessary, operational policies and procedures to ensure these technical characteristics and contextual factors are appropriately reflected in operational planning and decision-making, as well as training.]*

3.4 Ensure that our armed forces take into account *[and avoid]* the direct, *[indirect]* and reverberating effects *[of the use of explosive weapons]* on civilians and civilian objects which can be reasonably foreseen in the planning of military operations and the execution of attacks in populated areas. *[To this end, we will:*

*(a) Review operational policies and procedures to ensure that the [actual or presumed] presence of civilians and civilian objects, as well as foreseeable reverberating effects, are appropriately reflected in operational planning and decision-making.*

*(b) Establish capabilities to track, analyze, respond to and learn from incidents of civilian harm and damage to civilian objects resulting from the use of explosive weapons in populated areas by our armed forces].*

## ENDNOTES

- 1 Available here: <https://www.dfa.ie/media/dfa/ourrolepolicies/internationalpriorities/290126-EWIPA-Political-Declaration-REV-1.pdf>
- 2 See further, PAX and Article 36, *Areas of Harm – Understanding Explosive Weapons with Wide Area Effects* (October 2016). Available at: <https://article36.org/wp-content/uploads/2020/12/PAX-A36-Areas-of-Harm.pdf>
- 3 Figure 1 reproduced from PAX and Article 36, *ibid.*, at 9.
- 4 Article 36 of Additional Protocol I stipulates that “In the study, development, acquisition or adoption of a new weapon, means or method of warfare, a High Contracting Party is under an obligation to determine whether its employment would, in some or all circumstances, be prohibited by this Protocol or by any other rule of international law applicable to the High Contracting Party.” Article 36 is considered by ICRC to apply to all States, and not just High Contracting Parties to Additional Protocol I. See further: ICRC, *A Guide to the Legal Review of New Weapons, Means and Methods of Warfare Measures to Implement Article 36 of Additional Protocol I of 1977* (2006), at 4.
- 5 *Ibid.*
- 6 Director, Operational Test and Evaluation, *FY2020 Annual Report* (January 2021) 223. Available at: <https://www.dote.osd.mil/Publications/Annual-Reports/2020-Annual-Report/>
- 7 The lethal radius for a weapon may be established through an arena fragmentation test which measures the size, velocity, and the spatial distribution of fragments where the fragments penetrate steel target plates. Hyukzae Lee et al., “A Deep Learning-Based Fragment Detection Approach for the Arena Fragmentation Test”, *10 Applied Sciences* (2020) 4744; <https://doi.org/10.3390/app10144744>
- 8 Adapted from Department of the Army, *Infantry and Platoon Squad*, ATP 3-21.8 (April 2016) at C-17.
- 9 Some countries have implemented blast distance thresholds for their soldiers that trigger mandatory screening for traumatic brain injury (TBI). The US military requires all military personnel within 50 meters (indoors or outdoors) of a blast to undergo TBI screening. See Department of Defense, *DoD Policy Guidance for Management of Mild Traumatic Brain Injury/Concussion in the Deployed Setting*, DoD Instruction 6490.11 (26 November 2019), cited in M. Schmitt and C. Highfill, “Invisible Injuries: Concussive Effects and International Humanitarian Law”, *9 Harvard National Security Journal* (2018) 86.
- 10 Department of the Army, *The Infantry Rifle and Platoon Squad*, FM 3-21.8 (March 2007) at 2.11.
- 11 See, for example, Chairman of the Joint Chiefs of Staff (CJCS) Instruction, *No Strike and the Collateral Damage Estimation Methodology* CJCSI 3160.01A (12 October 2012). The instruction defines collateral damage as “the unintentional or incidental injury or damage to persons or objects that would not be lawful military targets in the circumstances ruling at the time.” The process itself is described as “a balance of science and art that produces a conservative characterization of the risk of collateral damage for commanders and decision makers.” *Ibid.*, D-1..
