

DISSECTING THE RULES GOVERNING CONDUCT OF HOSTILITIES IN RELATION TO USE OF EXPLOSIVE WEAPONS IN URBAN AREAS IN TIMES OF ARMED CONFLICT

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Abstract

Under the means and method of armed conflict, the use of explosive weapons with wide area effects in populated areas has a devastating impact on civilians. Less visible than the direct effects of explosive weapons, but equally devastating, are the reverberating effects of the use of explosive weapons in populated areas. While there is growing consensus that parties to an armed conflict are legally obliged to take into account the reasonably foreseeable reverberating effects of an attack, particularly for the purposes of the rules on proportionality and precautions in attack, the precise scope of this obligation remains unclear. After setting out the legal arguments in support of the position that reasonably foreseeable reverberating effects must be taken into account, the work goes on to examine how such effects should be evaluated and how they must be avoided or minimized.

Keywords: *conduct of hostilities, explosive weapons, International humanitarian law, urban areas, proportionality, feasible precautions*

Introduction

During armed conflict, the use of explosive weapons with wide area effects¹ in populated areas² has a devastating impact on civilians. Most visible are the direct blast and fragmentation effects of explosive weapons, which kill and injure civilians and damage civilian objects including civilian houses. Less visible, but equally devastating, are the reverberating effects of the use of explosive weapons in populated areas, meaning those effects that are not directly and immediately caused by the attack, but are nevertheless the product thereof.³ When civilian housing and essential infrastructure are damaged or destroyed, civilians are affected in a number of ways, especially when populated areas sustain attacks over a long period of time.⁴ Civilians may be displaced, electricity may be temporarily or permanently disabled, health services may be weakened, wastewater collection and treatment may be reduced, and the accessibility, quality and quantity of water

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¹ Explosive weapons with wide area effects include: (1) weapons that employ an individual munition with a large destructive radius - i.e., with large blast and fragmentation range or effect (such as large bombs or missiles); (2) weapon systems with inaccurate delivery systems (such as unguided indirect fire weapons including artillery and mortars); and (3) weapon systems that are designed to deliver multiple munitions over a wide area (for example, multi-barrel rocket launchers).

² "Populated area is synonymous with "concentration of civilians", which is defined under international humanitarian law (IHL) as "a city, town, village or other area containing a similar concentration of civilians or civilian objects". See Protocol Additional () to the Geneva Conventions of 12 August 1949, and Relating to the Protection of Victims of International Armed Conflicts, 1125 UNTS 3, 8 June 1977 (entered into force 7 December 1978) (AP I), Art. 51(5)(4). See also ICRC, International Humanitarian Law and the Challenges of Contemporary Armed Conflicts, report prepared by the ICRC for the 32nd International Conference of the Red Cross and Red Crescent, Geneva, 2015 (2015 Challenges Report), 49.

³ Michael N. Schmitt, "Wired Warfare: Computer Network Attack and Jus in Bello", (2002), *International Review of the Red Cross*, Vol. 84, No. 846, 392.

⁴ See, for example, ICRC, Urban Services during Protracted Armed Conflict: A Call for a Better Approach to Assisting Affected People, Geneva, 2015 (Urban Services Report), 21-32.

supplies may deteriorate.⁵ In many contexts, the reverberating effects of an attack, particularly one that disables the national electricity system, may far outweigh the immediate civilian casualties caused by the attack.⁶

While international debate concerning the legal obligation to take into account the reverberating effects of an attack has evolved significantly over the last ten years- most recently in the context of cyber-warfare⁷ - and enjoys increasing acceptance by commentators⁸ and States,⁹ there is still no consensus on the scope of this obligation as it applies to the rules on proportionality and precautions in attack.¹⁰ This article seeks to shed light on this grey area in the law, particularly as it relates to the use of explosive weapons in urban/populated areas. More precisely, the work examines the parameters of the obligation under the rules on proportionality and precautions in attack, including the extent of reverberating effects that must be taken into account, how reverberating effects should be evaluated, and how such effects must be avoided or minimized. While the use of explosive weapons in urban/populated areas is not explicitly prohibited under international humanitarian law (IHL), this work will demonstrate that such use might violate the rule on proportionality and certain precautionary requirements, if the reasonably foreseeable reverberating effects of the attack are not taken into account.¹¹

The work is structured in four parts. The first part presents the IHL rules on the conduct of hostilities, while the second part explores the legal arguments in support of the position that foreseeable reverberating effects must be taken into account for the purposes of the rule on proportionality and some of the rules relating to precautions in attack. The third part examines the scope of the obligation to take into consideration foreseeable reverberating effects, including the notion of "foreseeability" and the standard of care imposed by the obligation. The work concludes by analyzing the practical measures that must be taken to assess and minimize the foreseeable reverberating effects of an attack, as required by the obligation to take all feasible precautions in attack.

IHL Rules on the Conduct of Hostilities

Like other means of warfare, the use of explosive weapons in populated areas is regulated by IHL rules on the conduct of hostilities, namely, the rules on distinction, proportionality and precautions in attack. These rules, as set out in treaty and customary IHL, are applicable

⁵ *Ibid.*

⁶ See, Doleh, W. *et al.*, 'Health and Welfare in Iraq After the Gulf Crisis: An In-depth Assessment', *Report by the International Study Team, Electrical Facilities Survey, October 1991*

⁷ See, Droege, C., "Get Off My Cloud: Cyber Warfare, International Humanitarian Law and the Protection of Civilians", (2012), *International Review of the Red Cross*, Vol. 94, No. 886,57

⁸ Marco Sassòli and Lindsey Cameron, "The Protection of Civilian Objects: Current State of the Law and Issues de Lege Ferenda", in Natalino Ronzitti and Gabriella Venturini (eds), (2006), *The Law of Air Warfare: Contemporary Issues*, Eleven International Publishing, Utrecht, 65

⁹ ICRC, *Explosive Weapons in Populated Areas: Humanitarian, Legal, Technical and Military Aspects*, Geneva, 2015 (Expert Meeting Report), 23 (this report is a product of the Expert Meeting held in Chavannes-de-Bogis, Switzerland, on 24-25 February 2015); US Department of Defence, *Law of War Manual*, 2015 (US Law of War Manual), 342

¹⁰ Yoram Dinstein, *The Conduct of Hostilities under the Law of International Armed Conflict*, 3rd ed., Cambridge University Press, Cambridge, 2016, 159; Michael N. Schmitt, "The Law of Targeting", in Elizabeth Wilmshurst and Susan Breau (eds), *Perspectives on the ICRC Study on Customary International Humanitarian Law*, Cambridge University Press, Cambridge, 2007, 131, 159.

¹¹ While the foreseeable reverberating effects of an attack using explosive weapons in populated areas are also relevant to the prohibition against indiscriminate attack, this article will focus solely on the relevance of reverberating effects in the interpretation and application of the rules on proportionality and precautions in attack. The relevance of the foreseeable reverberating effects of a cyber-attack in relation to the prohibition against indiscriminate attacks, among other rules, is referred to in the 2015 Challenges Report, above note 2, 42-43.

in international and non-international armed conflicts.¹² The rule of distinction prescribes that parties to an armed conflict must at all times distinguish between civilians and civilian objects on the one hand, and military objectives on the other;¹³ civilians and civilian objects are protected and must not be the object of attack.¹⁴ The prohibition on indiscriminate attacks which flows from the rule of distinction prohibits attacks not directed at a specific military objective, attacks which employ means or methods of combat that cannot be directed at a specific military objective, and attacks which employ means or methods of combat the effects of which cannot be limited as required by IHL and consequently, in each such case, are of a nature to strike military objectives and civilians or civilian objects without distinction.¹⁵ The prohibition of indiscriminate attacks also entails the prohibition of disproportionate attacks.¹⁶ According to this prohibition, the expected incidental loss of civilian life, injury to civilians and damage to civilian objects, or combination thereof (hereafter referred to as incidental damage"), of an attack must not be excessive in relation to the concrete and direct military advantage anticipated.¹⁷ While it is argued that an object which serves both civilian and military functions (dual-use object) is to be regarded as a military objective in its entirety,¹⁸ there is considerable support from States¹⁹ and commentators for the idea that:²⁰

The destruction of the civilian part of this object, or more effects generally, the fact that the attack puts an end to its use by civilians, as well as the reverberating of such damage forms part of the incidental damage that must be taken into account under the proportionality principle.²¹

In order to ensure compliance with the rules of distinction and proportionality, and to ensure that constant care is taken in the conduct of military operations to spare civilians and civilian objects, IHL requires parties to an armed conflict to take precautions in attack. Precautionary requirements entail doing everything feasible to verify that the target is a military objective;²² taking all feasible precautions in the choice of means and methods of attack, with a view to

¹² AP I, Arts 48(1), 51(1), 51(2), 51(5)(6), 57; Jean-Marie Henckaerts and Louise Doswald-Beck (eds) *Customary International Humanitarian Law*, Vol. 1: Rules, Cambridge University Press, Cambridge 2005 (ICRC Customary Law Study), Rules 1, 7, 14, 15-21.

