



Terms and Conditions of Use of Digitised Theses from Trinity College Library Dublin

Copyright statement

All material supplied by Trinity College Library is protected by copyright (under the Copyright and Related Rights Act, 2000 as amended) and other relevant Intellectual Property Rights. By accessing and using a Digitised Thesis from Trinity College Library you acknowledge that all Intellectual Property Rights in any Works supplied are the sole and exclusive property of the copyright and/or other IPR holder. Specific copyright holders may not be explicitly identified. Use of materials from other sources within a thesis should not be construed as a claim over them.

A non-exclusive, non-transferable licence is hereby granted to those using or reproducing, in whole or in part, the material for valid purposes, providing the copyright owners are acknowledged using the normal conventions. Where specific permission to use material is required, this is identified and such permission must be sought from the copyright holder or agency cited.

Liability statement

By using a Digitised Thesis, I accept that Trinity College Dublin bears no legal responsibility for the accuracy, legality or comprehensiveness of materials contained within the thesis, and that Trinity College Dublin accepts no liability for indirect, consequential, or incidental, damages or losses arising from use of the thesis for whatever reason. Information located in a thesis may be subject to specific use constraints, details of which may not be explicitly described. It is the responsibility of potential and actual users to be aware of such constraints and to abide by them. By making use of material from a digitised thesis, you accept these copyright and disclaimer provisions. Where it is brought to the attention of Trinity College Library that there may be a breach of copyright or other restraint, it is the policy to withdraw or take down access to a thesis while the issue is being resolved.

Access Agreement

By using a Digitised Thesis from Trinity College Library you are bound by the following Terms & Conditions. Please read them carefully.

I have read and I understand the following statement: All material supplied via a Digitised Thesis from Trinity College Library is protected by copyright and other intellectual property rights, and duplication or sale of all or part of any of a thesis is not permitted, except that material may be duplicated by you for your research use or for educational purposes in electronic or print form providing the copyright owners are acknowledged using the normal conventions. You must obtain permission for any other use. Electronic or print copies may not be offered, whether for sale or otherwise to anyone. This copy has been supplied on the understanding that it is copyright material and that no quotation from the thesis may be published without proper acknowledgement.

**LIABILITY AND PEACEFUL, CIVIL SPACE ACTIVITIES AT
NATIONAL, REGIONAL AND INTERNATIONAL LEVELS:
SELECTED LEGAL ISSUES**

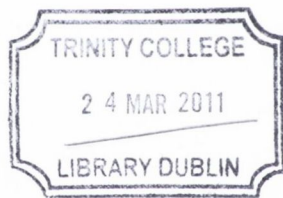
ZELDINE NIAMH O'BRIEN LL.B. (DUBLIN) B.L.

SUPERVISOR:

† DR GERNOT BIEHLER

SUBMITTED TO THE UNIVERSITY OF DUBLIN, OCTOBER 2009, IN
FULFILMENT OF THE REQUIREMENTS FOR ADMISSION TO THE
DEGREE OF DOCTOR IN PHILOSOPHY (PHD)

Volume I



THOS IS
8987.1

DECLARATION

I hereby declare that this thesis “Liability and Peaceful Space Activities at National, Regional and International Levels: Selected Legal Issues” has not previously been submitted for any degree at the University of Dublin or any other university, and that it is entirely my own work. I also agree that Trinity College Library may lend or copy the thesis upon request. This permission covers only single copies made for study purposes, subject to normal conditions of acknowledgment.

Signed: Zeldine N. O'Brien
Zeldine Niamh O'Brien

Date: 13th August 2010.

SUMMARY

The thesis “Liability and Peaceful Space Activities: Selected Legal Issues at National, Regional and International Levels” defines space activities by reference to the historical development of the space industry, its current and future prospects as well as the development of law. It assesses the choice between functionalism and spatialism in light of increased private commercial exploitation of space. There are several trends evident - first increased private commercialisation of space activities, second, the development of a private space transportation of persons industry and third, a movement away from binding regulation on space issues from COPUOS to soft law measures. It is in this context that the current regulation of liability and ancillary issues are examined. The ancillary issues include sovereignty, ownership and jurisdiction in outer space as well as insurance and are analysed in light of these trends. This examination is conducted at three levels – national, regional (European) and international.

Methodology: My methodology involved focusing first on primary sources of law. A detailed analysis of the relevant international instruments from the Committee on the Peaceful Uses of Outer Space is required, specifically the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies 1967 and the Convention on International Liability for Damage Caused by Space Objects 1972. Relevant customary international law as evinced by state practice is assessed. In particular, the documents relating to the Cosmos 954 claim which relied on both the Liability Convention and customary international law. In order to further examine the definitional issues, regard was had to the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space 1968, the Convention on Registration of Objects Launched Into Outer Space 1975 and the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies 1979. Reliance was placed on the travaux préparatoires where appropriate.

Bilateral and multilateral instruments were analyzed to determine the practice of not only States, but of international entities such as the European Space Agency (ESA), including the International Agreement governing the International

Space Station 1998 and ESA's council declaration on legal liability. Relevant primary sources from air law were identified, for example the Chicago Convention 1944 and the Warsaw and Montreal Conventions and used to provide comparative analysis. Both regional and domestic space law, including relevant case law where it arose, were then examined, specifically focusing on the laws of space-faring nations or member states of ESA, including *inter alia* United States' federal and domestic law and laws from Russia, Japan Australia and the United Kingdom. EU law was investigated to determine its potential application towards private commercial space activity, particularly space tourism. The examination of primary sources was relied on to deduce the theory of liability adopted and its effect on the lower order and reliance on secondary sources was used to determine the suitability of such a theory.

Utilization of texts, commentaries, articles, and other papers from space law and international law generally but also from conflicts, space history and economic tort theory gave a wider understanding of the issues and oriented the discussion within the larger framework. Secondary sources from *inter alia* the US, Australia, Germany, Japan, Russia, the Netherlands and Finland were used to gain a deeper understanding of the primary sources and other perspectives from across the academic community.

Findings: The first chapter provides a brief history of the development of space law, as well as answering some definitional issues, particularly the meaning of space activities, and examines some of the future trends in the space industry as projected by the Organisation for Economic Co-Operation and Development. The research found that the issue of the demarcation of air and space and the need for a legal boundary remains disputed between States at international level. The *corpus iuris* reflect the functional approach but frequently private sector practice acknowledges a boundary and Australia has taken the first steps to set out the limit of its regulatory authority. Historic reflection indicates that rocketry was the principal space activity but modern technology demonstrates a fusion of both air-breathing and rocket propulsions systems leading to a move away from such a narrow construction. For the purpose of the thesis, 'space activities' embraces those activities that occur both in the locus of outer space and which may occur in airspace and on earth and which contribute to the turnover of the space industry.