- 12 It should be noted that the CDE process has important limitations. As the Instruction notes, CDE is not an exact science but “is inherently limited by the quantity and reliability of collected and analyzed weapons effects data, weapon delivery uncertainties, and target information. Furthermore, the science of the [collateral damage methodology (CDM)] cannot always account for the dynamics of the operational environment.” At D-1. It further observes that the “supporting technical data and processes of the methodology are derived from physics-based computer models, weapons test data, and operational combat observations. All of these sources contain some degree of inherent error and uncertainty. The CDM does not predict the actual outcome of weapon employment. The operational environment, weapon’s reliability, and fidelity of intelligence data are primary factors that account for a CDE output differing from actual combat employment” – though it has been noted that there is no requirement under existing US military policy to determine if the collateral damage estimate was actually correct. See Kenneth Cross, Ove Dullum, Nick Jenzen-Jones and Marc Garlasco, *Explosive Weapons in Populated Areas: Technical Considerations Relevant to their Use and Effects*, Armament Research Services (May 2016) 45-46. See also: L. Lewis and R. Goodman, “Civilian casualties: we need better estimates – not just better numbers”, *Just Security* (22

- March 2018), available from <https://www.justsecurity.org/54181/civilian-casualties-estimates-not-numbers/>
- The CJCS Instruction also indicates that a number of weapons are excluded from the CDM, including some weapon systems where the risk of collateral damage is presented by the distribution of munitions in the target area and not from the explosive effects of the warhead – suggesting that the CDM can only calculate the risks to civilians and civilian objects around a single munition rather than multiple munitions across an area. In addition, the CDM does not account for individual marking or adjusting rounds when employing surface-to-surface ballistic munitions in the Observer Adjusted method of engagement; or for the use of cluster or improved conventional munitions beyond CDE Level 3 because of the greater risk of unexploded ordnance and the limited weaponizing options available to mitigate the risk of collateral damage with these munitions. Rocket Assisted Projectiles (RAPs) or enhanced/extended range artillery, mortar, and naval gun munitions are not addressed beyond CDE Level 3 due to the considerable increase in ballistic errors associated with these munitions and the significant increase in risk associated with their use in urban areas. *Ibid.*, D-5 - D-6.
- 13 *Ibid.*, at GL-4.
  - 14 A *sheaf* is the planes of fire of a group of weapons. Depending on how the weapons in the group are aimed, the pattern formed by the group may take several forms: “Parallel sheaf” occurs when you aim all the weapons in the battery in the same direction and angle. “Regular sheaf” is when the shells are intended to land in a line with regular lateral spacing. “Open sheaf” is a type of regular sheaf where the spacing is chosen so the sheaf has maximum width (given the burst area of each shell) without any gaps in between. “Converged (or point) sheaf” occurs when all the guns are corrected to hit the same point. Also known as precision fire. Finally, “unusual sheafs” refers to specially-shaped sheafs that can be arranged under certain circumstances, such as strangely-shaped targets, point targets, barrages, etc. *US Artillery Fire Patterns*, at: <http://grunt-redux.atspace.eu/arty21.htm>
  - 15 CJCS, note 11 above, at D-A-3.
  - 16 Adapted from CJCS, note 11 above, at D-A-4
  - 17 Not all military forces understand the primary effects of their munitions. Even Article 36 weapon reviews – which are legally required – are only carried out by a “handful” of High Contracting Parties to Additional Protocol I. See David Turns, “Implementation of International Humanitarian Law”, in Ben Saul and Dapo Akande (Eds), *The Oxford Guide to International Humanitarian Law* (2020) 375. *The Program on the Regulation of Emerging Military Technologies (PREMT)* lists only 16 States that are believed to carry out weapons reviews of the type envisaged by Article 36. See: <https://www.premt.net/resources/legal-review/> See also Vincent Boulanin and Maaike Verbruggen, *SIPRI Compendium on Article 36 Reviews*, SIPRI Background Paper (December 2017), at: [https://www.sipri.org/sites/default/files/2017-12/sipri\\_bp\\_1712\\_article\\_36\\_compendium\\_2017.pdf](https://www.sipri.org/sites/default/files/2017-12/sipri_bp_1712_article_36_compendium_2017.pdf)
  - 18 Ove Dullum notes that while it is relatively easy to quantify blast effects as the pressure and impulse from an explosion is a function of the charge size and distance, fragment effects are more complicated: “Firstly it is a problem to assess the initial state of the fragments, i.e. their initial velocity, their weight distribution and their shape. Secondly, the aerodynamic performance is not known with certainty. Thirdly, there is some uncertainty about the effect fragments have when entering a human body. Finally, the exposed area and the posture of the human body are to some extent random.” Ove Dullum, *The Rocket Artillery Reference Book*, Norwegian Defence Research Establishment (2010) 57.