¹³ AP I, Art. 48(1); ICRC Customary Law Study, above note 12, Rules 1, 7.

¹⁴ AP I, Arts 51(2), 52(1); ICRC Customary Law Study, above note 12, Rules 1, 7.

¹⁵ AP I, Art. 51(4); ICRC Customary Law Study, above note 12, Rules 11, 12.

¹⁶ Under AP I, Article 51(5), area bombardment and disproportionate attacks are treated as particular forms 15 of indiscriminate attacks.

¹⁷ API, Art. 51(5)(b); ICRC Customary Law Study, above note 12, Rule 14. The rule on proportionality in attack is also found in Article 3(8)(c) of the Protocol on Prohibitions on the Use of Mines, Booby-Traps and Other Devices as amended on 3 May 1996 (Amended Mines Protocol) annexed to the Convention on prohibitions or Restrictions on the Use of Certain Conventional Weapons which may be deemed to be Excessively Injurious or to have Indiscriminate Effects, Geneva, 3 May 1996 (CCW), and Rule 102(b) of the San Remo Manual on International Law Applicable to Armed Conflicts at Sea, 12 June 1994, regarding naval blockades. See AP I, Art. 85(3)(b); Rome Statute of the International Criminal Court, UN Doc. A/CONF. 183/9, 17 July 1998 (entered into force 1 July 2002), Art. 8(2)(b) (iv); ICRC Customary Law Study, above note 12, Rule 156.

¹⁸ Jachec-Neale, A., *The Concept of Military Objectives in International Law and Targeting Practice*, Routledge, New York, 2016, 69; Boothby, W. H., *The Law of Targeting*, Oxford University Press, Oxford, 2012, 104-105.

¹⁹ See Royal Army of the Netherlands, *The Humanitarian Law of War: A Manual*, VS 27-41, unofficial English translation available at the ICRC library, September 2005, para. 0546: "When attacking mixed objects ... it must be carefully considered whether the military advantage expected from eliminating the military element of the mixed objective outweighs the damage done to the civilian population, by damaging or destroying the civilian element of the mixed object or ending its civilian function"

²⁰ Tallinn Manual, above note 8, D. 135; W. H. Boothby, above note 18, 104-105; Henry Shue and David Wippman, "Limiting Attacks on Dual-Use Facilities Performing Indispensable Civilian Functions", *Cornell International Law Journal*. Vol. 35, No. 3, 2002, 565

²¹ Laurent Gisel, "Relevant Incidental Harm for the Proportionality Principle", *Urban Warfare*, Proceedings of the 16th Bruges Colloquium, 15-16 October 2015, 123.

²² API, Art. 57(2) (a)(i); ICRC Customary Law Study, above note 12, Rule 16.

avoiding, and in any event minimizing, the expected incidental damage;²³ refraining from launching an attack that may be expected to violate the rule on proportionality;²⁴ and cancelling or suspending an attack if it becomes apparent that the target is not a military objective or is subject to special protection, alternatively, that the attack may be expected to violate the rule on proportionality.²⁵ The application of these rules, which are the most relevant ones in relation to the use of explosive weapons in populated areas, will necessarily be based on *ex ante* information²⁶ - that is, the information that is reasonably available to the attacking party at the time of the attack - and not on hindsight.²⁷

As is clear from the elaboration of these basic conducts of hostilities rules, both the rule of proportionality and several of the precautionary rules require an assessment of the expected incidental damage arising from an attack.²⁸ While many military manuals include the notion of incidental damage, the term has been defined in different ways.²⁹ At its core, it refers to damage to civilians and civilian objects that is incidental, collateral or secondary to an attack against a lawful target. In the view of the International Committee of the Red Cross (ICRC) and others, incidental damage also includes the foreseeable reverberating effects of an attack³⁰, otherwise known as "knock-on" or indirect effects.³¹ According to this position, commanders are not only obliged to take into account the direct incidental damage that may be expected from an attack, but must also consider the foreseeable reverberating effects of the attack. These effects form part of the incidental damage that must be weighed up against the anticipated military advantage under the rules of proportionality and precautions in attack, and which must be taken into consideration when taking all feasible precautions in the choice of means and methods of an attack in order to avoid, and in any event minimize, the expected incidental damage.

Legal Obligations Regarding the Reverberating Effects of an Attack

The legal obligation to take into account the reverberating effects of an attack derives from rules in Additional Protocol I (AP I) on proportionality and precautions, interpreted in line with the rules on treaty interpretation. In addition, there is a growing body of State practice which demonstrates increasing acceptance of this obligation.

Treaty interpretation

As with all treaty rules, the AP I rules on proportionality and precautions in attack must be interpreted in good faith in accordance with the ordinary meaning to be given to the terms

²³ API, Art. 57(2)(a) (ii); ICRC Customary Law Study, above note 12, Rule 15.

²⁴ API, Art. 57(2)(a) (ii); ICRC Customary Law Study, above note 12, Rules 17 and 18.

²⁵ API, Art. 57(2)(b); ICRC Customary Law Study, above note 12, Rule 19. Note that Rule 19 does not refer to objects "that are subject to special protection". Additional precautionary requirements are set out in AP I, Articles 57(2)(c), 57(3) and 57(4), and ICRC Customary Law Study, above note 12, Rules 20 and 21.

²⁶ Commentary to ICRC Customary Law Study, above note 12, Rule 15.

²⁷ Knut Dörmann, "Obligations of International Humanitarian Law", *Military and Strategic Affairs*, Vol. 4, No. 2, 2012, 12.

²⁸ There are four such rules: (1) the rule on proportionality; (2) the obligation to take feasible precautionary measures in the choice of means and methods of attack in order to avoid and in any event minimize "expected" incidental damage; (3) the obligation to refrain from launching an attack that may be expected to violate the rule on proportionality, including to do everything feasible to assess whether the attack may be expected to violate this rule; and (4) the obligation to cancel or suspend an attack if it becomes apparent that the attack may be expected to violate the rule on proportionality

²⁹ See ICRC Customary Law Study, above note 12, Rule 14. See also Y. Dinstein, above note 10, 150.

³⁰ Challenges Report, above note 2, 42, 52; Expert Meeting Report, above note 9, p. 21; ICRC, *International Humanitarian Law and the Challenges of Contemporary Armed Conflicts*, report prepared by the ICRC for the 28th International Conference of the Red Cross and Red Crescent, Geneva, 20053, 12

³¹ See L. Gisel, above note 21, 125.

of the treaty in their context, and in light of the object and purpose of the treaty.³² In this regard, there are a number of arguments to support the view that the "expected" incidental damage to civilians should be interpreted so as to include the reverberating effects of an attack.

i. Textual interpretation

First, the phrase "may be expected" in Articles 51(5) (b) and 57(2) (a) (ii) and (b) of AP I is not explicitly limited in either time or space. Indeed, the 1974-77 Diplomatic Conference expressly rejected attempts to confine incidental damage to those in the immediate vicinity of the military objective.³³ There is accordingly no reason, based on the text of the provisions, to limit the assessment under the rules on proportionality and precautions in attack to the immediate or direct effects of an attack. This argument is articulated by Droege, who states that "considering the wording of Article 51(5)(b) of Additional Protocol I ('may be expected'), it is reasonable to argue that foreseeable damages, even if they are long-term, second-and third-tier damages, must be taken into account".³⁴ Similarly, Sassòli and Cameron take the view that:

The expected collateral damage from an attack on a dual-use object must include the damage expected due to the destruction of the object itself in addition to whatever other collateral damage that may be expected in the surrounding area or that is foreseeable, including through reverberating effects.³⁵

This approach is consistent with the ordinary meaning of "expected", which is defined in the Oxford English Dictionary as regarded that something is likely to happen".³⁶

ii. Purposive interpretation

Second, the rules on proportionality and precautions in attack must be interpreted in light of their context, including the headings and the respective chapeau provisions of Articles' 51 and 57 of AP I. Indeed, API Article 51(5)(b) on proportionality should be read in light of the heading of Article 51 ("Protection of the Civilian Population") as well as Article 51(1), which provides that the civilian population and individual civilians "shall enjoy general protection against dangers arising from military operations".³⁷ Likewise, the specific rules on precautions in attack operate under the umbrella of AP I Article 57(1), which provides that in the conduct of military operations, constant care shall be taken to spare the civilian population, civilians and civilian objects".³⁸ It is true that the humanitarian objective of the rule on proportionality is explicitly tempered by military considerations (for instance, by only prohibiting 'excessive' incidental damage compared to the concrete and direct military advantage) and that the rules on precautions in attack are contingent upon what is reasonably feasible. However, incidental damage" as such - separate from the subsequent

³² Vienna Convention on the Law of Treaties, 23 May 1969, United Nations, Treaty Series, Vol. 1155, Art. 31 (1).

