

Contents

<i>Acknowledgements</i>	<i>page xi</i>
<i>Table of cases</i>	xiii
<i>List of abbreviations</i>	xvi
1 The world in which we live and fight	1
1 Computer network attacks	4
2 Law and war in the internet age	8
3 Societal trends generally	11
3.1 The information revolution and digitisation	11
3.2 Globalisation, interdependency and the changing world order	17
3.3 The rise of the knowledge economy	20
4 Military trends	21
4.1 A change of purpose	23
4.2 Network-centric warfare and effects-based operations	24
4.3 Outsourcing and civilianisation	25
5 Terminology and definitions	27
5.1 New laws for old?	28
5.2 Methodology	30
5.3 A word about examples and hypotheticals	31
6 Conclusion	32
PART I Jus ad bellum	
2 Computer network attacks as a use of force in international law	37
1 Force defined as armed force	40
2 Definition of armed force	49

viii CONTENTS

2.1	State actions	53
2.2	Theories of force – scholastic writings	58
3	Computer network attacks as a use of force	62
3.1	Characteristics of computer network attacks	65
4	Conclusion	74
3	Armed attack and response in the digital age	75
1	Armed attack	76
1.1	Anticipatory self-defence	82
1.2	Pinprick attacks or accumulation of events theory	93
2	Self-defence against non-state actors	95
3	Attribution	99
4	Necessity and proportionality	102
5	Countermeasures against unlawful acts	105
6	Security Council authorisation and collective measures	109
7	Conclusion	113

PART II Jus in bello

4	The applicability of the laws of armed conflict to computer network attacks	117
1	Armed conflict	118
1.1	The requirement of armed force	122
1.2	Intervention of the armed forces	123
2	Application to computer network attacks	126
2.1	Application during conventional armed conflict	127
2.2	Computer network attack on its own	129
2.3	Computer network attacks in support of conventional attacks	134
3	Territory	134
4	Conclusion	137
5	Participants in conflict: combatant status, direct participation and computer network attack	139
1	Combatant status	140
1.1	Requirements of combatant status	144
1.2	Saboteurs and spies	151
2	Direct participation by civilians	159
2.1	Requirements of direct participation	161
2.2	Offensive computer network attack	167
2.3	Computer network attack system support	167
2.4	Generic IT support	170

2.5	Mercenaries	172
3	Child soldiers	175
4	Conclusion	178
6	Targeting and precautions in attack	179
1	The principle of distinction	180
2	Legitimate military objectives	184
2.1	Nature, location, purpose or use	185
2.2	Effective contribution to military action	188
2.3	Definite military advantage	190
3	Dual-use technology	193
4	Protection of civilian objects	195
4.1	Attacks and operations	196
4.2	Indiscriminate attacks	202
5	Proportionality	205
5.1	Knock-on effects	207
5.2	Dual-use systems	208
6	Precautions in attack	209
6.1	Verification of military objectives	211
6.2	Choice of weapons	212
6.3	Choice of targets	216
7	Precautions against the effects of attacks	217
7	Measures of special protection	220
1	The environment	221
1.1	Additional Protocol I	222
1.2	ENMOD Convention	224
1.3	Other protections	226
2	Cultural property	227
2.1	The legal framework	228
2.2	Attacks on, and damage to, digital works	233
2.3	Theft, pillage or misappropriation of digital works	235
3	Installations containing dangerous forces	239
4	Objects indispensable to the survival of the civilian population	243
5	Hospitals and other medical units	244
5.1	Location and access to medical databases	244
5.2	Hospital ships	247
6	Non-defended localities and demilitarised zones	247
6.1	Non-defended localities	248
6.2	Demilitarised zones	248