  - 19 See note 12 above.
  - 20 US joint targeting doctrine notes that the targeting process can be generally grouped into two categories: deliberate and dynamic. Deliberate targeting normally supports the joint force’s future plans effort. Dynamic targeting takes place in *current* operations planning because the nature and timeframe associated with current operations (usually the current 24-hour period) typically requires more immediate responsiveness than is achieved in deliberate targeting. Related to this, targets are described in terms of planned targets and targets of opportunity. Planned targets are known to exist in the operational environment with engagement actions scheduled against them. Targets of opportunity refer to identified targets that were not selected for action during the current joint targeting cycle. Targets of opportunity can be divided into two subgroups: unplanned targets and unanticipated targets. Chairman of the Joint Chiefs of Staff, *Joint Targeting*, Joint Publication 3-60 (31 January 2013) x.
  - 21 In the case of the UK, for example, even if it seeks to acquire equipment that is already in service in the armed forces of another State, and even if that State conducts its own Article 36 review, the UK still conducts a review. “Obligations under international law differ between States and, even when subject to the same obligation, different States interpret or implement them differently.” Ministry of Defence, *UK Weapon Reviews*, Development, Concepts and Doctrine Centre (11 March 2016). Available at: <https://www.gov.uk/government/publications/uk-weapon-reviews>
  - 22 CJCS, note 11 above, at GL-11.
  - 23 For example, fuze type and setting determine how and when the munition detonates in relation to the target. It has a significant effect on blast and fragmentation damage and how widespread it is. The same air-delivered bomb, for example, may be fitted with either a time delay fuze or a proximity fuze. This may result in a munition which detonates once partially embedded subsurface, containing the blast and fragmentation effects, or a munition which explodes with an airburst effect, allowing the spread of blast and fragmentation damage over a wider area. See Cross et al., note 12 above, at 41.
  - 24 Article 36, *Damage to the Built Environment from the Use of Explosive Weapons*, Briefing Paper (September 2013). At: <https://article36.org/wp-content/uploads/2013/09/DAMAGE.pdf> Footnotes omitted. See also Geneva International Centre for Humanitarian Demining (GICHD), *Explosive Weapon Effects – Final Report* (2017) 105-106: “The effects of high explosive munitions within populated areas are influenced substantially by the presence of built structures and geographical features.”; and Schmitt and Highfill, note 9 above, at 78, who note that urban operations may have implications for concussive effects due to blast waves reflecting off structures, thereby potentially increasing the concussive severity of the blast.
  - 25 US policy on the use of mortars notes that “the natural dispersion of indirect fires with unguided projectiles can result in many hits on buildings” and that care is required in planning mortar fires during urban operations to minimize collateral damage. Department of the Army/US Marine Corps, *Tactical Employment of Mortars*, ATP 3-21.90/MCTP 3-01D (October 2019) at 4-28.
  - 26 CJCS, note 11 above, at D-A-2.
  - 27 *Ibid.*, at D-6.
  - 28 NATO, *Protection of Civilians ACO Handbook* (March 2021) 22.
  - 29 See note 20 above.
