

# Contents

Foreword .....	VII
Foreword to the 1st Edition .....	IX
Literature .....	XVII
List of abbreviations .....	XIX
Table of figures .....	XXIII

## CHAPTER 1 SOME ASTROPHYSICAL AND MECHANICAL FACTS: 5 MINUTES PHYSICS AND MECHANICS

I. Outer space, the universe and what man can regulate .....	1
1. The universe — it is incomprehensively big .....	1
2. Our Earth space environment — the Sun and its planets .....	3
3. Space medicine .....	3
4. What can we learn from this? (Outer space as an environment adverse to humans) .....	5
II. How to go to outer space (orbital mechanics) .....	5
1. Orbital mechanics .....	5
2. Problems by leaving the Earth .....	7
3. Launching a rocket into outer space .....	8
4. Launchers .....	10
5. Reusable launch vehicles .....	11
6. Mini launchers .....	12
III. Outer space in the legal sense — an attempt of a definition .....	13
1. Where does outer space begin? .....	13
2. The grey area: mesospace .....	14
3. Outer space — a proposal for a definition .....	15

## CHAPTER 2 CONCRETE APPLICATIONS

I. Space transportation/launchers .....	17
II. Satellites .....	19
1. Broadcasting by satellites/satellite communications .....	20
2. Navigation satellites .....	20
3. Remote sensing by satellites .....	22
4. Small satellites and CubeSats .....	23
III. Space stations .....	24
IV. Space tourism .....	26
V. Unmanned spacecraft .....	26

## CHAPTER 3 HISTORY OF SPACEFLIGHT

I. Before 1957 .....	29
II. After 1957 .....	32

CHAPTER 4  
HISTORY OF SPACE LAW

I. Early writings .....	40
II. Space law-making in UNCOPUOS .....	41
III. The three phases of space law-making .....	42
IV. Space law-making outside the United Nations .....	45
1. Conference on Disarmament .....	45
2. UNIDROIT Space Assets Protocol .....	46
3. Space Debris Mitigation Guidelines .....	47
4. National space legislation .....	47
V. Other normative sources of space law .....	47
VI. The characteristics of space law .....	48
VII. The history of space law in a contemporary perspective .....	49

CHAPTER 5  
SPACE LAW AS A SELF-CONTAINED REGIME OR PART OF PUBLIC  
INTERNATIONAL LAW (ARTICLE III OST)?

I. Self-contained regimes and international law .....	51
II. Space law as <i>lex specialis</i> to general international law .....	53

CHAPTER 6  
SOURCES OF SPACE LAW

I. The first phase of space law-making (until 1979) .....	58
1. The Outer Space Treaty of 1967 (113 ratifications as at 1.3.2023) .....	58
a) The freedoms of outer space .....	59
b) Legal status of outer space .....	59
c) Applicability of general international law .....	59
d) Peaceful uses of outer space .....	59
e) Article V OST .....	59
f) Article VI OST .....	59
g) Article VII OST .....	60
h) Article VIII OST .....	60
i) Article IX OST .....	60
2. The Rescue Agreement of 1968 (99 ratifications as at 1.1.2023) .....	61
3. The Liability Convention of 1972 (98 ratifications as at 1.1.2022) .....	61
4. The Registration Convention of 1975 (74 ratifications as at 1.3.2023) .....	62
5. The Moon Agreement of 1979 (18 ratifications as at 1.1.2023) .....	62
II. The second phase of space law-making: UN GA Resolutions on particular human activities in outer space (1982–1996) .....	63
1. UN GA Resolution on Direct Broadcasting by Satellites .....	63
2. UN GA Resolution on Remote Sensing by Satellites .....	63
3. UN GA Resolution on Nuclear Power Satellites .....	63
III. The third phase of space law-making: UN GA Resolutions as means of interpretation of existing principles/concepts entailed in the treaties on space law (1996–2013 and ongoing) .....	64
1. The Space Benefits Declaration of 1996 .....	64
2. UN GA Resolution on the “Launching State” .....	65
3. UN GA Resolution on Registration Practice .....	65
4. UN GA Resolution on National Space Legislation .....	66
5. The UNCOPUOS Space Debris Mitigation Guidelines of 2007 .....	66

6. The Space Assets Protocol of March 2012 to the Cape Town Convention of 2001 .....	67
7. Other documents with relevance for normative regulation .....	68
CHAPTER 7	
MAIN LEGAL CONCEPTS OF SPACE LEGISLATION	
I. The Non-Appropriation Principle (Article II OST) .....	71
II. The Freedom of Exploration and Use (Article I, para 1 and 2 OST) .....	77
III. The Freedom of Scientific Investigation (Article I, para 3 OST) .....	78
IV. The Principle of the Peaceful Uses of Outer Space (Article IV OST) .....	79
V. The Principle of Astronauts as Envoys of Mankind/Astronauts in Distress (Article V OST and the 1968 Rescue Agreement) .....	80
VI. Activities of Non-Governmental Entities (Article VI OST and UN GA Resolution 68/74 on National Space Legislation) .....	81
VII. The Principle of Liability for Space Activities (Article VII OST and the Liability Convention and UN GA Resolution 59/115 on the “Launching State”) .....	82
1. International liability .....	85
2. Ultrahazardous activities .....	85
VIII. The Principle of Registration (Article VIII OST, the Registration Convention and Resolution 62/101 on Registration Practice) .....	87
IX. The Principle of Jurisdiction and Control (Article VIII OST) .....	90
X. On-orbit transfer: A legal challenge for the existing main legal concepts of space legislation .....	91
CHAPTER 8	
THE LEGAL REGIME OF ENVIRONMENTAL PROTECTION IN OUTER SPACE	
I. An overview on the sources .....	93
II. The use of nuclear power sources .....	95
III. The problem of space debris .....	97
CHAPTER 9	
COMMERCIAL USES OF OUTER SPACE	
I. The legal regime for commercial uses of outer space .....	107
1. General aspects .....	107
2. Examples .....	110
3. The legal regime contained in the Moon Agreement of 1979 .....	111
II. Trade and finance aspects of space activities .....	114
1. International trade aspects of space activities .....	115
2. Legal mechanisms for facilitating the financing of space activities .....	117
3. Satellite applications and investment law .....	119
CHAPTER 10	
MILITARY ACTIVITIES IN OUTER SPACE — THE PRINCIPLE OF PEACEFUL USES AS CONTAINED IN ARTICLE IV OST	
I. Use of military systems in outer space .....	123
II. The legal regime for the military uses of outer space .....	126
III. Other relevant instruments .....	129