The second chapter examines the issues of sovereignty, ownership and jurisdiction in outer space. Space is not subject to claims of sovereignty by States by means of appropriation or otherwise according to Art.II of the Outer Space Treaty. The emerging commercial space industry is challenging this idea and suggests that private property rights may exist independent of appropriation. However, the common law precludes a division of appropriation from rights in property and it is submitted that claims to private property on the Moon or other celestial bodies by individuals must be viewed as precluded by Art.II. Ownership remains unaffected by presence in outer space but jurisdiction vests not in the State or the State of the natural or juridical person claiming ownership but in the State of registry. The means of resolving conflicts of law in relation to civil matters arising in contract and in tort where they arise on a space object is contrasted with the principles applicable for determining criminal jurisdiction.

The third chapter provides an economic analysis of the alternate theories of liability for bilateral and multilateral accidents both between strangers and parties with a market relationship and reflects on how this analysis compares and contrasts with the approach taken internationally in the Outer Space Treaty and the Liability Convention and in various national laws. Currently a no fault regime is applied to surface damage and damage to aircraft in flight while negligence is applied for damage sustained elsewhere. Such an approach fits with the conclusions of the economic analysis.

Chapter four examines the history of insurance in relation to space activities, the types of insurance available and the requirement for insurance under national law as well as the coupling of insurance or other financial guarantee scheme with liability in international law. It is not feasible to address liability or propose new liability regimes without examining the impact of insurance. This is particularly true in relation to strict liability regimes for ultra-hazardous activities where the liability is unlimited, as in essence, space insurance ensures that in reality, the financial costs are circumscribed. In light of the proposals in Chapter VII, it is submitted that any system addressing liability must also provide a means of guaranteeing that such liability will be met and victims will not be left without compensation in the event of a successful suit. While this would require States to impose insurance or some other

financial guarantee obligations on private entities, it is submitted that this would not in effect be radically different from the current national law which makes such demands in any case.

Chapter five examines liability under national law for space activities. It analyses the position of state agencies and commercial entities under various national laws in relation to liability and in doing so focused on the two central means of limiting liability, *viz*, exclusion clauses and waivers. In the absence of an international regime as in air law, the liability of private actors in space is regulated by the national or federal, as the case may be, laws. The suggestions in Chapter VII will not preclude the application of tort or contract where damage is entirely an internal matter of the State. Liability in both tort and contract is examined as it may arise between parties engaged in space activities as well as to third parties. The torts of trespass, nuisance, negligence and *Rylands v Fletcher* are considered. The methods of escaping the rigors of waivers and exclusion clauses where possible as set out in the case law, the common law and statute are examined as is the impact of various consumer protection measures both at national.

The regulation of space activities at regional level is examined in Europe in chapter six where the relationship of ESA and the EC is considered as well as the functions of the former and the competence of the latter. The chapter includes a case study on the potential application of European consumer law, tying into the arguments made in Chapter five of space tourist as consumers. In light of the protection of consumers at European level, the question of whether the approaches to the limitation of liability adopted in the US at federal and national level are suitable for Europe. It is submitted that complete waivers of all liability would clearly be incompatible with consumer protection. However, a waiver of liability arising from the inherent risks of space flight as the maximum exclusion may be seen to strike a fairer balance. Nonetheless, such a clause may be subject to the rigors of the Unfair Terms Directive.

The seventh chapter analyses the international position with respect to liability caused by space activities under the Outer Space Treaty and the Liability Convention. It considers liability generally and liability for environmental harm separately given the specific principles of environmental law applicable only to the

latter. It analyses the obligations on international intergovernmental agencies, states, state agencies and commercial entities to preserve the space environment and the possibilities for liability in the event of non-compliance with these obligations. Ultimately, it reaches the conclusion that liability for damage caused by space objects by private operators, due to the potential international aspect to such damage, should be regulated at international level. The Rome Convention of 1952 is assessed as a potential system though it is found to have some shortcomings; such difficulties may be overcome by adopting a modified system. In relation to liability as and between parties, it is recommended that States adopt a system similar to that set out in the Montreal Convention of 1999. The final recommendation addresses the need for a system to regulate the liability of private space operators arising from space debris that may operate in parallel to the existing regime and which applies the polluter-pays principle. To this end, the approach of maritime law to oil pollution is examined to assess its potential to operate an equivalent scheme in international space law.

ACKNOWLEDGEMENTS

I am grateful to many people for their help, both direct and indirect, in researching and writing this thesis. I would like to acknowledge my gratitude to my late supervisor Dr Gernot Biehler whose guidance, support and comments during the process of research and writing were both inspiring and enlightening. This thesis is dedicated to him. I would also like to thank Dr Neville Cox for his invaluable assistance and direction. I also wish to thank Prof Dr Stephan Hobe for his invitation to avail of the library at the Institute of Air and Space Law at the University of Cologne and the assistance of Dr. Jörn Griebel while I was there. Others have also helped me in a myriad of ways from answering my questions to forwarding me copies of research materials. I wish to express my gratitude to Prof Setsuko Aoki, Prof William Binchy, Mr P.J. Blount, Prof Hilary Delany, Dr Oran Doyle, Prof Dr Stephan Hobe, Mr Gerhard Lotz, Dr Eoin O'Dell, Prof Yvonne Scannell, Dr Bernard Schmidt-Tedd, Mr Dermot Sheehan and Prof Peter Van Fenema. Parts of this thesis were also presented at various proceedings including the IISL's Colloquium on the Law of Outer Space, the Society of Legal Scholars Centenary Conference and the Dublin Legal Workshop. I would like to take this opportunity to thank the European Space Agency and the University of Dublin Graduate Studies Committee for providing the financial support to present my findings personally at the IISL Colloquiums over the previous years and to Dr Frans Von Der Dunk and Dr Sa'id Mosteshar for presenting my research in summary when I could not. I also wish to gratefully acknowledge the Postgraduate Studentships received from 2005-2008 and 2008-9 from the Board of Trinity College Dublin.

On a personal note, I wish to thank my parents, Gloria and Raymond, and my brother Carl for their encouragement and ongoing support throughout my time at Trinity. My apologies if I have inadvertently omitted anyone to whom acknowledgement is due. Regardless of the assistance received, I remain solely responsible for any shortcomings.

Thank you all.