³³ Bothe, M., Josef, K. P. and Solf, W., *New Rules for Victims of Armed Conflicts: Commentary on the Two 1977 Protocols Additional to the Geneva Conventions of 1949*, Martinus Nijhoff, Leiden, 2013, para. 2.6.2.

³⁴ Droege, C., above note 7, 572.

³⁵ Sassòli, M. and Cameron, L., above note 8, 65 (emphasis added).

³⁶ *Oxford Dictionary of English*, 3rd ed., Oxford University Press, Oxford, 2010, available at: www.oxforddictionaries.com/definition/english/expect.

³⁷ AP I, Art. 51(1).

³⁸ AP I, Art. 57(1); ICRC Customary Law Study, above note 12, Rule 15. According to Kalshoven: "This should be taken literally: total avoidance of damage to the civilian population is the ideal standard that combatants should seek to attain in all cases." Frits Kalshoven, *Constraints on the Waging of War: An Introduction to International Humanitarian Law*, 4th ed., Cambridge University Press, Cambridge, 2011, 113.

proportionality assessment or considerations of feasibility - should arguably be interpreted in light of the humanitarian purpose spelled out in the chapeau provisions, so as to provide the broadest protection to civilians, including by requiring that commanders take into account the foreseeable reverberating effects of an attack.

Moreover, the relevance of reverberating effects is affirmed in other articles of AP I, including Articles 54(2) and 56(1), which prohibit attacks on specially protected objects (objects indispensable to the survival of the civilian population and works or installations containing dangerous forces), arguably because of the foreseeable humanitarian impact if such objects are damaged or destroyed.³⁹

State Practice

The rules on treaty interpretation support the view that the notion of "expected incidental damage" as set out in AP I entails an obligation to take into account the reverberating effects of an attack. Increasingly, such an approach also enjoys support in State practice. In particular, there is significant State practice arising from the Third Review Conference on the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects (CCW) in 2006. In the debate concerning Protocol V of the CCW on Explosive Remnants of War (ERW), several States underlined that the long-term humanitarian impact of (ERW) for civilians had to be considered as part of the proportionality analysis. For example, Switzerland expressed the view that;

The military commander's proportionality assessment with regard to the choice and use of a particular means or method of warfare must also take into account the foreseeable incidental long term effects of an attack such as the humanitarian costs caused by duds becoming ERW.⁴⁰

As a result, the Final Declaration of the Third Review Conference of the CCW in 2006 - adopted by consensus - notes that the foreseeable effects of explosive remnants of war are a relevant factor to be considered in applying the international humanitarian law rules on proportionality and precautions in attack".⁴¹

This position is also reflected in the text of Article 3(10)(a) of Amended Protocol II to the CCW, which provides that circumstances to be taken into account when considering all feasible precautions to protect civilians from the effects of weapons include the short- and long-term effects of mines upon the local civilian population for the duration of the minefield". In 2015, at an ICRC Expert Meeting of States on the use of explosive weapons in

³⁹ See M. Roscini, above note 30, 221, note 376.

⁴⁰ See "Response from Switzerland to Document CCWIGGE/X/WG.I/WP.2," CCW/GGE/XI/WG.I/WP.13, 3 August 2005, § 15. See also "Response from Norway to the Document CCW/GGE/X/WG.1/WP.2," CCW/GGE/XI/WG.1/WP.5, 29 July 2005, § 18 (a military commander, in his assessment of the proportionality between the military necessity of launching the attack and the humanitarian consequences caused by the attack, must take into consideration both the humanitarian concerns related to the direct impact of the munitions (due to the wide dispersal and in some cases large number of sub-munitions contained in the bomb), as well as the humanitarian effects caused by unexploded ordnance remaining on the ground after the attack")

⁴¹ See Third Review Conference of the High Contracting Parties to the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons which May be Deemed to be Excessively Injurious or to Have Indiscriminate Effects, Final Declaration, CCW/CONF.III/11, Part II, 17 November 2006, D, 4 (Final Declaration of the 3rd Review Conference).

populated areas, several States also expressed support for the view that commanders must take into account the foreseeable reverberating effects of an attack.⁴²

Moreover, in providing guidance on how to apply the rules on proportionality and precautions in attack, several States refer to the second- order or "foreseeable effects of an attack in their military manuals. For example, the US Army Manual.⁴³ Counterinsurgency (US Counterinsurgency Manual) of 2006 indicates that leaders must consider not only the first-order desired effects of a munitions or action, but also possible second and third-order effects - including undesired ones. For example, bombs delivered by fixed-wing close air support may effectively destroy the source of small arms fire from a building in an urban area; however, direct-fire weapons may be more appropriate due to the risk of collateral damage to nearby buildings and non-combatants.⁴⁴

In sum, the interpretation of the API rules on proportionality and precautions in attack indicates that the notion of incidental damage is not limited to the direct effects of an attack but encompasses certain reverberating effects, which must be taken into account when assessing the lawfulness of an attack. Although this section has not examined whether the same obligation is inherent in the equivalent customary IHL rules on proportionality and precautions in attack, the growing body of state practice points in that direction - i.e., that they are understood in the same way.

The Obligation to Take into Account the Reverberating Effects of an Attack?

Having shown that the rules on proportionality and precautions in attack encompass an obligation to take into account the reverberating effects of an attack, this section examines the scope of this obligation. What is the necessary degree of causation between the attack and the reverberating effects of the attack, such that those effects must be considered for the purposes of the rules on proportionality and precautions in attack? When can reverberating effects be considered too remote in time or space? Are there certain reverberating effects that are in general objectively foreseeable? With a view to identifying more precisely the parameters of the obligation to take into account the reverberating effects of an attack, it is first necessary to examine the legal standard for causation, including the notion of "foreseeability". Moreover, this section will explore the temporal, geographical and material scope of the obligation to take into account the foreseeable reverberating effects of an attack.

Causal Link

As previously noted, the position of the ICRC and others is that commanders must take into account the foreseeable reverberating effects of an attack.⁴⁵ Practically speaking, it is impossible to foresee all possible reverberating effects of an attack. Thus, a reasonable legal standard must reflect this reality and acknowledge that some reverberating effects are too

⁴² Expert Meeting Report, above note 9, 23.

⁴³ For example, see UK Joint Service Manual, above note 9, para. 5.33.4 (in deciding whether an attack would be proportionate, commanders must bear in mind the "foreseeable effects of the attack"; the Manual gives the example of an attack on a military fuel storage depot where there is a foreseeable risk of the burning fuel flowing into a civilian residential area and causing injury to the civilian population)

⁴⁴ US Counterinsurgency Manual, above note 9, 7-36.

⁴⁵ 2015 Challenges Report, above note 2, 42, 52; Final Declaration of the 3rd Review Conference, above note 41. See also K. Dörmann, above note 27, 17; M. Brehm, above note 30, 254; R. J. Barber, above note 30, 480; C. Droegge and M.-L. Tougas, above note 30, 30; M. Roscini, above note 30, 221.

remote and thereby outside the scope of what must be considered at the time of the attack.⁴⁶ Limiting the causal link through the standard of foreseeability is in line with the approach adopted by States in defining the scope of incidental damage. For example, the Final Declaration of the Third Review Conference of the CCW notes that "the foreseeable effects of explosive remnants of war are a relevant factor to be considered in applying the international humanitarian law rules on proportionality and precautions in attack".⁴⁷ In addition, several States have explicitly adopted the standard of foreseeability in their military manuals.⁴⁸ Moreover, the Inter-American Commission on Human Rights stated in its report on Colombia in 1999 that the principle of proportionality required that foreseeable injury to civilians and damage to civilian objects should not be disproportionate or excessive to the anticipated concrete and direct military advantage.⁴⁹

Different tests have been proposed to define the requisite causal link for the purpose of the obligation to take into consideration reverberating effects under the rules of proportionality and precautions in attack. For example, in the context of computer network attacks, Schmitt, Harrison Dinnis and Wingfield have suggested a "but for" legal test requiring that the attack must be the "proximate cause" of the effects - i.e., reverberating effects are only relevant to the proportionality assessment and the obligation to take feasible precautions in attack, if such effects would not have occurred "but for" the attack.⁵⁰ In effect, a "but for" test reverses the assessment, such that it is necessary to start by examining the reverberating effect in question and tracing a line of causation back to the attack. Although this approach may be more effective in excluding those effects that are too remote, it would appear more useful for an *ex post facto* assessment as opposed to a standard that can be easily complied with by commanders in the field.

