

PART I

The Legal Background

# 1

## Introduction

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### 1.1 INTRODUCTORY REMARKS

We live in times of very rapid technological advance in many fields of science. We are witnessing scientific revolutions that will radically change many aspects of the way in which ordinary people live their lives. What has happened in the field of digital technology is an example from the past that serves to show how novel developments can rapidly change traditional ways of doing things across numerous fields of activity. The digital revolution is an expression that trips off the tongue with almost casual ease, and yet for those ‘of a certain age’, like the editor of this volume, the now increasingly pervasive employment of, and dependence upon, digital electronics in virtually every sphere of life amounts in truth to a revolution compared to the methods that preceded it. To an author who, as a qualified lawyer, was required to prepare first drafts of his legal advices in long hand in his early days in the Royal Air Force Legal Branch and whose advices in later years were routinely dictated to and typed by professional secretaries, the irresistible march of the personal computer brought with it an absolute and permanent transformation of ways of working. Bulky case files gave way to data records, paper communications gave way to emails, the pace of work quickened markedly and the secretaries were no more.

If the workplace was dramatically altered forever, almost all other fields of activity followed suit, and one rather doubts that those who initiated the first faltering steps towards electronic communication could, in their wildest imaginings, have conceived how commercial, industrial, professional, academic and daily life would all be changed to such a considerable degree.

The reference in the opening paragraph to ‘those of a certain age’ is deliberate, because for many, perhaps a majority of the population, aspects of modern digital technology have been evident in everyday life to a greater or

lesser extent throughout their lives. It is those for whom that is not the case that will appreciate most keenly the breadth of effect that these technologies have brought.

These thoughts, or something rather like them, were forming in the present editor's mind while he was preparing the second edition of *Weapons and the Law of Armed Conflict*.<sup>1</sup> He appreciated that while the subject matter of that book, as reflected in its title, was indeed in its own right a worthy topic for a book, it nevertheless only dealt with a singular aspect of the technologies that it addressed, namely their employment in connection with warfare. The thought started to develop that emerging technologies that are used in warfare often also have applications, perhaps their origins, in the non-military, peacetime environment. In the past, the focus and motivating factor driving scientific research forward into new technologies has often been the development of new and improved weaponry or military ways of doing things, with the clear purpose of securing a technological advantage over prospective or actual enemies.

In more recent times, it has frequently been the large-scale peacetime, consumer markets that have inspired technological development and progress, and the product of those improvements has tended to be adapted to military use where this was feasible and seen to be useful. Either way, whether it was a recognised military need or anticipated commercial gains that motivated the initial research, a number of emerging technologies have ended up being, in this sense, 'dual use'.

Sometimes new technologies are applied to discharge similar functions in the military/armed conflict setting as in the peacetime/commercial setting. On other occasions, the technology is used in significantly different ways and to achieve fundamentally different purposes. Sometimes the same technology is used for both similar and different purposes.

Realising that this is the case led to the thought that the bodies of law that address these emerging technologies will often differ as between the military/armed conflict sphere and the peacetime/commercial sphere. Where the former is concerned, it was clear that it would be the law of armed conflict that would take precedence when the technology is employed in connection with hostilities associated with an armed conflict. Nevertheless, in certain applications even military use of novel technologies would be regulated by other bodies of law. In the peacetime/commercial context, however, it was obvious that domestic law, human rights law and some other elements of

<sup>1</sup> W. H. Boothby, *Weapons and the Law of Armed Conflict*, 2nd edn (Oxford: Oxford University Press, 2016).

international law would regulate the circumstances in which, and the ways in which, the new or emerging technology could lawfully be used. These recognitions, however, did not really address the more intriguing challenges: it is, let us face it, relatively easy to assert in fairly general terms that the bodies of law mentioned in the previous sentence will apply. It is altogether more challenging to consider, in the context of an emerging, incompletely understood technology what domestic law rules appear to be relevant, what if any legislation, domestic or international, is being produced to address the challenges posed by the new way of doing things and to what extent the existing legal rules apply. It is, moreover, difficult to determine what the future seems likely to look like in terms of further technological evolution and in terms of changes in regulations and other legal and policy provision to address evolving challenges posed by these scientific changes.