TABLE OF CONTENTS

DECLARATION.....	ii
SUMMARY	iii
ACKNOWLEDGEMENTS.....	viii
TABLE OF CONTENTS	ix
TABLE OF PRINCIPAL ABBREVIATIONS AND ACRONYMS	xv
TABLE OF CASES	xxii
TABLE OF INTERNATIONAL MATERIALS.....	xlv
International Documents	xlv
Agreements, Conventions, Declarations and Treaties	xlv
Other International Materials	liii
Community Materials	lviii
Regulations.....	lviii
Directives	lix
Other Community Materials	lx
TABLE OF NATIONAL LEGISLATION, PROPOSED LEGISLATION AND REGULATIONS..	lxiv

Volume 1

CHAPTER I: HISTORY, DEFINITION AND FUTURE TRENDS	1
1. Introduction.....	1
2. A Brief History of Space Activities	2
2.1 Early and Modern Rocketry	2
2.2 The Space Race	3
3. The Space Industry.....	8
3.1 The Irish Space Industry	8
3.2 The European Space Industry	10
3.3 The American Space Industry	11
3.4 The Global Space Industry.....	13
4. The Development of International Space Law	14
5. Definition of Space Activities.....	18
5.1 Definition of Space	18
5.1.1 <i>Functionalism</i>	20
5.1.2 <i>Spatialism</i>	22
5.1.3 <i>Current Practice</i>	26
5.2 Definition of Activities	28
6. Future Trends	30
6.1 The OECD's View	30
7. Conclusion	31
 Chapter II: Sovereignty, Ownership and Jurisdiction.....	 34
1. Sovereignty	35
1.1 Sovereignty and Freedom of Exploration and Use of Outer Space	35
1.2 Sovereignty and Lunar Resources.....	40
1.3 Private Appropriation of Space and its Resources.....	42
2. Ownership	47

2.1 Space Objects	47
2.1.1 <i>Ownership of Objects in Space</i>	50
2.2 Ownership of Intellectual Property and the International Space Station ...	50
3. Jurisdiction	53
3.1 Introduction	53
3.2 Jurisdiction over Space Objects, their Component Parts and Personnel....	54
3.3 Nationality of Space Objects.....	58
3.4 Criminal Jurisdiction.....	60
3.5 Civil Jurisdiction	69
3.5.1 <i>U.S. Practice</i>	70
3.5.2 <i>Irish Practice on the Exercise of Jurisdiction</i>	71
3.5.2.1 <i>The Traditional Rules</i>	72
3.5.3 <i>European Choice of Law</i>	74
3.5.3.1 <i>Brussels Convention, Brussels I Regulation and the Lugano Convention</i>	74
3.5.3.2 <i>Regulation 44/2001</i>	74
3.5.3.2.1 <i>Contracts of Insurance</i>	80
3.5.3.2.2 <i>Consumer Contracts</i>	81
3.5.3.2.3 <i>Inter-Related Claims</i>	83
3.5.3.2.4 <i>Exclusive Jurisdiction</i>	84
3.5.4 <i>Forum Non Conveniens</i>	85
3.5.4.1 <i>Forum non Conveniens and Regulation 44/2001</i>	87
3.5.5 <i>Forum Shopping</i>	89
3.5.6 <i>Other Civil Matters</i>	91
3.5.7 <i>Conflicts of Law in the Law of Air</i>	92
3.6 Choice of Law	93
3.6.1 <i>Choice of Law and Non-European States</i>	96
3.6.1.1 <i>Contract</i>	96
3.6.1.2 <i>Tort</i>	98
3.7 Recognition and Enforcement.....	99
3.7.1 <i>Recognition</i>	99
3.7.2 <i>Enforcement</i>	99
4. Conclusion.....	100
Chapter III: Theories of Liability	101
1. Introduction	102
2. Negligence v Strict Liability	103
2.1 Social Utility and Strict Liability Systems.....	105
2.2 Economic Efficiency and Theories of Liability	107
2.3 Fairness Rationale for Strict Liability	114
2.3.1 <i>Space Activities as Ultra-Hazardous</i>	115
2.3.1.1 <i>Space Activities and Non-Natural User</i>	131
2.4 Other Fairness-Based Arguments.....	132
3. Applicable Theory in International Law	134
4. Applicable Theory in Domestic Law	137
5. Conclusion on Theories of Liability	140
Chapter IV: Insurance, Indemnities and Space Activities.....	141
1. Introduction	142

2. Insurance and Space Activities	143
3. Types of insurance	147
3.1 Pre-Launch Insurance	147
3.2 Launch Insurance	148
3.3 In-Orbit Insurance	149
3.4 Third Party Liability Insurance	150
3.5 Liability to Space Flight Participants	151
3.6 Other Available Types of Insurance	152
4. The Scope of the Insurer's Liability	153
4.1 Mandatory Insurance	155
4.1 International Insurance Requirements	155
4.2 Domestic Space Law Insurance Requirements	157
4.2.1 <i>Australia</i>	157
4.2.2 <i>Brazil</i>	159
4.2.3 <i>France</i>	160
4.2.4 <i>The Republic of Korea</i>	161
4.2.5 <i>The Netherlands</i>	161
4.2.6 <i>Russia</i>	162
4.2.7 <i>The United Kingdom</i>	163
4.2.8 <i>The United States of America</i>	163
4.2.8.1 <i>NASA</i>	166
4.2.9 <i>Other National Law Provisions</i>	170
5. Indemnities	171
6. The European Space Agency (E.S.A.)	173
3. Conclusion	173
CHAPTER V: LIABILITY IN NATIONAL LAW	175
1. Introduction	175
2. Liability of the State	177
2.1 Liability of Space Agencies	179
2.2 Liability of Government Contractors	181
2.3 Liability to Non-Nationals injured within State	182
2.4 Liability to Private Contractors	182
3. Liability to the State	186
4. Liability and Third Parties	189
4.1 Trespass and Property Rights	189
4.2 Nuisance	195
4.3 The Rule in <i>Rylands v Fletcher</i>	196
4.4.1 <i>Vicarious Liability for Negligence of Servants or Employees</i>	199
5. Inter-Party Liability in Contract and Tort	200
5.1 Inter-Party Liability under U.S. Federal Law	200
5.2 Waivers between Parties of Unequal Bargaining Power	206
5.2.1 <i>Definition of a 'Space Tourist'</i>	206
5.2.2 <i>The Space Tourist as a Consumer</i>	207
5.3 Waivers, Spaceflight Participants and Licensees/Permittees	210
5.3.1 <i>Virginia's Spaceflight Liabilities and Immunities Act 2007</i>	212
5.3.2 <i>Florida's Informed Consent to Spaceflight Act</i>	214
5.3.3 <i>New Mexico's Spaceflight Informed Consent Act</i>	215
5.3.4 <i>Waivers in Irish Law</i>	216