  - 30 US Air Force, *US Air Force Doctrine, Annex 3-60 Targeting: Changes and Limitations During Dynamic Targeting* (15 March 2019). Available from: [https://www.dctrine.af.mil/Portals/61/documents/Annex\\_3-60/3-60-D21-Target-Dynamic-Chng.pdf](https://www.dctrine.af.mil/Portals/61/documents/Annex_3-60/3-60-D21-Target-Dynamic-Chng.pdf) Cross et al note that during operations where troops on the ground come under fire (“troops in contact” situations) and targeting to support them is therefore time-sensitive, it is not uncommon for the ground commander to undertake a rapid, or field CDE. A field CDE is done for immediate targeting such as a target of opportunity or for a troops-in-contact situation. This is a less rigid model due to time constraints. The ground commander tries to determine if any non-combatants are in danger from an intended strike. Visual observations and requests from forces in the field about the location of non-combatants are conducted. For weapons such as air-delivered bombs, the pilot may at times override the ground commander if the pilot observes something that may lead to unacceptable collateral damage. See Cross et al., note 12 above, at 45.
  - 31 Chairman of the Joint Chiefs of Staff, *Joint Urban Operations*, Joint Publication 3-06 (20 November 2013) I-2 – I-3 At: [https://www.jcs.mil/Portals/36/Documents/Doctrine/pubs/jp3\\_06.pdf](https://www.jcs.mil/Portals/36/Documents/Doctrine/pubs/jp3_06.pdf)
  - 32 “Providing intelligence support to operations in the complex urban environment can be quite challenging. It may at first seem overwhelming. The amount of detail required for operations in urban environments, along with the large amounts of varied information required to provide intelligence support to these operations, can be daunting.” US Army, *Intelligence Support to Urban Operations*, TC 2-91.4 (December 2015).

- 33 The US Army's *Intelligence Support to Urban Operations* includes multiple pages that list very detailed and specific information requirements for these different areas. *Ibid.*, at I-15 – I-43. See also Australian Defence Force, *Law of Armed Conflict*, Australian Defence Doctrine Publication 06.4 (11 May 2006) which provides a “Law of Armed Conflict Profile Format” to be prepared where possible for populated areas within an area of operations for inclusion in the operational planning process. The profile requires specific information pertaining to the civilian population, protected objects, and dangerous substances and hazards. It also contains a section on “LOAC guidance” which states that “[t]he use of indirect fire or close air support should be avoided where the civilian population is concentrated.”
- 34 Mark Zeitoun and Michael Talhami, “The Impact of Explosive Weapons on Urban Services: Direct and Reverberating Effects Across Space and Time”, 98 *Int'l Review of the Red Cross* (2016) 68
- 35 The availability of resource personnel cannot be taken for granted. An ICRC report on urban services provision in armed conflict notes that killing and assaults in situations of armed conflict result in fewer essential services staff reporting to work and fewer staff willing to go to the field to conduct routine operation and maintenance work. They most probably also speed up the departure of critical staff from the combat zone. When armed conflict and sanctions (or embargoes and other restrictions) begin to affect a country's economy, essential services in urban areas tend to suffer indirectly, especially outside the capital. The reduction in funds can lead to staff demotivation. Staff who are able to do so may therefore either resign from their official position to work for higher-paying international organizations or the private sector or leave the country altogether. ICRC, *Urban Services During Protracted Armed Conflict: A Call for a Better Approach to Assisting Affected People* (2015) 22-24.
- 36 *Ibid.*, at 68.
- 37 See, for example, Department of the Army, *Protection of Civilians* (ATP 3-07.6) (2015); United States Joint Chiefs of Staff, *Joint Publication 3-0: Joint Operations* (2017); Department of the Army/United States Marine Corps, *Urban Operations*, ATP 3-06 MCTP 12-10B (2017); US Joint Chiefs of Staff, *Joint Fire Support*, Joint Publication 3-09 (10 April 2019); and “Development of a DOD Instruction on Minimizing and Responding to Civilian Harm in Military Operations”, *Memorandum from the Under-Secretary of Defense* (31 January 2020). See also *British Army, British Army Field Manual, Vol.1, Part 10, Countering Insurgency*, Army Code 71876 (October 2009) 6-7 and 7-4; European Union Military Committee, *Avoiding and Minimizing Collateral Damage in European Union-Led Military Operations* (EEAS(2015) 772 REV 8) (2016), paras.8-9; and NATO, *Policy for the Protection of Civilians* (July 2016).