Another test focuses on the degree of likelihood of the reverberating effects. In this regard, Greenwood argues that in its normal meaning, "a consequence is said to be expected if it is thought more likely than not that the consequence will result. A lesser degree of risk is not sufficient."⁵¹ Similarly, *the Commentary on the Harvard Humanitarian Policy and Conflict Research Manual on International Law Applicable to Air and Missile Warfare* (AMW Manual) takes the view that "expected" (and "anticipated") 'means that the outcome is probable, i.e. more likely than not'. This approach, however, is based on an overly restrictive interpretation of 'expected'. As noted above, the ordinary meaning of "expected" is that something is "likely

⁴⁶ As noted above, the rules of proportionality and precautions in attack, as well as other conduct of hostilities rules, impose an obligation at the time of the attack and not in hindsight. See, for example, F. Kalshoven, above note 38, 101, 105, 185.

⁴⁷ See Final Declaration of the 3rd Review Conference, above note 41, 4.

⁴⁸ See, for example, Ministry of Defence of Spain, above note 43, Vol. 1, para. 2.5 ("An attack is prohibited if, during the planning phase, the available information makes it foreseeable that the damage to the civilian population and/or to civilian objects which the attack will cause is excessive in relation to the military advantage anticipated from the attack as a whole.")

⁴⁹ Inter-American Commission on Human Rights, Third Report on the Human Rights Situation in Colombia, OEA/Ser.L/V/II.102, Doc. 9, Rev. 1, 26 February 1999, para. 79.

⁵⁰ Schmitt, M., Dinnis, H. A and Wingfield, T. C., 'Computers and War: The Legal Battlespace, Background Paper prepared for the Informal High-Level Expert Meeting on Current Challenges to International Humanitarian Law', Cambridge, 25-27 June 2004, 9, available at: www.hpcrresearch.org/sites/default/files/publications/schmittetal.pdf, cited in M. Roscini, above note 30, 221

⁵¹ See Christopher Greenwood, Observations dated 13 November 2003 circulated by the United Kingdom Delegation to the CCW Group of Governmental Experts, 17-24 November 2003, cited in Williams H. Boothby, Cluster Bombs: Is There a Case for New Law? Occasional Paper Series, Program on Humanitarian Policy and Conflict Research, Harvard University, 2005, 28.

to occur" rather than "more likely than not".⁵² Even if the risk of incidental damage is only likely (i.e., less likely than not), it is still foreseeable and should be taken into account when applying the rules on proportionality and precautions in attack. Thus, at a 2005 expert meeting convened by the Geneva Academy of International Humanitarian Law and Human Rights, it was argued that the scope of the obligation should be based on the notion of "reasonable causality", meaning that attackers must take into account "civilians dying of thirst, if there (is) a reasonable expectation of causality or if thirst and certain diseases [are] a likely or foreseeable consequence of the attack".⁵³ Accepting that foreseeability is the most appropriate standard for limiting the scope of the reverberating effects that must be taken into account, it is necessary to examine this standard in greater detail.

"Foreseeable" Notion

At one end of the spectrum, it is sometimes argued that the rules on proportionality and precautions in attack inevitably involve a subjective assessment by the military commander responsible for launching the attack. In particular, this view holds that the process of assessing both the concrete and direct military advantage, as well as the expected incidental damage, is based on the subjective view of the military commander in light of his or her specific skills, experience and knowledge, in the circumstances ruling at the time.⁵⁴ In addition, it has been argued that determining whether the expected incidental harm is excessive in relation to the concrete and direct military advantage is also a subjective matter. For example, according to the US *Law of War Manual*, "the question of whether the expected incidental harm is excessive may be a highly open-ended legal inquiry, and the answer may be subjective and imprecise".⁵⁵

In contrast to the view that the expected incidental damage and anticipated military advantage should be assessed on an entirely subjective basis, it is argued that the rules on both proportionality and precautions in attack incorporate a degree of objectivity. This is supported by the terms "may be" and "expected" in the relevant provisions, which in conjunction clarify that the relevant standard is not what the commander in fact, subjectively, expected, but what can objectively be predicted. This interpretation finds support in the ICRC Commentary to Article 57 of AP I, which while recognizing that the rule on precautions in attack includes an element of subjectivity, notes that "the interpretation must above all be question of common sense and good faith for military commanders".⁵⁶ In other words, compliance with the rule must also be measured against the objective standards of "common sense" and "good faith for military commanders".⁵⁷

More recently, the objective element of these rules has been framed as a requirement of reasonableness. For example, Dinstein takes the view that the attacker "must act reasonably

⁵² Commentary on the AMW Manual, above note 8, 91 (emphasis added). See also Roscini, M., above note 30, 221. It should be noted, however, that in relation to reverberating effects, the AMW Manual specifically endorses an approach based on reasonable foreseeability, stating that "indirect effects cannot be taken into account 'if they are too remote or cannot be reasonably foreseen'".

⁵³ *Ibid.*

⁵⁴ In Bothe, M., Partsch, K. I. and Solf, W. A., above note 33, 351-352, the authors note that the decision on whether those effects are excessive will "involve a balancing of different values which are difficult to compare" and thus the judgment must be subjective". Yet, "despite the impossibility of quantifying the factors of the equation, a plain and manifest breach of the rule will be recognizable".

⁵⁵ US Law of War Manual, above note 9, 5.12.4. See also 2.4.1.2 ("Under the law of war, judgments of proportionality often involve difficult and subjective comparisons.").

⁵⁶ CRC Commentary to AP I, § 2208. See also ICRC Commentary to AP I, 1978.

⁵⁷ See, Sassòli, M., "Autonomous Weapons and International Humanitarian Law: Advantages, Open technical Questions and Legal Issues to be Clarified", (2014), *International Law Studies*, Vol. 90, 335.

and in good faith".⁵⁸ A similar approach is taken in the 2001 Canadian Manual on the Law of Armed Conflict in relation to the rule on precautions in attack: "The test for determining whether the required standard of care has been met is an objective one: Did the commander, planner or staff officer do what a reasonable person would have done in the circumstances?".⁵⁹ This approach is also adopted by Kalshoven, who indicates that the relevant standard is "that of a normally alert attacker who is reasonably well-informed and who, moreover, makes reasonable use of the available information".⁶⁰ An objective standard is also reflected in the case law on disproportionate attacks, namely in the *Galić* case before the International Criminal Tribunal for the former Yugoslavia (ICTY). Here, the Tribunal held that

In determining whether an attack was proportionate, it is necessary to examine whether a reasonably well-informed person in the circumstances of the actual perpetrator, making reasonable use of the information available to him or her, could have expected excessive civilian casualties to result from the attack.⁶¹

While it must be emphasized that IHL and international criminal law (ICL) are distinct bodies of law, the latter is an important source of interpretation of IHL rules.⁶² As argued by Sassòli and Cameron, "any behavior which leads to individual criminal responsibility must first be contrary to the standard of care required by IHL from belligerent parties".⁶³ A similar but slightly distinct approach is to focus not only on a standard of "reasonable person", but on the slightly higher standard of 'reasonable commander'. According to Cannizzaro, the standard of reasonable commander "on the one hand tends to locate the assessment of proportionality with the subjective situation of the agent, but on the other hand seems to require an objective degree of diligence".⁶⁴ For example, Sassòli and Cameron argue that

While the average "reasonable person" on the street might not be expected to foresee that destroying electricity facilities would cut off the civilian fresh water supply, the reasonable military commander, who is aware of the interconnectedness of infrastructure, would be expected to foresee this Consequence.⁶⁵

The standard of the reasonable commander has been embraced by some States. For example, Israel takes the view that:

⁵⁸ Dinstein, Y., above note 10, 159. See also Schmitt, M. N. and Thurnher, J. S., "Out of the Loop': Autonomous Weapon Systems and the Law of Armed Conflict", (2013), *Harvard National Security Journal*, Vol. 4, 256

⁵⁹ Canada, Office of the Judge Advocate General, Law of Armed Conflict at the Operational and Tactical Levels, Joint Doctrine Manual, 13 August 2001, § 418. See also Brian J. Bill (ed.), *Law of War Deskbook, US Army, International and Operational Law Department*, 2010, 140-141

⁶⁰ Kalshoven, F., above note 38, p. 115 (the proportionality assessment is "not entirely left to the subjective judgment of the attacker").