5.3.5 Freedom to Contract and Exclusion Clauses.....	219
5.3.6 Exclusion Clauses Generally	220
5.3.7 Exclusion Clauses in Non-Standard From Contracts	222
5.3.8 The Sale of Goods and Supply of Services Act 1980.....	230
6. Conclusion.....	233

Volume II

CHAPTER VI: REGIONAL LAW AND SPACE ACTIVITIES: EUROPE, ESA AND A CASE

STUDY OF EC CONSUMER LAW.....	239
1. Introduction	240
2. The European Space Agency	241
2.1 History and Competence	241
2.2 Scope of Liability	242
2.3 Conclusion.....	246
3. The European Communities.....	246
3.1 History and Competence	246
3.2 EC Space Policy	248
3.3 EC and ESA	248
3.4 Conclusion.....	252
4. A Case Study on EC Consumer Law	252
4.1 The Freedom to Provide Space Services.....	253
4.2 Protection of the Tourist.....	255
4.3 A Brief History of EU Consumer Policy	257
4.4 Objectives and Principles of Community Consumer Law	258
4.5 The Image of the Consumer	259
4.6 Consumer Rights in Community Law.....	260
4.7 The Unfair Terms Directive	262
4.8 The Directive on Liability for Defective Products.....	263
4.9 The Distance-Selling Directive	265
4.10 The Package Holidays Directive	266
4.10.1 Definition of a Package	267
4.10.1.1 'Pre-Arranged'	268
4.10.1.2 'Inclusive'	268
4.10.1.3 'Transport'	268
4.10.1.4 'Accommodation'	269
4.10.1.5 'Other Tourist Service'	269
4.10.2 The Parties to the Contract	271
4.10.3 Obligations of Operators	272
4.10.3.1 Pre-Contractual Responsibility.....	272
4.10.3.2 Pre-Departure Obligations	273
4.10.3.3 Post-Departure Obligations	274
4.10.4 Financial Obligations	276
4.10.5 Liability for Damages.....	277
4.10.5.1 <i>Leitner v TUI</i>	278
4.11 Advertising Law	279
4.11.1 Application of Directive 84/450 to Space Services	280
4.11.1.1 Implementation of the Directive	281
4.11.2 Comparative Advertising.....	283

4.11.3 <i>Actions Against Misleading and Comparative Advertisers</i>	287
4.11.4 <i>Other Directives</i>	287
4.11.5 <i>Minimal Standards and National Laws</i>	289
4.11.6 <i>Challenging National Advertising Legislation</i>	289
5. Conclusion	293
CHAPTER VII: LIABILITY IN INTERNATIONAL LAW	295
Part I: General Liability	297
1. Introduction	297
2. Regulation of Liability under the <i>Corpus Iuris Spatialis</i>	300
2.1 The Scope of Damage	301
2.1.1 <i>Psychological Injury</i>	302
2.1.2 <i>Moral Damage</i>	303
2.1.3 <i>Use or Dissemination of Remote Sensing Data</i>	304
2.1.4 <i>Indirect Damage</i>	304
2.2 Liability for Damage to the Surface of Earth.....	305
2.3 Liability for Damage to Crafts in Airspace.....	306
2.4 Liability for Damage to Outer Space	307
2.5 The Liable Party	308
2.5.1 <i>International Intergovernmental Agencies</i>	309
2.6 Multiple Liable Parties and Indemnification	310
2.8 Claimants under the <i>Corpus Iuris</i>	312
2.9 Time Limits.....	313
2.10 Compensation.....	314
2.11 Procedure	314
2.12 Convention Interaction with Other Law	317
2.13 Difficulties Posed by the Current International Law	318
3. Regulation of Liability under General Principles of International Law	319
4. <i>Cosmos 954</i>	319
4.1 Other Space Object Incidents.....	321
5. Liability for Breach of International Responsibility	322
6. Challenges for the Current Regime.....	325
7. Regulating Liability of Private Parties for Damage.....	325
7.1 Liability of Private Parties for Damage to the Surface	326
7.2 Liability to Spaceflight Participants.....	331
7.2.1 <i>The Warsaw Convention</i>	333
7.2.2 <i>The Montreal Convention</i>	338
7.2.3 <i>Warsaw or Montreal Convention for Space Law?</i>	339
8. Conclusion	346
Part II: Environmental Liability	348
9. Introduction	348
10. Harm, Damage and Pollution.....	349
10.1 Environmental Harm and Damage.....	349
10.2 Pollution	352
10.2.1 <i>Space Debris</i>	354
11. Reasons for Regulation of Space as an Environmental Issue	357
11.1 <i>Intergenerational Equity</i>	358
11.2 <i>Human Health and Safety and Self-Interest Rationales</i>	359
11.3 <i>Economic Rationales</i>	360

11.4 To Protect the Space Environment on its Own Merits	361
12. Level of Regulation	363
13. Current Regulation of the Space Environment	365
13.1 Substantive Regulation of Environmental Damage	366
13.1.1 Regulation of Environmental Damage under the <i>Corpus Iuris</i>	366
13.1.1.1 Environmental Damage to the Surface of the Earth and Airspace ..	366
13.1.1.2 Environmental Damage to Outer Space.....	369
13.1.2 Regulation of Environmental Damage under General International Law	
.....	369
13.1.3 Environmental Principles.....	373
13.1.3.1 The Precautionary Principle	373
13.1.3.2 Prevention	375
13.1.3.3 Polluter Pays Principle	377
13.2.1 Duty to Inform or Notify.....	379
13.2.2 Duty to Consult.....	382
13.2.3 Power to Request a Consultation.....	382
14. Responses to Actual Environmental Damage	385
14.1 Compensation and Restitution	385
14.2 Remediation	388
14.2.1 Remediation and Space Debris	389
14.3 The Forum for Disputes	390
15. Responses to Anticipated Environmental Damage	391
15.1 Prevention and Mitigation.....	391
16. Comparative Responses	394
16.1 Addressing Liability for Oil Pollution	395
17. Conclusion.....	398
BIBLIOGRAPHY	401

TABLE OF PRINCIPAL ABBREVIATIONS AND ACRONYMS

A

- A.B.Q.B. – Alberta Queen’s Bench Reports
A.C. – Appeal Cases
A.D. – Anno Domini
AEB – Agência Espacial Brasileira
AFDD – Air Force Doctrine Document (U.S.)
A.I.A.A. – American Institute of Aeronautics and Astronautics
Am J. Int’l L – American Journal of International Law
ARABSAT – Arab Corporation for Space Communications
Art. – Article
Arts – Articles
All E.R. – All England Reports
Ann. Air & Space L. – Annals of Air and Space Law
ASA – Austrian Space Agency
ASAT – Anti-Satellite Weapon
ASC – Agence Spatiale Canadienne
ASI - Agenzia Spaziale Italiana
ASILP – American Society of International Law Proceedings
AST – Office of Commercial Space Transportation (U.S.)
ATV – Automated Transfer Vehicle (Jules Verne)