- 38 See, for example, Department of the Army/US Marine Corps, *ibid.*, at 2-4, para.2-16; and Chairman of the Joint Chiefs of Staff Instruction, *Target Development Standards*, CJCSI 3370.01B (6 May 2016) D-B-6.
- 39 NATO, note 28 above, at 25.
- 40 *Ibid.*, at 29.
- 41 See, for example, C. Wille and A. Malaret Baldo, *Reference Framework: Menu of Indicators to Measure the Reverberating Effects on Civilians of the Use of Explosive Weapons in Populated Areas*, UNIDIR (2021); Humanity and Inclusion, *Death Sentence to Civilians: The Long-Term Impact of Explosive Weapons in Populated Areas in Yemen* (2020); and Zeitoun and Talhami, note 34 above. Additional research and resources available on the INEW website: <http://www.inew.org/resources/>
- 42 In Afghanistan, for example, ISAF Commander Petraeus issued a tactical directive requiring that prior to the use of fires, commanders must determine that no civilians are present in the target area and that if unable to assess the risk of civilian presence, fires were prohibited, except under certain conditions. Petraeus' successor, Commander Allen, directed ISAF forces to presume every Afghan is a civilian unless otherwise apparent; presume all compounds are civilian structures, until otherwise apparent; and presume that in every location where there is evidence of human habitation, civilians are present until otherwise apparent. See OCHA, *Reducing the Humanitarian Impact of the Use of Explosive Weapons in Populated Areas: Compilation of Military Policy and Practice* (2017) 35-36.
- 43 ISAF created the Civilian Casualty Tracking Cell (CCTC) in 2008 to respond to allegations of ISAF-caused civilian casualties. Prior to this, ISAF did not record allegations of civilian casualties, as this was not standard practice for militaries. Because collection of data was not standardized, ISAF often lacked complete information in the face of civilian casualty allegations. In July 2008, ISAF ordered units to treat all allegations of civilian casualties, regardless of source, as items for investigation. This was followed by the establishment of the CCTC that began collecting reported information from units as well as allegations of civilian casualties brought to ISAF headquarters. The CCTC initially served to strengthen ISAF's internal situational awareness of civilian casualties and to respond quickly and accurately to allegations of civilian casualties. 12 months later, ISAF amplified reporting requirements, requiring BDAs for all incidents of air strikes and indirect fire. That same year, ISAF also created Joint Incident Assessment Teams (JIATs), composed of Afghan government-appointed representatives and ISAF personnel, to investigate incidents. The teams were disbanded once investigations were complete. Reports produced by JIATs were intended to determine the facts; recommend actions to be taken to avoid casualties in future and changes in techniques/procedures that may be relevant across ISAF. By the end of 2009, the CCTC had amassed enough information on suspected or actual civilian casualties to begin to examine the data for trends. The aggregated data was used for reports and recommendations to ISAF leaders on civilian casualty mitigation. In mid-2011, the CCTC expanded into the Civilian Casualty Mitigation Team (CCMT). The CCMT created internal working groups to provide guidance on civilian casualty avoidance and mitigation. Its mandate included: coordinating subject-specific studies and providing recommendations to ISAF leadership; leading the working groups and decision-making bodies that addressed modification or establishment of guidelines, tactical directives, etc.; and collecting and archiving lessons and best practices regarding civilian casualties. See further, Centre for Civilians in Conflict, *Civilian Harm Tracking: Analysis of ISAF Efforts in Afghanistan* (2014). Available at: [https://civiliansinconflict.org/wp-content/uploads/2017/09/ISAF\\_Civilian\\_Harm\\_Tracking.pdf](https://civiliansinconflict.org/wp-content/uploads/2017/09/ISAF_Civilian_Harm_Tracking.pdf)