So, it was with these inchoate thoughts in mind that attention shifted back in favour of getting on with the completion the second edition of *Weapons and the Law of Armed Conflict*. Revisiting what at that stage was still a rather nebulous notion after the ‘Weapons Law’ manuscript was safely in the hands of the publisher, it became clear that turning such vague concepts into anything resembling a coherent book was going to be a considerable challenge – yet the issues involved seemed to be fascinating and there was the inescapable thought that there were potentially valuable lessons to be learned here. It was at that point, however, that following an invitation to write a chapter critiquing part of the US Department of Defense *Law of War Manual*, the editor took on the daunting task of co-authoring with Professor Wolff Heintschel von Heinegg a commentary addressing the whole of that most lengthy and important legal document. Ideas associated with new and emerging technologies therefore ‘took a back seat’ for the best part of a further year until that manuscript had also been safely despatched to its publisher.

With those two major diversions out of the way, the opportunity now presented itself to try to take forward the ideas outlined in the opening paragraphs of the present chapter. It was immediately evident that it would not be possible to consider all emerging technologies. There are too many and to do so would likely produce an unwieldy text that would inevitably lack the required sharpness of focus. So an attempt has been made to select specific technologies that seem to be relevant in both the military/armed conflict and the peacetime/commercial spheres and that involve interesting issues where plans or measures for their regulation are concerned.

Many of the new technologies that have been chosen have applications across numerous fields of human activity. Here again a choice has had to be made. To seek to discuss all such applications, or potential applications,

would likely result in chapters that would be excessively lengthy and potentially confusing. It is, of course, not possible to predict in which respects legal and practical challenges associated with these new technologies and methods will arise. Sometimes they will pose challenges that differ as between those different fields; sometimes the challenges are similar. Sometimes the aspects that have been discussed in this book will indeed be the focus of future concern and regulation; sometimes that focus will lie elsewhere for reasons that may not, at the time of writing, have been evident, foreseeable or foreseen. Be that as it may, rightly or wrongly the technologies reflected in Chapters 5–14 of this book are the ones that have been chosen and it is hoped that the resulting analysis is thought to be illuminating and worthwhile.

A considerable effort has been made to try to ensure that the technological and legal explanations that are given are both as accurate and up to date as possible as at the date of completion of the present manuscript, namely 15 April 2018. This is, however, a rapidly changing field. In a sense, if some aspect of regulation has changed, or if the technology has further matured since a particular chapter was written, that is somewhat tangential to the main purpose of the book. Indeed, the idea that spurred the writing of this book is that there are, perhaps, lessons to be learned by considering how both the law and policy attempt to deal with the diverse applications of these evolving technologies and the legal, security and other challenges that these developments pose. By giving an account of how the relevant legislatures, governments and other institutions, international and national, were then approaching the task of addressing those challenges, the intended points and the basis for comparison will emerge.

The purpose of the book is to reassure, where reassurance seems to be indicated, to draw attention to matters of concern where that seems appropriate, and above all to try to build into the discussion a recognition that what is being discussed in the context of conflict situations may have relevance in the peacetime environment, and vice versa. It is the collective view of the contributors participating in this endeavour that to examine the issues posed by rapid technological advance from a singular standpoint, such as the law of armed conflict, would be to omit vitally important perspectives reflected in other bodies of law and would thus risk producing a potentially distorted view. However, by looking at how the law grapples with new technologies in somewhat different contexts, it is possible that a deeper understanding, for example of what the law can and cannot do for us, will emerge. Certainly, the emerging technologies and their significance will be placed in a more comprehensive context which, alone, may help readers to devise their own appreciation of the relative merits and drawbacks of what is going on in the

scientific arena and of the regulatory or analogous measures that are being taken or that are required.

### 1.2 THE SOURCES OF TECHNOLOGICAL AND SCIENTIFIC INNOVATION

As was noted earlier, in the past it was often said that new technologies for peacetime applications tended to emerge from military applications. According to this appreciation, it was the pressing need to find technological solutions to problems on the battlefield that yielded new scientific insights which were then adapted to peacetime use. The development of radar during World War II and its subsequent evolution as one of the chief cornerstones of modern, safe civil aviation is but one among many examples of such a process. Perhaps this ‘military invention – subsequent civilian adaptation’ phenomenon had at least as much to do with the traditionally large expenditures that were devoted to armament and the conduct of military affairs, particularly in the lead up to and during the conduct of two world wars.