B

- BNSC – British National Space Centre
B.Y.I.L. – British Yearbook of International Law

C

- Calif. L.R. – California Law Review
CALT– China Academy of Launch Vehicle Technology
Ch. – Chapter
CDTI – Centro para el Desarrollo Tecnológico Industrial
C.L.R. – Commonwealth Law Reports

CNES – Centre National d'Études Spatiales
CNSA – China National Space Administration
CONAE – Comision Nacional de Actividades Espaciales
CONIDA - Comisión Nacional de Investigación y Desarrollo Aeroespacial
COTIF – Convention concerning International Carriage by Rail
COPUOS – Committee on the Peaceful Uses of Outer Space
CSA – Canadian Space Agency
CSIRO – Commonwealth Scientific and Research Organisation
CSLAA – Commercial Space Launch Amendments Act 2004
C.U.P. – Cambridge University Press

D

DARS – Digital Audio Radio Services
DBS – Direct Broadcasting Services
DETE – Department of Enterprise, Trade and Employment (ROI)
Dist. – District
DLR – Deutsche Zentrum für Luft- und Raumfahrt
DSRI – Danish Space Research Institute
DTH TV – Direct to Home Television Service

E

EADS – European Aeronautics, Defence and Space Company
EC – European Community
E.C.R. – European Court Reports
ECSL – European Centre for Space Law
ECtHR – European Court of Human Rights
E.J.I.L. – European Journal of International Law
ELDO – European Space Vehicle Launcher Development Organization
ESA – European Space Agency
ESRO – European Space Research Organisation
ESTEC – European Space Research and Technology Centre
EUECJ – EU Electronic European Court Reports
EUMETSAT – European Organization for the Exploitation of Meteorological Satellites

EUTELSAT – European Telecommunications Satellite Organisation

EWHC – England and Wales Electronic High Court Reports

F

FAA – Federal Aviation Administration (US)

FECA – Federal Employees Compensation Act (US)

Fla. L. Weekly – Florida Law Weekly

FTCA – Federal Tort Claims Act (US)

G

GEO – Geostationary Orbit

GMES – Global Monitoring for Environment and Security

H

Harv. L. Rev. – Harvard Law Review

H.C.A. – High Court of Australia

HTOHL – horizontal take-off, horizontal landing

I

IADC – Inter-Agency Space Debris Co-Ordinating Committee

Ibid. – Ibidem

I.C.J. – International Court of Justice

I.C.L.Q. – International Comparative Law Quarterly

IEHC – Irish Electronic High Court Reports

IESC – Irish Electronic Supreme Court Reports

I.G.A. – Inter-Governmental Agreement

IISL – International Institute of Space Law

I.L.A. – International Law Association

I.L.R. – International Law Reports

I.L.R.M. – Irish Law Reports Monthly

ILT – Irish Law Times

I.L.T.R. – Irish Law Times Reports

I.R. – Irish Reports

Ir.T.S. – Irish Treaty Series

I.L.M. – International Legal Materials
I.M.S.O. – International Mobile Satellite Organization
Infra. – Vide Infra
INMARSAT – International Maritime Satellite Organisation
INTA – Instituto Nacional de Técnica Aeroespacial
INTELSAT – International Telecommunications Satellite Consortium
INTERSPUTNIK - International System and Organization of Space
Communications
IPELJ – Irish Planning and Environmental Law Journal
Ir. Jur Rep – Irish Jurist Reports
ISLR – Irish Student Law Review
ISRO – Indian Space Research Organisation
ISS – International Space Station
ITAR – International Trade in Arms Regulations
ITSO – International Telecommunications Satellite Organization
ITU – International Telecommunications Union

J

JAXA – Japanese Aerospace Exploration Agency
JPL – Jet Propulsion Laboratory

K

K.B. – King’s Bench

L

LAPAN – Lembaga Penerbangan dan Antariksa Nasional
LEO – Low Earth Orbit
L. Rev. – Law Review

M

M.A. – Massachusetts
Mich. Telecomm. Tech. Rev. – Michigan Telecommunication and Technology
Review

M.L.R. – Modern Law Review

N

N.A.S.A. – National Aeronautics and Space Administration

N.I. – Northern Ireland

NIVR – Nederlands Instituut voor Vliegtuigontwikkeling en Ruimtevaart

NORAD – North American Aerospace Defense Command (U.S.)

NSC – Norwegian Space Centre (Norsk Romsenter)

NSPO – National Space Organisation (Taiwan)

NSWLR – New South Wales Law Report

O

OECD – Organisation for Economic Co-Operation and Development

O.J. – Official Journal

OPW – Office of Public Works (Ireland)

OST – Outer Space Treaty 1967

OUP – Oxford University Press

P

PAL – Convention relating to the Carriage of Passengers and their Luggage by Sea 1974

P.C.I.J. – Permanent Court of International Justice

Proc. Coll. L. Out. Sp. – Proceedings of the IISL Colloquium on the Law of Outer Space

Q

QB – Queen's Bench

R

Res. – Resolution

ROSA – Romanian Space Agency/Agentia Spatiala Romana

R.I.A.A. – Reports of the International Arbitral Awards

S

S.D.R. – Special Drawing Rights
S.I. – Statutory Instrument
S.I.A. – Satellite Industry Association
SNSB – Swedish National Space Board (Rymdstyrelsen)
SRON – Netherlands Institute for Space Research
SSO – Swiss Space Office
SUPARCO - Space and Upper Atmosphere Research Commission
Supp. – Supplement
Supra. – Vide Supra

T

TEKES – Teknologian ja Innovaatioiden Kehittämiskeskus
T.I.A.S – Treaties and other International Acts Series
TLR – Times Law Reports
TRIPS – Trade Related Aspects of International Property Rights

U

U.B.C. Law Rev – University of British Columbia Law Review
U.C.S. – Union of Concerned Scientists
UNESCO – United Nations Education, Scientific and Cultural Organization
U.N.C.L.O.S. – United Nations Convention on the Law of the Sea
U.K. – United Kingdom
U.K.H.L. – United Kingdom Electronic House of Lords Reports
U.K.T.S. – United Kingdom Treaty Series
UN – United Nations
U.N.G.A. – United Nations General Assembly
U.N.G.A.O.R – United Nations General Assembly Official Records
U.N.T.S. – United Nations Treaty Series
US – United States
U.S.C. – United States Code
U.S.D. – United States Dollars
USSR – Union of Soviet Socialist Republics
U.S.T. – United States Treaty