CHAPTER 11  
NATIONAL SPACE LEGISLATION

I. Article VI, para 1, sentence 2 OST and UN GA Resolution 68/74 of 2013 as the legal basis for national legislation .....	131
II. Examples for national space laws .....	134
1. France .....	135
2. Russia .....	136
3. USA .....	136
III. Possible model legislation .....	137
1. The ILA model law of 2012 .....	137
Annex:	
The ILA Model Law as adopted by the Biannual ILA Conference 2012 in Sofia .....	139
2. UN GA Resolution 68/74 on National Legislation .....	146

CHAPTER 12  
LEGAL REGULATION FOR SPECIFIC SPACE APPLICATIONS

I. Satellites .....	149
1. Direct broadcasting by satellites .....	149
a) The allocation of frequencies by the ITU .....	149
b) The legal regime for direct broadcasting by satellites .....	153
2. Remote sensing by satellites .....	155
3. The use of nuclear power sources on board satellites .....	160
4. Navigation satellite systems (GPS, GALILEO, GLONASS, BEIDOU) .....	161
a) Organizational structure of the different GNSS systems .....	162
b) The Global Navigation Satellite System (GLONASS) .....	162
c) GALILEO .....	163
d) The Chinese BeiDou System .....	164
5. Other navigation systems .....	164
6. Some liability issues .....	165
II. The legal regime for the recovery of resources from celestial bodies .....	165
1. Current development .....	165
2. The basic legal order for recovery of the resources from celestial bodies .....	167
3. National initiatives .....	171
a) USA .....	171
b) Luxembourg .....	172
c) Assessment .....	172
4. The Solution: Creation of an International Legal Order .....	173
III. Space tourism/non-orbital flights .....	174
IV. The use of the International Space Station .....	176
1. The Beginnings .....	176
2. Legal basis .....	177
3. Legal elements of cooperation in outer space .....	178
a) Jurisdiction, control and property rights .....	178
b) User regime .....	178
c) Intellectual property .....	179
d) Crew: obligations and responsibilities .....	179
e) Criminal jurisdiction .....	179
f) Liability .....	180
4. Assessment and perspectives .....	180

V. Launching services .....	181
1. National launch acts .....	181
2. Launch service agreements .....	182
a) Cross-waivers of liability .....	184
b) Best efforts clauses .....	184
c) Insurance clauses .....	184
VI. Spaceports .....	185
1. Factual background and examples .....	185
2. Legal regulation for spaceports .....	186

CHAPTER 13  
INTERNATIONAL AND REGIONAL INSTITUTIONALIZED  
COOPERATION IN HUMAN ACTIVITIES IN OUTER SPACE

I. The United Nations .....	191
II. The International Telecommunication Union (ITU) .....	193
III. The World Trade Organization (WTO) .....	197
IV. The International Institute for the Unification of Private Law (UNIDROIT) ....	198
V. Intelsat/Inmarsat/Eutelsat/Intersputnik/Arabsat .....	198
VI. The European Space Agency (ESA) .....	201
VII. The World Intellectual Property Organization (WIPO), the International Civil Aviation Organization (ICAO) and the International Maritime Organization (IMO) .....	204
VIII. Arianespace, Airbus and (ex-)Spot Image .....	204
IX. Non-governmental organizations with relevance for space law-making .....	205
1. The International Institute of Space Law (IISL) .....	205
2. The International Law Association (ILA) .....	206
3. The European Centre for Space Law (ECSL) .....	206

CHAPTER 14  
SETTLEMENT OF DISPUTES

I. Dispute settlement as the ultimate goal for the regulation of conflicts .....	209
II. Dispute settlement mechanisms in space law .....	211
1. The Cosmos 954 Case of 1978 .....	211
2. Provisions in the treaties on space law relevant for dispute settlement .....	214
3. Other instruments .....	216
III. Conclusion .....	218

CHAPTER 15  
PERSPECTIVES

I. Uncertainty about the legal sources — a basis for the future? .....	221
II. From space tourism to space transportation as an upcoming activity .....	225
III. Guaranteeing a clean environment for the future — the problem of space debris remediation .....	226
IV. Space traffic management as the main challenge of the immediate future .....	228
V. Cyber law .....	230
VI. Exploration of the universe and space settlements .....	232

## UNITED NATIONS TREATIES ON OUTER SPACE

A. Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies .....	237
B. Agreement on the Rescue of Astronauts, the Return of Astronauts and Return of Objects Launched into Outer Space .....	243
C. Convention on International Liability for Damage Caused by Space Objects .....	247
D. Convention on Registration of Objects Launched into Outer Space .....	255
E. Agreement Governing the Activities of States on the Moon and Other Celestial Bodies .....	260
F. United Nations treaties depositary information .....	268
Index .....	269