⁶¹ ICTY, *Prosecutor v. Stanislav Galić*, Case No. IT-98-29, Judgment (Trial Chamber), 30 November 2003) 58. This test has been endorsed by a number of commentators: see Marco Roscini, above note 30, p. 228; Paolo Benvenuti, "The ICTY Prosecutor and the Review of the NATO Bombing Campaign against the Federal Republic of Yugoslavia", *European Journal of International Law*, Vol. 12, No. 3, 2001, 5

⁶² Several authors refer to the ICTY case law and the Rome Statute: for example, Y. Dinstein, above note p. 159; W. H. Boothby, above note 18, 98-97.

⁶³ M. Sassòli and L. Cameron, above note 8, 64.

⁶⁴ Cannizzaro, E., "Proportionality in the Law of Armed Conflict", in Paola Gaeta and Andrew Clapham (eds), *The Oxford Handbook of International Humanitarian Law*, Oxford University Press, Oxford, 2014, 340.

⁶⁵ Sassòli, M. and Cameron, L., above note 8, 65. Likewise, Shue and Wippman contend that "the effects of large-scale infrastructure attacks are clear and foreseeable", and that "the proportionality principle obliges states to make at least a good faith effort to factor indirect effects into their targeting decisions", See H. Shue and D. Wippman, above note 20, 570-571.

The principle of proportionality requires consideration of a commander's assessment of the expected collateral damage from an attack. The test is based on the expected collateral damage that a "reasonable commander" would have assessed at the time of attack - and not the damage that actually occurred as a result of the attack.⁶⁶

In relation to reverberating effects, the standard of the reasonable commander would require that the attacker takes into account the reasonably foreseeable reverberating effects of the attack, meaning those effects that are foreseeable for a reasonable commander, making use of the information that is reasonably available to him or her, and in light of the circumstances ruling at the time, including whether the attack is pre-planned or an attack of opportunity. This is the preferred standard of care as it excludes negligent behaviour that does not meet an objective degree of diligence, whilst clearly taking into account that the rules apply based on the circumstances ruling at the time.

Foreseeability of Reverberating Effects

Acknowledging that "reasonable foreseeability" entails an objective standard enables the identification of certain elements that a reasonable commander should take into account - i.e., which would be unreasonable to ignore- when assessing the expected reverberating effects of an attack. Reverberating effects may be considered reasonably and objectively foreseeable based on past practice and empirical research, lessons learned and publicly available information.

Past practices and empirical data

While recognizing that no two cases are identical, past experiences and empirical data can contribute to making certain reverberating effects foreseeable. For instance, in light of the nuclear attacks on Hiroshima and Nagasaki and the extensive subsequent research exposing the long-term effects of these attacks, it can no longer be argued that reverberating effects of using nuclear weapons such as long-term health effects - are too remote or speculative.⁶⁷ In the context of the CCW negotiations on Protocol V on ERW, past practice and extensive documentation regarding the failure rates of sub-munitions provided an important indication of the foreseeable reverberating effects of an attack using such weapons. For example, the ICRC stated that:

In light of the experience gained from the use of cluster munitions in past conflicts and the work of governments and organizations to address them, the ICRC is of the view that the application of the proportionality rule must now include the extended impact of sub-munitions (and other ordinance) that become ERW. When these weapons are used in or near populated areas the long-term consequences of unexploded sub-munitions upon civilians are readily foreseeable. If civilians are already present in a target area, they will predictably need to gather food and water, travel, seek medical care and conduct other daily activities which put them at risk from unexploded sub-munitions. If they have left the area during the hostilities, it is predictable that they will return at the earliest opportunity and be at risk from unexploded sub-munitions.⁶⁸

⁶⁶ State of Israel, *The 2014 Gaza Conflict (7 July-26 August 2014): Factual and Legal Aspects*, May 2015, 49, 317.

⁶⁷ Maresca, L. and Mitchell, E., "The Human Costs and Legal Consequences of Nuclear Weapons under International Humanitarian Law", (2015), *International Review of the Red Cross*, Vol. 97, No. 899, 623-626.

⁶⁸ Working Paper submitted by the ICRC, CCW/GGE/XI/WG.1/WP.7, Geneva, 28 July 2005, S 21. According to Tim McCormack, who presented at the CCW meetings on ERW, "Whenever the use of weapons likely to cause

In effect, "past experience has put users on notice about the long-term dangers that cluster munitions cause to civilians".⁶⁹ As noted above, past practice was accepted in the context of the CCW as an important source of understanding the objectively foreseeable reverberating effects of certain weapons.⁷⁰ At least Ireland and Norway have made explicit reference to the foreseeable effects of an attack or a particular weapon being informed by past practice. For example, Ireland has noted that military commanders will be informed in their assessments of likely, post-conflict harm to civilian life and property by- amongst other things - the considerable research into this question that has been done in recent years".⁷¹ Similarly, at an ICRC Expert Meeting on the humanitarian, technical, legal and military challenges posed by cluster munitions, a representative from the Norwegian Ministry of Defence expressed the view that:

It is difficult to claim that the long-term effects of cluster munitions are too remote or uncertain to be considered by a military commander. Experiences in Vietnam, Laos, and other places have demonstrated both the magnitude of the problem and the length of time required to resolve it.⁷²

Past experiences and empirical data have also informed the foreseeable reverberating effects of damage to or destruction of electricity networks. For example, it is estimated (conservatively) that the coalition attacks on Iraq's electrical power system in 1991 resulted in 70,000 civilian deaths.⁷³ In effect, the attacks reduced Iraq's power capacity to 15% of its pre-conflict levels, with a significant impact on health services (reduced hospital capacity, inability to refrigerate adequate quantities of vaccines) and sanitation (inability to treat and dispose of raw sewerage).⁷⁴

More recently, statistical analysis has demonstrated that disruption of electricity and safe drinking water can have a dramatic impact on civilian lives and health. For instance, the increase in hepatitis, dysentery and typhoid in certain parts of Syria has been attributed to the reduced access to safe drinking water, sanitation and hygiene in those areas.⁷⁵

In some cases, past experiences, such as the attacks in Iraq, have led to a change in policy. For example, during Operation Allied Force in Kosovo, NATO forces sometimes used carbon graphite filaments designed to temporarily disrupt power. This was in part based on a policy

ERW is contemplated in residential areas or in areas otherwise known to be frequented by the civilian population, assessments of expected civilian damage ought to take account of the consistent conclusion of numerous reports and studies carried out by international and non- governmental organizations, many of which include data on percentages of munitions which fail to explode and the effect of such unexploded ordnance on civilian populations".

⁶⁹ Louis Maresca, "Cluster Munitions: Moving Toward Specific Regulation", UNIDIR Disarmament Forum, United Nations Institute for Disarmament Research, 2006, 29.

⁷⁰ See Final Declaration of the 3rd Review Conference, above note 41.

⁷¹ Statement by Ireland, CCW 3rd Review Conference, Main Committee I, 9 November 2006. According to the New Zealand delegation at a CCW meeting in June 2003, "through the improved collection of information on weapons used, clearance operations and civilian casualties from mines and ERW including submunitions, we are beginning to know more about when the greatest numbers of civilian casualties actually occur and would expect that this information is also available to militaries for informing the conduct of their military operations".

⁷² ICRC, Expert Meeting: Humanitarian, Military, Technical and Legal Challenges of Cluster Munitions, report, Montreux, Switzerland, 18-20 April 2007, 60.

⁷³ W. Arkin, above note 6, 110.

⁷⁴ J. Crawford, above note 6, p. 110.