V

Ven. Arb. – Venezuelan Arbitration

Vol. – Volume

VTOHL – Vertical take-off, horizontal landing

VTOVL – Vertical take-off, vertical landing

VTT – Technical Research Centre of Finland

VUCA – Vanuatu Court of Appeal

W

WHO – World Health Organization

WIPO – World Intellectual Property Organization

WLR – Weekly Law Reports

WMO – World Meteorological Organisation

Y

Yale U.P. – Yale University Press

TABLE OF CASES

International Cases and Opinions

- Advisory Opinion on the Legality or Threat of Use of Nuclear Weapons (1996) ICJ Reports 226
- Anglo-Norwegian Fisheries Case* [1951] ICJ Rep. 116
- Barcelona Traction, Light and Power Co. Ltd. (Belgium v Spain)* [1970] ICJ Rep. 32
- Chorzow Factory Case* PCIJ Ser. A, No.13, at p.47
- Democratic Republic of the Congo v. Belgium* [2002] ICJ Rep. 121
- Faber Case* [1903] Ven. Arb 600, p. 629; (1903) X R.I.A.A.438.
- G.B. v The Netherlands* (1897) Moore, 5 Int. Arb. 4948
- Island of Las Palmas Arbitration* 2 RIAA 829
- Liechtenstein v Guatemala* [1955] ICJ Rep. 4 (*Nottebohm*)
- The Lotus* (1927) P.C.I.J. Ser A no. 10
- The Nicaragua v. U.S.* (1986) ICJ Reports 14
- United Kingdom v Albania* (Merits) [1949] ICJ Reports 4 (Corfu Channel)
- U.S. v Canada* 3 R.I.A.A. 1938, 1965 (Mar. 11, 1941) (Trail Smelter Arbitration)

Courts of Justice of the European Community

- AFS Intercultural Programmes Finland* (Case 237/97) [1999] ECR I- 0825.
- Re Alfred John Webb* (C-279/80) [1981] ECR 3305
- Alpine Investments BV v Minister van Financiën* (C-384/93) [1995] ECR I-1141
- ASBL Piagemme & Others v. Peeters* (C-85/94) [1995] ECR 2955
- Belgium v. Humbel* (C-263/8)6 [1988] ECR 5365
- Bier v. Mines de Potasse d'Alsace* (Case 21/76) [1976] E.C.R. 1735
- Blijdenstein* (Case C-433/01) [2004] E.C.R. I-1417
- BMW* (Case C-63/97) [1999] ECR I-905
- Bond van Adverteerders v. The Netherlands* (C- 352/85) [1988] ECR 2085
- Canal Satélite Digital* (Case C-390/99) [2002] ECR I-607
- Ciola v. Land Vorarlberg* (C- 224/97) [1999] ECR I-2517

Clean Car Autoservice v Landeshauptmann von Wien (C-350/96) [1998] ECR I-2521

Club-Tour, Viagens E Turismo SA v. Garrido (C-400/00) [2002] ECR I-4051

Competence of the Community to conclude the new Lugano Convention on jurisdiction and the recognition and enforcement of judgments in civil and commercial matters (ECJ Opinion 1/03) [2006] ECR I-1145

Commission v France (C-152/78) [1980] ECR 2299

Commission v France (C-220/83) [1986] 4 ECR 3663

Commission v France (Case C-154/89) [1991] ECR I-659

Commission v France (Case C-23/99) [2000] ECR I-7653

Commission v Germany (Case C-178/84) [1987] ECR 1227; [1988] 1 CMLR 780

Commission v Greece (Case C-198/89) [1991] ECR I-727

Commission v Italy (Case C-180/89) [1991] ECR I-709

Commission v. Spain (C-45/93) [1994] ECR I-911

Commission v. UK (Case C-179/78) [1980] ECR 417; [1981] 1 CMLR 716

Cowan v. Le Trésor Public (C-186/87) [1989] ECR 195

Criminal Proceedings v André Ambry (Case 410/96) [1998] ECR I-7875

DaimlerChrysler (Case C-324/99) [2001] ECR I-9897

De Bloos, S.P.R.L. v. Bouyer (Case 14/76) [1976] E.C.R. 1497

Elleniki Radiophonia Tilèorassi AE v. Dimotiki Etaireia Pliroforissis and Sotiros Kouvelas (C-260/89) [1991] ECR I-2925

Erich Dillenköfer v Federal Republic of Germany (Case 174/94) [1996] ECR I-4845

Estée Lauder Cosmetics GmbH & Co. OHG v Lancaster Group GmbH (Case C-220/98) [2000] ECR I-0117

Finalarte Sociedade Construção Civil v. Urlaubs- und Lohnausgleichskasse der Bauwirtschaft (C-49/98) [2001] ECR I-7831

Frankovich v Italy [1991] ECR I-5357 (Joined Cases 6/90 and 9/90); [1992] IRLR 84

FRG v. Parliament and Council (C-233/94) [1997] ECR I-2405

Geffroy (C-366/98) [2000] ECR I 6579

Re Giuseppe Saachi (C-155/73) [1974] 1 ECR 409

Goerres (C-385/96) [1998] ECR I-443

Hassan Shenavai v. Klaus Kreischer (Case 266/85) [1987] E.C.R. 239

Herbert Karner Industrie-Auktionen GmbH v Troostwijk GmbH. (Case C-71/02) [2004] ECR I-3025

HM Customs and Excise v. Schindler (C-275/92) [1994] ECR 1039

Hünermund and Others (Case C-292/92) [1993] ECR I-6787

Kalfelis v Bankhaus Schroder, Muenchmeyer, Hengst and Co. and Others
(Convention On Jurisdiction And The Enforcement Of Judgments)(Case 189/87)
 [1988] EUECJ R-189/87 (27 September 1988); [1988] E.C.R. 5565

Re Keck and Mithouard (C-267 and 268/91) [1993] 7 ECR I-6097; [1995] 1 CMLR 101

Konsumentombudsmannen v De Agostini (Svenska) Forlag AB [1997] All ER (EC) 697

Kronhofer v Maier and others, (Case 168/02) [2004] E.C.R. I-6009

Leitner v TUI Deutschland GmbH & Co KG (Case C-168/00) [2002] ECR I- 2631;
 [2002] All ER (EC) 561

Lucien Ortscheit GmbH v Eurim-Pharm Arzneimittel GmbH (C-320/93) [1994] ECR I-5243

