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## Introduction

The progressive development of international humanitarian law (IHL) represents an ongoing effort to accommodate multiple, often competing,<sup>1</sup> goals of States and the international community: principally, the necessity for States to effectively pursue and protect their national interests through military means when peace has failed and their parallel obligation to serve broader humanitarian goals by limiting the harm inflicted on those involved in armed conflict.<sup>2</sup> Maintaining a suitable balance of interests<sup>3</sup> in the face of the constantly changing practice of warfare means revising, reinterpreting and supplementing the prevailing body of law as the actors, the battlefields and the means and methods of warfighting evolve.

In many cases, such evolution can be traced directly or indirectly to progress of a scientific, mathematical or technical nature which confers some military advantage on the armed forces which wield it.<sup>4</sup> Where that military advantage affects the type or degree of harm inflicted on those against whom it is wielded, it is necessary to reassess the legal checks that are in place, to ensure that none of the various goals of IHL are unduly compromised. The research presented in this book was motivated by one

<sup>1</sup> See generally Michael N Schmitt, 'Military Necessity and Humanity in International Humanitarian Law: Preserving the Delicate Balance' (2010) 50 *Virginia Journal of International Law* 796.

<sup>2</sup> Jean de Preux, 'Protocol I – Article 35 – Basic Rules' in Yves Sandoz, Christophe Swinarski and Bruno Zimmermann (eds), *Commentary on the Additional Protocols of 8 June 1977 to the Geneva Conventions of 12 August 1949* (Martinus Nijhoff, 1987) 389, 392–3 [1389].

<sup>3</sup> References to 'balance' between military necessity and humanity do not imply that any particular position is taken here on the question of whether or not they are necessarily in conflict. For a detailed discussion of two conflicting views on that question, see Nobuo Hayashi, 'Military Necessity as Normative Indifference' (2013) 44 *Georgetown Journal of International Law* 675. For current purposes it is only necessary to note that military necessity and humanity are both significant drivers of weapon development and of the corresponding regulatory responses.

<sup>4</sup> See generally Braden R Allenby, 'Are New Technologies Undermining the Laws of War?' (2014) 70(1) *Bulletin of the Atomic Scientists* 21.

example of such progress. It responds to efforts by a growing number of militarily advanced States to develop increasingly autonomous weapon systems (AWS) for use in armed conflict: a development path which, it will be seen, has implications for both the means and the methods that armed forces will employ in conflict. While many existing weapon systems possess some capacity for operating without human intervention, current development efforts indicate that those capabilities will expand enormously in coming years. That prospect has already sparked considerable controversy, with a number of advocacy groups calling for a pre-emptive ban<sup>5</sup> and many States expressing concern in United Nations fora. Yet the motive to increase levels of autonomy in weapon systems is strong: greater operational effectiveness,<sup>6</sup> safety for one's own soldiers, decreased personnel requirements and financial savings are among the benefits that may be realised by States which possess AWS.

This book discusses the general matter of how IHL, as it stands today, regards autonomous weapon systems and, in particular, the specific question of what, if any, special requirements and limitations the law imposes on their development, acquisition and use.

Of course, the implications of advanced States pursuing a major new path of weapon development are very broad and extend far beyond the specialised scope of concern of IHL. In the many debates about regulation of AWS, proponents and opponents alike have made arguments based on a wide range of considerations: operational effectiveness,<sup>7</sup> strategy,<sup>8</sup> ethics,<sup>9</sup> politics,<sup>10</sup> international relations and several different

<sup>5</sup> In particular, the Campaign to Stop Killer Robots <<http://www.stopkillerrobots.org>>, a coalition of non-governmental organisations which has been active since 2012, has participated extensively in multilateral discussions about regulation of AWS.

<sup>6</sup> See, eg, Michael W Byrnes, 'Nightfall: Machine Autonomy in Air-to-Air Combat' (2014) (May–June) *Air & Space Power Journal* 48.