⁷⁵ UNICEF, News Note: Millions of Children in Syria at High Risk of Disease amid Water Scarcity and Summer Heat", 10 July 2015, cited in Urban Services Report, above note 4, p. 31.

decision to minimize long-term incidental harm to civilians.⁷⁶ In addition, greater awareness in the public domain regarding the interconnectedness of essential services has put commanders' notice regarding the objectively foreseeable reverberating effects of damage to or destruction of essential infrastructure.⁷⁷ For instance, the report of the ICRC Expert Meeting on Explosive Weapons in Populated Areas provides the example that "if the energy supply is cut, the ability to ensure the continuity of the water supply service and the evacuation and treatment of wastewater out of a populated area diminishes."⁷⁸

Finally, it should be noted that the logic of objectively foreseeable effects is already incorporated into decision-making tools, which are adapted so as to take into account past practices and ensure that lessons learned are incorporated into future targeting assessments. For example, collateral damage estimation methodologies (CDMs) – used by some militaries to estimate the expected collateral damage arising from an attack- rely on testing and data, as well as analysis of past practice and lessons learned through battle damage assessments.⁷⁹ Indeed, the CDM used by the United States joint services notes that "[a]s a science, the CDM uses a mix of empirical data, probability, historical observations, and complex modeling for [collateral damage estimation] analysis".⁸⁰ States are also required to take into account the foreseeable effects of a particular weapon when carrying out legal reviews of new weapons under Article 36 of AP I.⁸¹ Given the remoteness from the actual combat situation in which the weapon might be used in the future when carrying out the weapons review, this assessment must be premised on an assessment of the objectively foreseeable effects of the weapon in question.

The context of the attack

The circumstances ruling at the time of the attack with reverberating effects will impact on what kind attack may be objectively foreseeable. With respect to repeated or cumulative attacks, to the extent that the effects of past attacks on a populated area are- or should - reasonably be known, this must also be taken into account for the purpose of respecting the rules on proportionality and precautions attack.⁸² If a commander is aware that civilian infrastructure has been partially damaged, it is foreseeable that any further incidental damage caused by an attack will increase the reverberating effects on civilians. For example, if an attacker knows that a water treatment plant is only operating at 50% of its capacity due to previous damage, the reverberating effects on civilians caused by further incidental damage to the plant will be more significant than if the treatment plant was fully functioning. This is particularly true if the cumulative attacks take place in a short period of time, as it is then likely that the attacker is aware of the extent of past incidental loss of life, injury and damage.

⁷⁶ Stone, R. W., "Protecting Civilians during Operation Allied Force: The Enduring Importance of Proportional Force and NATO's Use of Armed Force in Kosovo", (2001), *Catholic University Law Review*, Vol. 50, No. 2,

⁷⁷ Urban Services Report, above note 4, 28-32; 2015 Challenges Report, above note 2, 52. See also Expert Meeting Report, above note 9, 23.

⁷⁸ *Ibid.*, 15

⁷⁹ Some multinational forces also monitor civilian casualties through civilian casualty tracking mechanisms. See *ibid.*, 6.

⁸⁰ US Chairman of the Joint Chiefs of Staff, No-Strike and the Collateral Damage Estimation Methodology, Instruction, CJCSI 3160.01A, 2012, D-1. In addition, the Instruction states: "The CDM is not an exact science. The supporting technical data and processes of the methodology are derived from physics-based computer models which generate statistical results, weapons test data, and operational combat observations." *ibid.*, D-2.

⁸¹ ICRC, *A Guide to the Legal Reviews of New Weapons, Means and Methods of Warfare: Measures to Implement Article 36 of Additional Protocol I of 1977*, Geneva, 2006, 15.

⁸² *Ibid.*, 23.

Moreover, known contextual factors such as economic sanctions, blockades, the protracted nature of a conflict or the inability of engineers to repair essential infrastructure due to denial of access may also be relevant to an assessment of the foreseeable reverberating effects of an attack. For instance, if there are long-term sanctions in place, and it is known that construction material is not accessible or is severely restricted, it is objectively foreseeable that the reverberating effects of an attack are more likely to last longer and be more severe. Similarly, if essential infrastructure cannot be repaired because access to the targeted area is systematically denied (including for engineers), it is reasonably foreseeable that the reverberating effects of an attack which damages essential infrastructure can be expected to have a more significant impact on civilians in the area. Likewise, in protracted conflicts such as those in Syria, eastern Ukraine, Libya or Yemen, it is reasonably foreseeable that the quality of essential services will have declined due to years of neglect or inability (financial or otherwise) to ensure proper maintenance of infrastructure and that the reverberating effects of damage to or destruction of essential civilian infrastructure- meaning the infrastructure which if damaged or destroyed will have a significant impact on essential services - will therefore have a more significant impact on the lives and health of the affected population.⁸³

Temporal scope of 'foreseeability'

In identifying the scope of the obligation to take into account the reasonably foreseeable reverberating effects of an attack, a lot of attention has been focused on the appropriate temporal scope. In other words, when an attacker is assessing the compliance of an attack in accordance with the rules on proportionality and precautions in attack, how far into the future should he or she consider? Is it necessary to balance the concrete and direct military advantage anticipated against the effects of an attack that are expected to eventuate in the days, months or even years following the attack?

As was demonstrated during the CCW discussions concerning ERW,⁸⁴ there is no clear consensus on this question. On the one hand, it has been argued that the time frame of the expected effects" of an attack should be limited, as long-term effects are too remote. For example, in 2002, Greenwood suggested that it is only the "immediate risk (i.e., during the attack and in the hours immediately after the attack) from ERW that should be considered in the proportionality equation, because the long-term risk" posed by ERW "turns on too many factors which incapable of assessment at the time of the attack".⁸⁵ According to Greenwood, such are factors include "when and whether civilians will be permitted to return to an area, what steps the party controlling that area will have taken to clear unexploded ordnance, [and] what priority that party gives to the protection of civilians".⁸⁶ At least two States at the CCW supported this view.⁸⁷ Similarly, Kenneth Rizer expressed the view in 2001 that "open-ended consideration of indirect effects is ... troubling" as it opens up a "Pandora's box of other

⁸³ Urban Services Report, above note 4, pp. 21-28; World Health Organization, "WHO Warns of Increased Risk of Disease Epidemics in Syria and in Neighboring Countries as Summer Approaches", press release, 3 June 2013 (indicating that 35% of Syria's public hospitals were not functioning and in some areas, 70% of medical staff had fled the country), available at: www.emro.who.int/press-releases/2013/disease-epidemics-syria.html.

⁸⁴ The CCW examined legal regulation of ERW from 2000 to 2006, with adoption of Protocol V on ERW in 2004.

⁸⁵ Greenwood, C., Legal Issues Regarding Explosive Remnants of War, Working Paper submitted to the CCW Group of Governmental Experts, CCW/GGE/I/WVP.10, 22 May 2002, 23. The paper was presented by the UK delegation to the first of several Groups of Governmental Experts that led to negotiations on Protocol V.

⁸⁶ *Ibid.*

⁸⁷ Pakistan, Statement at the 11th session of the Group of Governmental Experts, CCW, 2 August 2005; Response from the United States of America, "Responses to Document CCW/GGE/X/WG.1/WP.2, Entitled IHL and ERW, Dated 8 March 2005", CCW/GGE/XI/WG.1/WP.4, 25 July 2005, available at: http://repository.un.org/bitstream/handle/11176/256880/CCW_GGE_XI_WG.1_WP.4-EN.pdf;sequence=3&isAllowed=y.

problems", particularly the impossibility of defining a precise temporal limit for when indirect effects can be considered as too remote.⁸⁸ Ultimately, this line of argument seeks to remove the challenges posed by an unknown number of intervening factors by drawing a neat cut-off point after the immediate effects of an attack.

In contrast to this approach, a number of States and commentators have argued that the long-term effects of an attack are indeed relevant to the rules on proportionality and precautions in attack. At the CCW, a number of states including Brazil,⁸⁹ the Czech Republic,⁹⁰ Norway,⁹¹ Sweden,⁹² Switzerland⁹³ and Ireland⁹⁴ expressed the view that the "long-term" effects of ERW must be taken into account when complying with the rule on proportionality in attack.⁹⁵ Additionally, Austria indicated that the subsequent effects of ERW must also be considered as part of the obligation to take all feasible precautions in attack.⁹⁶ In particular, New Zealand questioned the "immediate effects standard, noting that this was an arbitrary measurement: 'the periods of during an attack' or 'hours immediately' after an attack may not always be when civilians are at greatest risk from sub-munitions".⁹⁷ Similarly, the Committee

⁸⁸ Kenneth Rizer, "Bombing Dual-Use Targets: Legal, Ethical and Doctrinal Perspectives", (2001), *Air Space Power Journal*, 8.