Luisi and Carbone v Ministero del Tesoro (Joined Cases 286/82 and 26/83) [1984] ECR II-66

Marinari v Lloyds Bank plc (Case C-364/1993) [1995] E.C.R. I-3719

Ministère Public v. Van Wesemael (C-110-111/78) [1979] ECR 35

Nold KG v. Baustoffgroßhandlung v Commission (C-4/73) [1974] 1 ECR 491; [1974] 2 CMLR 338

Océano Grupo Editorial, S.A. and Salvat Editores, S.A. v Rocío Murciano Quintero et al. (Joined Cases C-240/98 to C-244/98) [2000] ECR I 4941

Re Oosthoek's Uitgeversmaatschappij (C-286/81) [1982] 4 ECR 4575

Owusu v Jackson (Case No. C-281/02) [2005] EUECJ C-281/02

Parfümerie-Fabrik 4711(Case C-150/88) [1989] ECR 3891

Pippig Augenoptik GmbH and Co. KG v Hartlauer Handelsgesellschaft mbh. (Case C-44/01) [2004] E.T.M.R. (5) 65; [2003] ECR I-3095

Procureur du Roi v. Debauvée (C-52/79) [1980] ECR 833

Procurer du Roi v. Marc JVC Debauvée and Others (C-52/79) [1980] ECR 833

Rich (Case C-190/89) [1991] E.C.R. I-3855

SA Compagnie Générale pour la Diffusion de la Télévision Coditel and Others (C-6/9) [1980] ECR 881

Säger v. Dennemeyer (C-76/90) [1991] ECR I-4221

Schindler (Case C-275/92) [1994] ECR I-1039

Scutzverband gegen Unwesen in de Wirtschaft eV v. Yves Rocher GmbH (C-126/91)
[1991] 3 ECR I-2361

*Seco SA and Desquenne and Giral SA v Etablissement d'Assurance contre la
Vielllesse et l'Invalidité* (C-62-63/81) [1982] 1 ECR 223

Société Bertrand v Paul Ott KG (C-150/77) [1978] ECR 1431

Société Générale Alsacienne de Banque S.A. v. Koestler (C-15/78) [1978] ECR 1971

SPUC v. Grogan (C-159/90) [1991] ECR I-4685

*Stichting Collectieve Antennevoorziening Gouda and Others v Commissariat voor de
Media* (C-299/89) [1991] 1 ECR 4007

Tankstation 't Heukske and Boermans (Joined Cases C-401/92 and C-402/92) [1994]
I-2199

Tatry (Case 406/92) [1994] E.C.R. I-5439

Toshiba Europe (Case C-112/99) [2001] ECR I-7945

UGIC v Group Josi (Case C-412/98) [2000] E.C.R. I-5925

Vanacker and Lesage (Case C-37/92) [1993] ECR I-4947

Van Binsbergen v. Bestuur van de Bedrijfsvereniging voor de Metaalnijverheid (C-
33/74) [1974] ECR 1299

Verein für Konsumenteninformation v Henkel (Case 167/00) [2002] E.C.R. I-8111

W. Rechberger and Renate Greindl v Republic of Austria (Case 140/97) [1999] ECR
I-3499

European Court of Human Rights

Bankovic v Belgium (2001) 11 B.H.R.C. 435

Groppera Radio AG and Others v. Switzerland Series A No. 173 of 28.3.10

Guerra and Others v. Italy (1998) 26 EHRR 357

López Ostra v Spain [1994] ECHR 46

Öneryıldız v. Turkey [2004] ECHR 657, (2005) 41 EHRR 20

Powell and Raynor v United Kingdom (1990) 12 EHRR 345

Australia

Burnie Port Authority v General Jones Pty Limited (1994) 120 ALR 42.

Laurie v Carroll 98 C.L.R. 310 (1958)
Mac Laine, Watson & Co. v Bing Chen [1983] 1 NSWLR 163
Oteri and Oteri v. Regina (1976) ALR 11
Regie National des Usines Renault SA v Zhang [2002] HCA 10 (14 March 2002)
S.S. Pharmaceutical v Qantas Airways [1991] 1 Lloyd's Rep 288
Schenker & Co.(Aust) Pty Ltd. v Malpas Entertainment and Services and Pty Ltd.
(1990) VR 834 (Supreme Court of Victoria)
Sutherland Shire Council v. Heyman (1985) 157 C.L.R. 424
Voth v Manildra Flour Mills Pty Limited (1990) 171 CLR 538; [1990] HCA 55

Canada

Amchem Products Inc. v. British Columbia (Workers' Compensation Board) (1993) 3
W.W.R. 441
Atlas Supply Co. Of Canada Ltd v Yarmouth Equipment Ltd (1991)103 CPR (3d) 38
(Nova Scotia Supreme Court)
BG Checo International Ltd. v. British Columbia Hydro & Power Authority [1993] 1
S.C.R. 12, 99 D.L.R. (4th) 577, 75 B.C.L.R. (2d) 145
Barclay's Bank PLC v Inc. Incorporated (1999) A.B.Q.B. 110
Belships (Far East) Shipping (PTE) Ltd v Canadian Pacific Forest Products (1999)
175 DLR (4th) 449
Central Trust Co. v Rafuse [1986] 2 S.C.R. 147
Delaney v Cascade River Holdings Ltd., [1983] 44 B.C.L.R. 24
Horsley v McLaren [1972] Sup. Ct 441; (1972) 22 DLR (3d) 545 *aff'g* [1970] 2 Ont
487, *rev'g* [1969] 2 Ont 137
J. Nunes Diamonds v. Dom. Elec. Protection Co. [1972] S.C.R. 769
Nova Mink Ltd. v Trans-Canada Airlines [1951] 2 D.L.R. 241
Tilden Rent-A-Car v Clendenning (1978) 83 D.L.R. (3d) 400

France

*Société Énergie Electrique du Littoral Méditerranéen v Campagna Impresse
Electriche Liguri* (1938-40) Ann. Dig. 120 (No. 47 Court de Cassation (United
Sections))

Germany

Württemberg and Prussia v Baden, Staatsgerichtshof, 18 June 1927, Entscheidungen des Reichsgerichts in Zivilsachen, vol. 116, App., pp. 18 (*Donauversinkung*)

Scanner Advertising Case Bundesgerichtshof, Judgement of 20 December 2001 – I ZR 215/98

Testpreis-Angebot BGH GRUR 1998, 824

Hong Kong

Manohar t/a Vinamito Trading House v Hill & Delamain (Hong Kong) Ltd. [1993] 2 HKC 342