8 Means and methods of warfare	250
1 Law of weaponry	251
1.1 General principles	252
1.2 Explicit prohibitions of weapons	258
1.3 Article 36 obligations	260
2 Perfidy and ruses of war	261
2.1 Ruses of war	261
2.2 Perfidy	263
2.3 Misuse of protected symbols and emblems	264
3 Destruction and seizure of property	265
3.1 Booty	270
3.2 Occupied territory	272
3.3 Pillage and plunder	274
3.4 Enemy-owned property on the territory of a belligerent	276
4 Conclusion	277
Concluding remarks	279
<i>Appendix 1 Selected computer network attack examples</i>	281
<i>Appendix 2 Glossary of selected computing terms</i>	293
<i>Bibliography</i>	297
<i>Index</i>	321

Table of cases

- Nawar v. Minister of Defence et al.* (1985) 39(3) Piskei Din 449, Israel Supreme Court. 268, 270, 271, 272
- The Caroline Case* (1837) 29 BFSP 1137–1138. 84–5, 87, 92, 102
- Case Concerning Armed Activities on the Territory of the Congo (Democratic Republic of the Congo v. Uganda)* (2005), International Court of Justice. 40, 95, 97, 99, 102
- Case Concerning Military and Paramilitary Activities in and against Nicaragua (Nicaragua v. United States of America) (Merits)* (1986) ICJ 14, International Court of Justice. 40, 46–8, 50, 52, 60, 66, 76–9, 85, 94, 96, 103, 105–6, 151
- Case Concerning Oil Platforms (Islamic Republic of Iran v. United States of America)* (2003), International Court of Justice. 77, 79–80, 95, 102–3, 106
- Case Concerning the Gabčíkovo-Nagymoros Project* (1997) ICJ Reports 3, International Court of Justice. 107
- Case Concerning the Land and Maritime Boundary between Cameroon and Nigeria (Cameroon v. Nigeria: Equatorial Guinea Intervening)* (2002) ICJ Reports 303, International Court of Justice. 95
- Case Concerning the United States Diplomatic and Consular Staff in Tehran (United States v. Iran)* (1980) 74 AJIL 746, International Court of Justice. 52
- Cession of Vessels and Tugs for Navigation on the Danube Case* (1921) 1 RIAA 97. 271
- Corfu Channel Case (UK v. Albania) (Merits)* (1949) ICJ Reports 4, International Court of Justice. 47, 71
- Cuba Submarine Telegraph Co.* (1923) 6 RIAA 118. 273
- Eastern Extension, Australasia and China Telegraph Co. Claim* (1923) 6 RIAA 112. 273

xiv TABLE OF CASES

- Ex p Quirin et al.* (1942) 317 US 1, Supreme Court of the United States. 152–3
- Finding of the International Commission of Inquiry Organized under Article 9 of the Convention for the Pacific Settlement of International Disputes, of July 29, 1899 (the Dogger Bank Incident)* (1905) 2 AJIL 931–936, The International Commission of Inquiry between Great Britain and Russia arising out of the North Sea incident. 120, 133
- Re Flesche* (1949) 16 *International Law Reports* 266, Holland, Special Court of Cassation. 157, 159
- Legal Consequences of the Construction of a Wall in Occupied Palestinian Territory* (2004) ICJ 136, International Court of Justice. 40, 85, 97, 99
- Legality of the Threat and Use of Nuclear Weapons* (1996) ICJ 226, International Court of Justice. 28, 30, 59, 64–5, 102, 128–9, 139, 180, 195, 205, 226, 252–3, 256–8, 273
- Legality of the Use by a State of Nuclear Weapons in Armed Conflicts* (1996) ICJ 26, International Court of Justice. 86
- The Lotus* (1927) Series A No. 10, Permanent Court of International Justice. 155
- Osman Bin Haji Mohamed Ali and Another v. the Public Prosecutor* (1969) 1 AC 430, Privy Council (Malaysia). 144, 152–3
- Partial Award, Civilians Claims, Eritrea's Claims 15, 16, 23 & 27–32 between the State of Eritrea and the Federal Democratic Republic of Ethiopia* (2004), Eritrea Ethiopia Claims Commission. 276–7
- Partial Award, Loss of Property in Ethiopia Owned by Non-Residents, Eritrea's Claim 24 between the State of Eritrea and the Federal Democratic Republic of Ethiopia* (2005), Eritrea Ethiopia Claims Commission. 276
- Prosecutor v. Dario Kordic and Mario Cerkez (Appeal)* (2004) Case No. IT-95–14/2-A, International Criminal Tribunal for the Former Yugoslavia, Appeals Chamber. 234–5
- Prosecutor v. Dragoljub Kunarac et al.* (2002) Case No. IT-96–23 and 23/1, International Criminal Tribunal for the Former Yugoslavia. 135
- Prosecutor v. Drazen Erdemovic* (1997) Case No. IT-96–22-A, International Criminal Tribunal for the Former Yugoslavia, Appeals Chamber. 31
- Prosecutor v. Dusko Tadic* (1997) 36 ILM 908, International Criminal Tribunal for the Former Yugoslavia. 97, 161
- Prosecutor v. Dusko Tadic (Interlocutory Appeal on Jurisdiction)* (1995) Case No. IT-94–1-AR, International Criminal Tribunal for the Former Yugoslavia, Appeals Chamber. 122, 124, 130, 151, 180, 209, 253, 263