⁸⁹ Brazil noted that the proportionality rule applies if the remains of cluster munitions might continue to cause casualties long after the end of the armed conflict. Brazil stated that the "post-conflict" effects should be taken into account at the time of use. Response from Brazil, "Responses to Document CCW GGE/X/WG.I/WP.2, Entitled IHL and ERW, Dated & March 2005", CCW/GGE/XII/WG.1/WP.1, 12 September 2005, available at: <http://courseweb.sthomas.edu/vowiebe/IHERWQuestionnaire%20and%20responses/Brazil050912.DOC>.

⁹⁰ Response from the Czech Republic, "Responses to Document CCW/GGE/X/WG.1/WP.2, Entitled IH and ERW, Dated 8 March 2005", CCW/GGE/XIII/WG.1/WP.2, 10 February 2006: "the use of munitions [that are] likely to fail ... might contradict this principle [of proportionality] as the low reliability of such munitions could cause collateral damage exceeding the lawful level by increasing probability and decreasing its military effectiveness".

⁹¹ Norway stated that military commanders must take into consideration "both the humanitarian concern related to the direct impact of the munitions as well as the humanitarian effects caused by unexploded ordnance remaining on the ground after the attack". Response to the IHL Questionnaire from Norway States Parties' Responses to the International Humanitarian Law and ERW' Questionnaire", CCW/ GGE/XI/WG.1/WP.5, 29 July 2005, S 19, available at: <http://repository.un.org/handle/11176/256881>.

⁹² Statement by Sweden on the McCormack Report, CCW 13th Meeting of the Group of Government Experts on ERW, March 2006 ("a cluster bomb with sub-munitions that have a high dud rate and is used in populated areas is likely to create disproportionate suffering for the civilian population compared with the military advantage from the use of such a weapon").

⁹³ Response to the IHL Questionnaire from Switzerland, "States Parties' Responses to the International Humanitarian Law and ERW' Questionnaire", CCW/GGE/XI/WG.1/WP.13, 3 August 2005, 15, available at: <http://repository.un.org/handle/11176/256892> ("proportionality assessment must also take into account the foreseeable incidental long-term effects of an attack such as the humanitarian costs caused by duds becoming ERW" such that ammunitions with high dud rates will influence the proportionality balance negatively and diminish the options of their use against legitimate military objectives").

⁹⁴ Statement by Ireland on the McCormack Report, CCW 13th Meeting of the Group of Government Experts on ERW, March 2006 (Ireland agreed with the statement in the Report that "after years of experiencing the effects of ERW, including the collation of data on the humanitarian effects of ERW, parties to an armed conflict cannot simply ignore the likely longer term effects of the use of cluster munitions in civilian residential areas or in other areas civilians are expected to return to after the cessation of hostilities).

⁹⁵ The same view was expressed by McCormack and Mtharu in their analysis of States responses. See McCormack, T. Mtharu, T. P and Finnin, S., 'Report on States Parties' Responses to the *Questionnaire: International Humanitarian Law and Explosive Remnants of War*', February 2006, 20.

⁹⁶ Response to the IHL Questionnaire from Austria, "States Parties' Responses to the International Humanitarian Law and ERW' Questionnaire", CCW/GGE/XI/WG.1/WP.14, 4 August 2005, § 11, available at: <http://repository.un.org/handle/11176/256893> ("the application of the principle [of proportionality] is not limited to the intended effects of an attack [T]he effects of duds - which are inherently incidental - seem to be covered by this provision").

⁹⁷ Statement by New Zealand at the CCW Meeting of Government Experts, June 2003 ("prior to an attack Civilians may have fled to a safer area and it may be that immediately in the hours after an attack there is a low level of civilian casualties from ERW. A second possible scenario is where the presence of large numbers of military

Established to Review the NATO Bombing Campaign against the Federal Republic of Yugoslavia also referred to a standard based on the long- term effects": even when targeting admittedly legitimate military objectives, there is a need to avoid excessive long-term damage to the economic infrastructure and natural environment with a consequential adverse effect on the civilian population".⁹⁸ An extreme example is the case of a nuclear attack, where it is certainly foreseeable that the attack is likely to result in casualties not only in the days, weeks and months following the attack, but also during the subsequent years and decades.⁹⁹

A third view, according to Rogers, is that the issue of longer- or shorter- term effects probably "does not matter so long as the same timescale is applied to both limbs" of the proportionality test.¹⁰⁰ This is a controversial approach given that the scope of incidental damage is not qualified in Article 51(5)(b) by any adjectives. Thus, whilst the anticipated military advantage is limited to the "direct and concrete" military advantage - meaning that which is "substantial and relatively close" and not that which is hardly perceptible" or "which would only appear in the long term" as explained above, there is no reason based on the text of AP I to likewise limit the scope of incidental damage to "direct and concrete".

While the very nature of reverberating effects means that they will typically not take place immediately,¹⁰¹ identifying a precise temporal scope for foreseeable reverberating effects is challenging. In this regard, it is important to query the added value of identifying the precise temporal scope of the effects that must be taken into account. On the one hand, specific temporal measurements risk being arbitrary. On the other hand, the temporal scope of broader phrases such as long-term effects of an attack remain ambiguous. Additionally, there is not necessarily a direct correlation between the foreseeability of reverberating effects and the time at which the effects eventuate. Indeed, the effects of an attack may be foreseeable and take place months or years in the future (e.g. environmental damage), or they may be unforeseeable and take place in the days following an attack (e.g. contamination of water due to an oil spill). Accordingly, it is preferable to focus on the objective foreseeability of the reverberating effects of an attack, regardless of the time at which such effects eventuate, meaning, those reverberating effects that are likely to occur based on the information reasonably available to the commander at the time of the attack.¹⁰²

Material scope of "foreseeability"

Regarding the material scope of the obligation to consider the reverberating effects of an attack, it is clear that it is not possible to establish clear-cut boundaries regarding the types of effects that should be taken into account. That said, it is helpful to identify some effects that

personnel limits the movement of civilians and it is some time before civilians have freedom of movement in an ERW-affected area)

⁹⁸ ICTY, Final Report to the Prosecutor, above note 61, 18.

⁹⁹ Maresca, L. and Mitchell, E., above note 67, 634.

¹⁰⁰ A. P. V. Rogers, above note 58, 22.

¹⁰¹ It should be noted that there may be some reverberating effects which will take place immediately, such as secondary explosions resulting from an attack on a munitions storage facility. However, in most cases, reverberating effects take place subsequent to an attack.

¹⁰² See Droege, C., above note 7, 573. A similar approach is taken by McCormack and Mtharu in a Working Paper submitted to the Third Review Conference of the CCW: "Whenever the use of weapons likely to cause ERW is contemplated in residential areas or in areas otherwise known to be frequented by the civilian population, assessments of expected civilian damage ought to take account of the consistent conclusion of numerous reports and studies carried out by international and non-governmental organizations, many of which include data on percentages of munitions which fail to explode and the effect of such unexploded ordnance on civilian populations."

may be considered reasonably foreseeable for the purposes of assessing the incidental harm that can be expected from an attack.

As a starting point, the rules on proportionality and precautions in attack both limit the types of harm, including reverberating effects, which are to be taken into account by explicitly referring to the expected incidental loss of civilian life, injury to civilians and damage to civilian objects". In interpreting these terms, it is argued that loss of civilian life includes the death of military medical and religious personnel, who are considered civilians for the purposes of the IHL rules on the conduct of hostilities.¹⁰³ Additionally, it is widely held that damage to civilian objects includes loss of functionality of a civilian object¹⁰⁴ as well as environmental damage.¹⁰⁵ Finally, given that the ordinary meaning of "injury" includes both "an instance of being injured" and "the fact of being injured; harm or damage",¹⁰⁶ "injury" should be understood broadly to include wounding as well as illness and disease. This view is supported in the Tallinn Manual on the International Law Applicable to Cyber Warfare (Tallinn Manual), which concludes that 'serious illness and severe mental suffering' that are tantamount to injury also fall within the scope of incidental harm.¹⁰⁷

The idea that psychological injury should be taken into account in the proportionality assessment and in the application of the precautionary rules is increasingly accepted.¹⁰⁸ Moreover, there is no principled reason for restricting injury to physical injury, when its scope is acknowledged to include illness and disease, as there are also mental illnesses that may result from an attack. Liebllich relies on the IHL prohibition against terrorizing civilians and recent research on post-traumatic stress disorder to argue that "incidental mental harm cannot be brushed aside ... if IHL is to maintain its integrity as a legal body aiming to minimize civilian harm".¹⁰⁹ While it is generally considered that mere inconvenience, stress or anxiety do not enter into the proportionality assessment,¹¹⁰ it is submitted that this should not be read as a rejection of relevance of more severe mental suffering, but rather as a demonstration that the less severe the injury – whether physical or mental – the less likely it is that the incidental civilian damage will be considered excessive compared to the anticipated military advantage.¹¹¹

In addition to loss of civilian life, injury to civilians and damage to civilian objects, it has been argued that the types of harm which are relevant for the rules on proportionality and precautions in attack should be interpreted more broadly to include other humanitarian

¹⁰³ Gisel, L., "Can the Incidental Killing of Military Doctors Never Be Excessive?", (2013), *International Review of the Red Cross*, Vol. 95, No. 889, 220-230.