- 44 Centre for Civilians in Conflict, Columbia Law School Human Rights Institute, *In Search of Answers: U.S. Military Investigations and Civilian Harm* (2020). A November 2017 article by Azmat Kahn and Anand Gopal in the *New York Times* reported the findings of an on-the-ground investigation into 130 air strikes conducted by coalition forces in Iraq between April 2016 and June 2017. Kahn and Gopal found that one in five of the coalition strikes resulted in civilian death, a rate more than 31 times that acknowledged by the coalition. They also found a consistent failure by the coalition to properly investigate claims of civilian casualties or to keep records that make it possible to investigate the claims. Kahn and Gopal note that while some of the civilian deaths documented were a result of proximity to a legitimate ISIS target, many others appear to be the result simply of flawed or outdated intelligence that conflated civilians with combatants. Azmat Kahn and Anand Gopal, “The Uncounted”, *New York Times Magazine* (16 November 2017): <https://www.nytimes.com/interactive/2017/11/16/magazine/uncounted-civilian-casualties-iraq-airstrikes.html>
- 45 See, for example: <https://media.defense.gov/2021/Jun/02/2002732834/-1/-1/0/ANNUAL-REPORT-ON-CIVILIAN-CASUALTIES-IN-CONNECTION-WITH-UNITED-STATES-MILITARY-OPERATIONS-IN-2020.PDF> Concerns have been expressed that US reporting is focused on civilian casualties and does not consider the impact of attacks on civilian objects which, as noted above, can have important repercussions for the civilian population. See: Steven Katz, “Toward a True Account of Collateral Damage in US Military Operations”, *Just Security* (23 June 2021), at: <https://www.justsecurity.org/77043/toward-a-true-account-of-collateral-damage-in-u-s-military-operations/>
- 46 Laurie Treffers, *Belgian Air Strikes and the Myth of Zero Civilian Casualties*, Airwars (2 October 2020). At: <https://airwars.org/news-and-investigations/belgian-air-strikes-and-the-myth-of-zero-civilian-casualties/>
- 47 Beginning in April 2020, the US Africa Command (AFRICOM) has been issuing civilian casualty assessments on a quarterly basis which provide an overview of the status of investigations into allegation of civilian harm. See: <https://www.africom.mil/civilian-casualty-report> AFRICOM was also the first Combatant Command to establish a public reporting portal for civilian harm allegations ( <https://www.africom.mil/civilian-casualty-reporting>). The US DOD has also established a web page that provides contact details of the different combatant commands for the submission of allegations of civilian harm resulting from US military operations: <https://policy.defense.gov/OUSDP-Offices/Reporting-Civilian-Casualties/>

- 48 Airwars notes that overall, by the end of 2020 the US-led Coalition had determined that its own actions had killed at least 1,410 civilians since 2014 in Iraq and Syria. Airwars' own database of locally reported claims indicates that at least 8,300 non-combatants were in fact killed by Coalition actions. Airwars, *Annual Report 2020* (March 2021). At: <https://airwars.org/report/annual-report-for-2020/>
- 49 BDAs have failed to identify civilian casualties that were subsequently found during ground-led investigations undertaken by local authorities, the UN, media and NGOs, often in response to allegations of civilian harm. See further *Protection of civilians in armed conflict. Report of the Secretary-General*. UN doc. S/2019/373 (7 May 2019), paras.53-56. An internal US Government study found that initial air BDAs in Afghanistan failed to identify civilian casualties in 90% (19 out of 21) of cases. Civilian casualties were only subsequently identified through ground force investigations. Cited in Christopher Kolenda et al., *The Strategic Costs of Civilian Harm: Applying Lessons from Afghanistan to Current and Future Conflicts*, Open Society Foundation (June 2016) at 54. See also, NATO, note 28 above, at 22: "Local forces in Iraq and Syria did not conduct post-strike assessments to better understand the impact of their operations on civilians and civilian infrastructure. Without this information, the local forces and the coalition lacked comprehensive capacity to adjust tactics to reduce civilian harm". It further observes that "the tempo of operations in Mosul and Raqqa outpaced resources allocated to analyze, in real time, the causes of civilian harm to inform adjustment of tactics to reduce civilian harm."
- 50 "[M]ost militaries do not conduct dedicated analyses on the after-effects of a strike. The United States, for example, will occasionally deploy teams to conduct weapons-effects analysis; however, there is no requirement under existing military policy to determine if the collateral damage estimate was correct." Cross et al., note 12 above, at 45-46.

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