In much more recent times, we have witnessed somewhat diminishing military budgets coinciding with rapid growth in consumer spending. Arguably, it is nowadays the peacetime applications that tend to drive invention and refinement of new technologies that are then applied, where possible and appropriate, to military requirements.

By asking whether there are similarities in the challenges that new technologies pose in the military and peacetime environments and by trying to identify in which disciplines such similarities reside, this book tries to determine how those challenges are being identified, clarified and addressed; if there are inadequacies in the way the challenges are being addressed; what the implications of those inadequacies might be; what problems the identified technologies of the future seem likely to bring as they mature; and whether existing law helps us as we consider how to deal with these new products of science. In short, is this a process of technical and scientific advance that we face unassisted by existing legal provision, or do existing law, domestic and international, and established policy and doctrine include rules, norms and principles that can point the way towards methods of coping with the challenges that novel technologies seem destined to pose?

### 1.3 THE PURPOSE OF THE BOOK

In a sense, for the purposes of the discussion in this book, it does not really matter whether a technology first emerged to satisfy consumer demand or to

meet military need. The feature that is of most interest where the analysis in this book is concerned is the tendency for there to be a crossover between military and consumer uses of a number of pivotal technologies. It is that very duality of potential application that leads one to consider how law will develop to regulate the application of the respective technologies in these two distinct spheres of activity: the military on the one hand and the peacetime/civilian/consumer on the other.

What will be the challenges in formulating such regulation, what will be the purposes that it is designed to achieve, how do those challenges and purposes compare as between the different technologies and as between the military/armed conflict sphere and the peacetime/civilian/consumer sphere and what lessons can be learned from the diverse legal/policy approaches to addressing these various issues? It is the central purpose of this book to try to shed some light on these matters. No claim is made that the book answers all relevant questions, nor that it represents any kind of blueprint on how to approach the control of new technologies within society. Indeed, if anything, the book will tend to show that ‘one size does not fit all’ in the sense that regulatory measures must be designed with the specific technology, application and relevant surrounding circumstances in mind.

So, in working out how best to adjust legal and policy arrangements to take account of new ways of doing things, the peculiarities of the new science or method, the particularities of the context in which the new science or method is to be employed, the framework of relevant existing law and policy and the goals that any new law or policy is being designed to achieve are among the more important factors that must be taken into account. At best, this book aims to represent some ‘food for thought’. By reflecting on how we are seeking to address these matters at the time of writing, trends can be identified, ideas as to improved approaches may emerge and both the individual technological/scientific advances themselves and the legal and policy responses to each of them can, usefully it is hoped, be placed into a broader context.

The authors who have contributed to this book are therefore laying before the reader factual material relating to the technologies in question and their appreciation of the regulations, policies and initiatives that are being applied to those technologies in selected applications or, in the case of ‘over the horizon’ capabilities, that seem to be indicated by their characteristics and by their likely uses. It is then for the readers to develop their own appreciation assisted, it is hoped, by the discussions and analyses in the following pages. So this book seeks to draw attention to some at least of the factors that seem to be relevant in reaching any such conclusions on these important issues.

#### 1.4 STRUCTURE OF THE BOOK

The discussion will be framed by reference to particular emerging technologies each of which will be the subject of a dedicated chapter. Each chapter will seek to explain the technology concerned in terms that are as accessible as possible. As will be appreciated when the particular technologies are listed in the next section of the present chapter, formulating such explanations is by no means an easy task. There are, for example, controversies as to the meanings to be given to significant terms and there will be differences of view as to how the relevant existing law should be interpreted and applied. Nevertheless, each such technology will be described and the way in which law of armed conflict principles and rules apply to its potential use in an armed conflict setting will be explained.

As a distinct matter, the legal implications of particular applications of the technology in certain fields within the peacetime/civilian/consumer environment will be explored with a view to identifying where there are differences in the uses to which the technology is put in armed conflict and in peace – where there are similarities – and whether the differences translate into distinctions in the legal and policy provision that is made in relation to such uses of the technology. The purpose of the discussion is not to delve into the theoretical and philosophical underpinnings of comparative law. Rather, the objective is to look in a practical way at the legal challenges that these new technologies pose in fundamentally different situational settings and to note where there are similarities and where there are differences.