¹⁰⁴ 2015 Challenges Report, above note 2, 41; Robin Geiss and Henning Lehmann, "Cyber Warfare: Applying the Principle of Distinction in an Interconnected Space", (2012), *Israel Law Review*, Vol. 45, No. 3, 397, cited in M. Roscini, above note 30, 222. See also Droege, C., above note 7, 559 (arguing that "disrupting the function of certain systems by interfering with their underlying computer systems can amount to damage insofar as it impairs their usefulness").

¹⁰⁵ C. Droege and M.-L. Tougas, above note 30, 25-27; Karen Hulme, "Taking Care to Protect the Environment Against Damage: A Meaningless Obligation?", (2010), *International Review of the Red Cross*, Vol. 82, No. 879, 677-678.

¹⁰⁶ *Oxford Dictionary of English*, 3rd ed., Oxford University Press, Oxford, 2010, available at: www.oxforddictionaries.com/definition/english/injury.

¹⁰⁷ Tallinn Manual, above note 8, 108.

¹⁰⁸ See, for example, Liebllich, E., "Beyond Life and Limb: Exploring Incidental Mental Harm Under International Humanitarian Law", in Derek Jinks, Jackson Maogoto and Solon Solomon (eds), *Applying International Humanitarian Law in Judicial and Quasi-Judicial Bodies*, Asser Press, The Hague, 2014, 185; Gisel, L., above note 21, 120; Tallinn Manual, above note 8, 108.

¹⁰⁹ E. Liebllich, above note 108, 189.

¹¹⁰ See L. Gisel, above note 21, 120.

¹¹¹ *Ibid.*

consequences -for example, displacement or economic hardship caused by contamination and loss of functionality of farming land. This approach has received some support. For example, Norway has previously expressed the view that military commanders should take into account the humanitarian consequences caused by the attack" and the "more long-term humanitarian problems".¹¹² Likewise, the recent report of the UK Iraq Inquiry (investigating the UK military intervention and presence in Iraq from 2003 to 2009) indicates that;

A Government has a responsibility to make every reasonable effort to identify and understand the likely and actual effects of its military actions on civilians. That will include not only direct civilian casualties, but also the indirect costs on civilians arising from worsening social, economic and health conditions.¹¹³

Adopting an even broader view, Reynolds argues that a thorough indirect collateral damage assessment must evaluate all foreseeable effects of a military operation on violence, crime, political infrastructure, housing, environment, public health, water and sanitation infrastructure, power infrastructure, poverty, economy labor and unemployment and education".¹¹⁴

Although many of these effects, particularly displacement, may be a reasonably foreseeable consequence of a particular attack, it is clear that the scope of incidental harm which must be taken into account is limited to life, injury to civilians and damage to civilian objects. As such, even under broad interpretation of "injury," incidental harm does not include effects such loss of civilian property, poverty, unemployment or economic capacity. For example, the US *Law of War Manual* takes a clear position that some economic harm is too remote, although the death of an enemy combatant might cause economic harm in the form of lost jobs; the attacker would not be required to consider such loss in applying the "proportionality rule".¹¹⁵ That said, some effects - including, for example, displacement - may still be relevant. Indeed, it may be reasonably foreseeable that displacement will result in increased mortality and deteriorating health of displaced persons, which fall squarely within the types of harm that must be taken into account. In addition, reasonably foreseeable displacement may be relevant in determining the weight to be given to destruction of civilian houses in the proportionality assessment.¹¹⁶ For instance, if it is reasonably foreseeable that incidental destruction of civilian houses will result in large-scale displacement, this may change the value given to the houses when assessing whether the expected incidental damage is excessive in relation to the direct and concrete military advantage."¹¹⁷

Conclusion

Although the rules on proportionality and precautions in attack require that reverberating effects are taken into consideration for all attacks, this obligation is particularly relevant in the context of attacks involving the use of explosive weapons that have wide area effects in a populated area. Indeed, recent conflicts have shown that when explosive weapons with a large destructive radius, inaccurate delivery system or the capacity to deliver multiple munitions over wide area are used in populated areas, there is a high likelihood that civilians

¹¹² Response from Norway, "Responses to Document CCW/GGE/XWG.1/WP.2, Entitled IHL and ERW, Dated 8 March 2005*", CCW/GGE/XI/WG.1/WP.5, 29 July 2005, 18-19.

¹¹³ Report of the Iraq Inquiry, 2016, S 277-278, available at: <http://www.iraqinquiry.org.uk/the-report/>.

¹¹⁴ According to Reynolds, collateral damage should be understood as both direct and indirect: "Failure to adequately evaluate these definitions suggests a faulty proportionality analysis, a defective effects-based targeting strategy, and a flawed post-conflict reconstruction assessment."

¹¹⁵ US Law of War Manual, above note 9, 241, 5.12.2.1.

¹¹⁶ L. Gisel, above note 21, 124.

¹¹⁷ *Ibid.*

will be killed and injured, and essential civilian infrastructure will be damaged destroyed, with consequent disruption in essential services and subsequent effects on the lives and well-being of the civilian population.

In fleshing out its contextual scope and framework, this work has argued that the obligation to take into account the reasonably foreseeable reverberating effects of an attack derives from the requirement to estimate the "expected" incidental damage attack when applying the rules of proportionality and precautions in attack. This obligation imposes an objective standard of care, based on the standard of the "reasonable commander". This implies that commanders must take into account those reverberating effects that are reasonably foreseeable in the circumstances ruling at the time, in light of the reasonably available information. Moreover, the clause, "reasonable foreseeability" means that commanders are put on notice regarding reverberating effects that may be considered reasonably and objectively foreseeable based on past practice and empirical research, lessons learned and publicly available information, including information about the reverberating effects of using explosive weapons in populated areas.

The obligation to take into account the reasonably foreseeable reverberating effects of an attack is reinforced by the precautionary obligation to refrain from launching a disproportionate attack, which imposes a duty to proactively gather information that will inform the assessment of the expected incidental damage of the attack. This includes, where feasible, obtaining information regarding the location and nature of essential infrastructure and ensuring that relevant technical experts are involved in assessing the expected incidental harm of an attack. While the operational context might impact the extent to which a commander is expected to proactively gather information to inform the estimation of incidental damage, a commander may never ignore reasonably available information, including such information that renders the reverberating effects of an attack reasonably foreseeable.

Additionally, all feasible precautions must be taken in the choice of means and methods of attack, by assessing the foreseeable effects of particular weapons, including reverberating effects, on the basis of their technical characteristics and the expected circumstances of their use. Feasible precautions include manipulating the technical features of explosive weapons such as the type of fuse and the type/ size of the warhead, as well as considering the timing, angle and location of the attack. Yet even such precautions may not be sufficient to obviate the wide area effects of certain explosive weapons. In such cases, the only option may be to refrain from using the weapon, if its use is likely to lead to a violation of the prohibition on indiscriminate and disproportionate attacks.

As is the case currently for some militaries, policy guidance should be put in place to identify which kinds of precautions in attack can and should be implemented, in order to assess and minimize the reverberating effects of an attack using explosive weapons in populated areas, building on good practices already applied by a number of militaries. Likewise, when it is reasonably foreseeable that using a particular explosive weapon in a populated area will in excessive incidental civilian harm, military manuals and policy should set out clear restrictions on the use of those weapons in populated areas. Although it is not possible to foresee and limit all of the possible effects of an attack, a lot more can be done to better understand the reverberating effects of an attack using explosive weapons in populated areas and to develop policy guidance setting out if and how such weapons, should be used.