<sup>7</sup> See, eg, Jai Galliot, 'The Limits of Robotic Solutions to Human Challenges in the Land Domain' (2017) 17(4) *Defence Studies* 327.

<sup>8</sup> See, eg, Jai Galliot, 'Defending Australia in the Digital Age: Toward Full Spectrum Defence' (2016) 16(2) *Defence Studies* 157.

<sup>9</sup> See, eg, Bradley Jay Strawser (ed), *Killing by Remote Control: The Ethics of an Unmanned Military* (Oxford University Press, 2013); Jai C Galliot, 'Closing with Completeness: The Asymmetric Drone Warfare Debate' (2013) 11(4) *Journal of Military Ethics* 353; Ronald C Arkin, *Governing Lethal Behavior in Autonomous Robots* (Chapman and Hall, 2009) 29–48; Jai C Galliot, 'Uninhabited Aerial Vehicles and the Asymmetry Objection: A Response to Strawser' (2012) 11(1) *Journal of Military Ethics* 58; Jai Galliot, 'Military Robotics and Emotion: Challenges to Just War Theory' in Jordi Vallverdú (ed), *Handbook of Research on Synthesizing Human Emotion in Intelligent Systems and Robotics* (IGI Global, 2014) 386.

<sup>10</sup> Jai Galliot, 'Unmanned Systems and War's End: Prospects for Lasting Peace' (2013) 8(1) *Dynamiques Internationales* 1.

legal frameworks including IHL, human rights law,<sup>11</sup> international criminal law and arms control law. Ultimately, the international community's response to AWS development will need to account for concerns in all of those areas. However, there is far too much material to cover the entire spectrum of relevant issues in detail in one volume. Instead, the primary focus of the current investigation is on issues arising under IHL. Four further restrictions have been applied.

First, the discussion is framed in abstract terms. It is not a detailed case study of a specific weapon system or a specific conflict, although examples of both are employed where appropriate. Rather, it addresses an abstract phenomenon, being a capacity for autonomous operation of weapon systems, however that capacity may be achieved and in whatever type of weapon system. An abstract approach is necessary, given that the motive for the research is to respond to plans for a broad path of future weapon system development. The precise characteristics of future AWS are unknown at this time, so the discussion must relate to autonomy as an abstract capability that may be present in potentially any type of weapon system. Similarly, the characteristics of the conflicts in which future AWS might be employed are difficult to reliably anticipate,<sup>12</sup> so discussions about applying the rules of IHL to AWS simply assume that *jus ad bellum*<sup>13</sup> requirements have been satisfied and that it is legal for the State operating the AWS to employ military force against its adversary. Consistent with the independence of the *jus ad bellum* and the *jus in bello*, no assumptions are made about either the causes or the legal merits of participation in armed conflict.

Second, the rules of IHL discussed below are those that apply to an international armed conflict, unless otherwise specified. The points of difference between the rules applicable to international and non-international conflicts are generally not at issue in respect of AWS, and significant space would need to be devoted to discussing the less well-

<sup>11</sup> For a general discussion of AWS and human rights law, albeit in a law enforcement context, see Christof Heyns, 'Human Rights and the Use of Autonomous Weapons Systems (AWS) during Domestic Law Enforcement' (2016) 38 *Human Rights Quarterly* 350.

<sup>12</sup> There is a large and growing volume of literature available on the many aspects and implications of the changing nature of armed conflict. See, eg, Hew Strachan and Sibylle Scheipers (eds), *The Changing Character of War* (Oxford University Press, 2011).

<sup>13</sup> *Jus ad bellum* is the law governing the legality of the resort to violence. See generally Keiichiro Okimoto, *The Distinction and Relationship between Jus Ad Bellum and Jus in Bello* (Hart, 2011).

defined legal concepts which apply to non-international armed conflict.<sup>14</sup> Greater utility may be realised from a deeper discussion of AWS and the law of international armed conflict, with the conclusions being readily applicable to situations of non-international armed conflict.