The book is divided into three parts. Part I comprises Chapters 1–4 and introduces the subject matter of the book, explains its purposes and gives a general explanation of the core legal principles and rules that address emerging military technologies in the military/armed conflict and in certain peacetime/commercial spheres. The purpose of this part is to give the reader a sufficient understanding of aspects of the applicable law to support a proper consideration of some of the legal challenges that will be addressed in the ensuing chapters. Part II, comprising Chapters 5–14, discusses each of the chosen technologies, applying a chapter to each such technology.<sup>2</sup> Part III draws the discussion in the preceding chapters together, considers notions that have been described as ‘convergence’ by referring to the technologies themselves and to the applicable law, and then seeks to draw some conclusions.

<sup>2</sup> It will, however, be noted that two chapters are devoted to human enhancement.



## 1.5 AN INTRODUCTION TO THE CHAPTERS

### 1.5.1 *Part I*

Chapter 2 will look at how the acceptability of military uses of new technologies is determined. It will do this by examining the international law principles and rules that differentiate between lawful and unlawful weapons and methods of warfare and will draw attention to the obligation of all States to determine whether new weapons they acquire and new ways of fighting that they adopt match the international law rules by which they are bound. This will provide the first part of the framework against which the analysis of particular technologies will be set.

Chapter 3 recognises that a comprehensive discussion of the law as it will apply to novel military activities in armed conflict must not be limited to the law as to the weapons that states may lawfully employ but must also consider the legal rules that regulate the actual conduct of hostilities. In heavily summarised form, therefore, Chapter 3 explains the core principles and rules of international law that regulate hostile operations in warfare.

Chapter 4 completes Part I of the book by dealing with applications of military technologies outside the scope of armed conflict and, thus, outside the regulatory regime of the law of armed conflict. The chapter addresses the issue through the useful lens of the domestic law of Australia and cites examples to illustrate the applicability of relevant domestic and human rights law. Reference is made to other, particular international law rule sets that apply to the employment of military technologies outside armed conflict, pointing out that these may also apply alongside the law of armed conflict. Particular mention is made of status of forces arrangements, rules as to liability and agency, export control obligations, some privacy-related regulations and review requirements related to acquisition of military technologies.

The particular regulations that apply when a specific technology is devoted to military or non-military peacetime activities will tend to depend on the peculiarities of that technology, on the kinds of activity for which it is to be employed and on relevant surrounding circumstances. Accordingly, in each of Chapters 5–14, existing, proposed or suggested peacetime regulatory arrangements are discussed by reference to the technology being addressed in that chapter and by reference to the peacetime applications of that technology that are being considered.

### 1.5.2 Part II

Chapter 5 starts the process of looking at specific technologies by addressing the use of cyberspace, a new environment in which hostilities will potentially be conducted. Initiatives, respectively, by International Groups of Experts and under the auspices of the UN General Assembly aimed at identifying the applicable rules are discussed and the conclusions so far reached by those processes are summarised and compared. Aspects of the positions taken by Russia and China are noted and proposals for a Code of Conduct are explained. In the peacetime/commercial context, the policy and legal challenges posed by hacking and by the Internet of Things are considered, e.g., by reference to the law applicable to human rights and to data protection.

Chapter 6 takes the analysis further by looking at emerging automation and autonomy technologies. Much has been discussed and written on these topics, particularly as they apply to the conduct of daily life and of warfare. The chapter proposes an interpretation of the respective terms, assesses the legal challenges that their use in warfare implies, considers some potential peacetime applications and determines how law and policy will regulate such uses. The use of autonomous surgery techniques, the rules and guidance on the use of autonomy in civil aviation and the emerging plans for testing and ultimate use of driverless cars on the public roads are the chosen peacetime applications that are considered.

Chapter 7 examines human enhancement technologies. After differentiating between enhancement and therapy and summarising the history of military human enhancement, the chapter explains many of the techniques that are currently available. Enhancing physical capabilities, cognitive performance, pharmacological approaches, neuro-enhancements including implanted neural interfaces, memory restoration and neurostimulation are among the techniques that are explained, citing in each case relevant examples. Some applicable rules of the law of armed conflict are considered, ethical challenges and opportunities are addressed and the discussion is set against the context of the use of enhancements in society, particularly in the sporting and employment settings.

Chapter 8 continues the exploration of issues raised by human enhancement technologies. Building on the discussion in the previous chapter, this contribution begins by examining the question of whether and under what circumstances we might consider that individuals who enhance their natural abilities might be considered something other than human – and what that might mean for their treatment under the law. Biochemical enhancement,