- Prosecutor v. Jean-Paul Akayesu* (1998) Case No. ICTR-96-4-T, International Criminal Tribunal for Rwanda. 124, 150, 159
- Prosecutor v. Kupreškić* (2000) Case No. IT-95-16-T, International Criminal Tribunal for the Former Yugoslavia. 202, 209, 218
- Prosecutor v. Miodrag Jokic (Sentencing Judgment)* (2004) Case No. IT-01-42/1-S, International Criminal Tribunal for the Former Yugoslavia. 234
- Prosecutor v. Mladen Naletilic and Vinko Martinovic* (2003) Case No. IT-98-34-T, International Criminal Court for the Former Yugoslavia. 274
- Prosecutor v. Moinina Fofana and Allieu Kondewa (Decision on Preliminary Motion Based on Lack of Jurisdiction (Child Recruitment))* (2004) Case No. SCSL-04-14-T, Special Court for Sierra Leone. 275
- Prosecutor v. Norman (Decision on Preliminary Motion Based on Lack of Jurisdiction (Child Recruitment))* (2004) Case No. SCSL-04-14-AR72(E)-131, Special Court for Sierra Leone. 177
- Prosecutor v. Zejnil Delalic et al. (Celebici)* (1998) Case No. IT-96-21-T, International Criminal Tribunal for the Former Yugoslavia. 237
- The Public Committee against Torture in Israel et al. v. the Government of Israel et al.* (2007) 46 ILM 375, Supreme Court of Israel. 161
- Public Prosecutor v. Koi et al.* (1968) AC 829, Privy Council. 144, 150
- R v. Boden* (2002) QCA 164, Court of Appeal of the Supreme Court of Queensland (Australia). 221-2, 243, 285
- R v. Wilkinson* (1999) 1 NZLR 403, Court of Appeal (New Zealand). 21
- Rivard v. United States* (1967) 375 F. 2d 882, United States Court of Appeals, 5th Circuit. 156, 158
- Trial of Alfred Felix Alwyn Krupp von Bohlen und Halbach and Eleven Others (Krupp Trial)* (1948) X Law Reports of Trials of War Criminals 69, United States Military Tribunal, Nuremburg. 236, 238, 265-7
- Trial of Alois and Anna Bommer and Their Daughters* (1947) IX Law Reports of Trials of War Criminals 62, Permanent Military Court at Metz. 274-5
- Trial of Carl Krauch and Twenty-Two Others (I.G. Farben Trial)* (1948) X Law Reports of Trials of War Criminals 1, United States Military Tribunal, Nuremburg. 236
- Trial of Friedrich Flick and Five Others (Flick Trial)* (1947) IX Law Reports of Trials of War Criminals 1, United States Military Tribunal, Nuremburg. 233, 275