Third, the discussion relates primarily to autonomy in the critical functions of selecting and engaging targets. While other functions of a weapon system, such as navigation, might also be done with a degree of autonomy, for the purposes of this book they are of interest only insofar as they contribute to the weapon system's autonomously selecting and engaging targets.

Fourth, it is assumed that the weapon part of the system (the gun, missile or other munition) is not subject to any specific prohibition or regulation which does not relate to autonomous capabilities. If a class of weapon is prohibited in some or all circumstances, such as a biological weapon<sup>15</sup> or a chemical weapon,<sup>16</sup> there is no *prima facie* reason to think the addition of autonomous capabilities would affect the applicability of that ban. In cases where a weapon is subject to some special regulation, such as an anti-personnel mine, the interaction of those regulations with the changes wrought by a degree of autonomy would require separate investigation. This research is concerned only with the interaction between weapon autonomy and general IHL.

Further, the legal analysis contained herein is based on the *lex lata* as it stands at the time of writing, without reference to the various statements of *lex ferenda* which have been made during the international debate about regulation of AWS.

It is not the intention here to advocate either for or against continued development of AWS. The book attempts to map part of the legal landscape that would be encountered by States deploying increasingly autonomous weapons, but is deliberately neutral as to whether States should or should not take that path. As noted earlier, the decision to pursue a path of weapon development must be based on considerations

<sup>14</sup> These include the definitions of lawful objectives and combatants, among other matters. See Ian Henderson, *The Contemporary Law of Targeting* (Martinus Nijhoff, 2009) 12.

<sup>15</sup> *Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction*, opened for signature 10 April 1972, 1015 UNTS 163 (entered into force 26 March 1975) ('*Biological Weapons Convention*').

<sup>16</sup> *Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction*, opened for signature 13 January 1993, 1974 UNTS 45 (entered into force 29 April 1997) ('*Chemical Weapons Convention*').

far broader than just IHL. It is hoped that this work will inform decisions about development and use of AWS, but it cannot, and does not attempt to, prescribe a path of development.

The legal frame of reference for the discussion is IHL as embodied in the First Additional Protocol to the Geneva Conventions of 1949.<sup>17</sup> A decision by a State to develop, purchase or use AWS must be consistent with all of the State's legal obligations, but it is not possible in the space available to address all the combinations of international and domestic obligations which a State may bear. Instead, *API* was chosen as representing relevant legal rules which directly bind a large number of States and which, in some instances, codify customary rules which bind all States.

At the time of writing, *API* conventionally binds 174 States Parties, with three other States being signatories.<sup>18</sup> The articles of *API* relevant to this investigation which are considered, with varying degrees of acceptance, to codify customary law, are as follows.

Article 35(1), which provides that the right of the parties to a conflict to choose methods or means of warfare is not unlimited, and Article 35 (2), which prohibits means and methods of warfare that are of a nature to cause superfluous injury or unnecessary suffering, both echo provisions in the Regulations annexed to the Fourth Hague Convention of 1907<sup>19</sup> (with the exception of the term 'methods of warfare', being a phrase not present in the Hague Regulations).<sup>20</sup>

Article 48, which sets out the principle of distinction, restates a general rule of international law which is universally acknowledged as binding on all States. Articles 51 and 52 protecting civilians and civilian objects, respectively, from dangers arising from military operations also restate customary law. Of particular interest are the customary prohibitions on inherently indiscriminate weapons codified in Articles 51(4)(b) ('means

<sup>17</sup> *Protocol Additional to the Geneva Conventions of 12 August 1949, and Relating to the Protection of Victims of International Armed Conflicts (Protocol I)*, opened for signature 8 June 1977, 1125 UNTS 3 (entered into force 7 December 1978) ('*API*').

<sup>18</sup> *Treaties, States Parties and Commentaries: Protocol Additional to the Geneva Conventions of 12 August 1949, and Relating to the Protection of Victims of International Armed Conflicts (Protocol I)*, International Committee of the Red Cross <[https://ihl-databases.icrc.org/applic/ihl/ihl.nsf/States.xsp?xp\\_viewStates=XPages\\_NORMStatesParties&xp\\_treatySelected=470](https://ihl-databases.icrc.org/applic/ihl/ihl.nsf/States.xsp?xp_viewStates=XPages_NORMStatesParties&xp_treatySelected=470)>.

<sup>19</sup> *Convention Respecting the Laws and Customs of War on Land and Its Annex: Regulations concerning the Laws and Customs of War on Land*, signed 18 October 1907 [1910] ATS 8 (entered into force 26 January 1910) ('*Hague Convention 1907*').

<sup>20</sup> Fausto Pocar, 'To What Extent Is Protocol I Customary International Law?' (2002) 78 *International Law Studies* 337, 344.

of combat which cannot be directed at a specific military objective’) and 51(4)(c) (‘means of combat the effects of which cannot be limited . . .’). However, it has been argued that some codifications in *API* employ more specificity than is generally seen as customary.<sup>21</sup> In particular, the definition of military objectives in Article 52(2) introduces clarifications which may be subject to different interpretations.<sup>22</sup>

Article 57, which sets out the precautions which an attacker must take in preparing for and conducting an attack, together with Article 58, have been described by the International Criminal Tribunal for the Former Yugoslavia (ICTY) as representing customary law:

[The principles of distinction and proportionality] have to some extent been spelled out in Articles 57 and 58 of the First Additional Protocol of 1977. Such provisions, it would seem, are now part of customary international law, not only because they specify and flesh out general pre-existing norms, but also because they do not appear to be contested by any State, including those which have not ratified the Protocol.<sup>23</sup>

The International Committee of the Red Cross (ICRC) has also argued for the customary status of Article 57.<sup>24</sup> On the other hand, Greenwood<sup>25</sup> and others have argued that some of its provisions go beyond customary law.

No attempt is made here to critique existing law or argue for a particular interpretation in areas of uncertainty. The intent instead is to argue for a particular understanding of how the *lex lata* applies to a new set of technologies. The precise interpretation of many of the provisions of *API* is a matter of contention. In some cases that is because “the specificity of Protocol I’s provisions add new elements to principles that, while well established in customary law, leave margins of discretion to belligerent States.”<sup>26</sup> In others it is because the expression of new, non-customary rules allows a range of interpretations. In all cases, an attempt has been made to utilise the most commonly accepted interpretation in order to keep the focus on the novel ways in which the law must be

<sup>21</sup> Ibid 345.

<sup>22</sup> Ibid 348.

<sup>23</sup> *Prosecutor v Kupreškić (Judgement)* (International Criminal Tribunal for the Former Yugoslavia, Trial Chamber, Case No IT-95-16, 14 January 2000) [524].

<sup>24</sup> Jean-Marie Henckaerts and Louise Doswald-Beck, *Customary International Humanitarian Law* (Cambridge University Press, 2005) vol 1, 51.

<sup>25</sup> Christopher Greenwood, ‘Customary Law Status of the 1977 Geneva Protocols’ in Astrid J M Delissen and Gerard J Tanja (eds), *Humanitarian Law of Armed Conflict: Challenges Ahead: Essays in Honour of Frits Kalshoven* (Martinus Nijhoff, 1991) 111.

<sup>26</sup> Pocar, above n 20, 347.

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applied to AWS. In respect of customary law, repeated reference is made to the ICRC's Customary IHL Study.<sup>27</sup> However, the extent to which that study accurately captures the current state of customary IHL is itself the subject of debate.<sup>28</sup>

Finally, the discussion employs numerous examples of particular weapon systems and incidents in which they have been, or could be, involved. No special status should be accorded to those systems or incidents due to their being mentioned here. They are used solely to demonstrate relevant points.

<sup>27</sup> Henckaerts and Doswald-Beck, above n 24.

<sup>28</sup> See, eg, Jann Kleffner, 'Sources of the Law of Armed Conflict' in Rain Liivoja and Tim McCormack (eds), *Routledge Handbook of the Law of Armed Conflict* (Routledge, 2016) ch 4 s 2.