Ireland

A.H.P. Manufacturing B.V. (trading as Wyeth Medica Ireland) v D.H.L. Worldwide Network N.V., D.H.L. Worldwide Express GmbH and D.H.L. International (Ireland) Ltd. [2001] 4 IR 531

Analogue Devices DV v Zurich Insurance Corporation [2002] 1 I.R. 272

Baldwin v Foy and Forrest Way Riding Holidays Ltd. [1997] IEHC 111

Bank of Ireland v McManamy [1916] 2 I.R. 161

Bio-Medical Research Ltd. v Delatex S.A [2000] 4 I.R. 307; [2000] IESC 32

Bord Tráchtála (An) v Waterford Foods Plc., Unreported, High Court, 25th November, 1992 *Burke v Aer Lingus Plc* [1997] 1 ILRM 148

Brady v Aer Rianta Unreported, cited by Clark

Buckley v AG [1950] IR 67

Byrne v Ireland [1972] I.R. 241

In the Matter of Article 26 of the Constitution and in the Matter of the Criminal Law (Jurisdiction) Bill 1975 (1977) I.R. 129

Carroll v. Bus Atha Cliath/Dublin Bus [2005] IEHC 278 (4 August 2005)

Carroll v An Post National Lottery Co. [1996] 11.R. 443

Connolly v South of Ireland Asphalt Co [1977] I.R. 99

DC v W O 'C [2001] 2 I.R. 1
Dinnegan v. Ryan [2002] IEHC 55 (13 May 2002)
Doe v Armour Pharmaceuticals Inc and ors [1997] IEHC 139
Duffy v Great Northern Railway (1878) 4 L.R. (Ir.) 178
Dunnes Stores v Mandate [1996] 1 ILRM 384; [1996] E.L.R. 56
Earl v Great Southern Railway [1940] I.R. 414
General Monitors Ireland v Ses-Asa [2005] IEHC 223
Glencar v Mayo County Council (No. 2) [2002] 1 I.R. 84
Grehan v. Medical Incorporated [1986] I.R. 528
Gonzalez v Mayer and Others [2003] IEHC 43 (25th July 2003)
Halpin and Others v. Tara Mines Limited, Unreported, High Court, 16th February 1976
Handbridge Limited v. British Aerospace Communications Ltd. [1993] 3 I.R. 342
Hanrahan v. Merck Sharp and Dohme (Ireland) Ltd. [1988] IESC 1; [1988] ILRM 629 (5th July, 1988)
Howard v OPW [1994] 1 I.R.101
Hughes v J.J. Power Ltd. v Collier Unreported, High Court, May 11th, 1988 (1988) 6 I.L.T. 261 Digest.
Intermetal Group Limited v. Worlslade Trading Limited, [1998] 2 I.R. 1
Irish Telephone Rentals Ltd. v. Irish Civil Service Building Society Ltd. [1991] ILRM 880
Johnson v Great Southern and Western Railway (1874) I.R. 9 C.L.108
Johnson v Longleat Properties (Dublin) Ltd (Unreported, High Court, 19 May, 1976 and noted in (1978)13 *Irish Jurist* 186)
Kelly v. Dublin County Council Unreported, High Court, 21st February 1986
Leo Laboratories v Crompton BV [2005] IESC 31
Lynch Roofing Systems (Ballaghaderen) Ltd v Christopher Bennett and Son (Construction) Ltd. [1999] 2 I.R. 450
McCarthy v Joe Walsh Tours Ltd. [1991] I.L.R.M. 813.
McCarthy v Pillay [2003] IESC 31; [2003] 2 I.L.R.M. 284, [2003] 1 I.R. 592
McComiskey v McDermott [1974] I.R. 75
Mc Cord v ESB [1980] ILRM 163 (SC)
McGee v. Ireland [1973] IESC 2; [1974] IR 284

Mc Kenna v Best Travel Ltd. T/A Cypriana Holidays [1996] IEHC 42; [1998] IESC 57

McNally v Lancs & New York Railway (1880) 8 L.R. (Ir.) 81

Miley v McKechnie (1949) 84 I.L.T.R. 89

Molumby v. Kearns [1999] IEHC 86 (19th January, 1999)

Murray v. Ireland [1991] ILRM 466

O'Beirne v Aer Rianta Unreported, cited by Clark

O'Callaghan v Hamilton Leasing (Ireland) Ltd [1984] I.L.R.M. 146.

O'Connor & Anor v Masterwood (UK) Ltd. & Ors [2009] IESC 49.

O'Connor v First National Building Society [1991] I.L.R.M. 278

O'Hanlon v ESB [1969] I.R. 75

O'Kane v Campbell [1985] IR 115

O'Keefe v. Ryanair Holdings plc [2002] IEHC 154 (19 June 2002)

Rainford v Newell-Roberts [1962] I.R. 95

Regan v. Irish Automobile Club [1990] 1 IR 278

Ronan v Midland Railway Co. (1883) 14 L.R. (Ir.) 157.

Ryan v Great Southern and Western Railway (1898) 32 I.L.T.R. 108

Ryan v Ireland [1989] I.R. 177

Shea v Great Southern Railway [1944] Ir. Jur. Rep. 26

Sheeran v. Meehan, Unreported, High Court, 6th February 2003

Shortt v Ireland [1996] 2 I.R. 188

Slattery v C.I.E. (1972) Ir. Jur. Rep. 21

SuperQuinn Ltd v. Bray Urban District Council, Unreported, High Court, 18 February 1998

Tromso Sparebank v. Burren, Unreported, Supreme Court, 15th December, 1989

Webb v Ireland [1988] IR 353

Western Meats v National Ice [1982] ILRM 99.

Israel

AG for the Government of Israel v Eichmann (1961) 36 ILR 5 D.Ct. of Jerusalem, *aff'd* (1962) 36 ILR 277

Cie Air France v. Teichner 39 Revue Francaise de Droit Aerien 243, 23 Eur. Tr. L.102

South Africa

Rabinowitz & King NNO v Ned-Equity Ins Co Ltd., 1980 1 (SA) 403

U.K.

A. Schroeder Music Publishing Co. Ltd. [1974] 1 W.L.R. 1308

Abnett v. British Airways Plc. (Scotland) and Sidhu v. British Airways Plc [1997]
A.C. 430

Ailsa Craig Fishing Co. Ltd v Malvern Fishing Co. Ltd. [1983] 1 W.L.R. 964

Alderslade v. Hendon Laundry Ltd. [1945] K.B. 189

Amiri Flight Authority v BAE Systems plc [2003] 1 Lloyd's Rep. 50; [2003] 2 Lloyd's
Rep. 767

Andrews v Singer [1934] 1 K.B. 17

Anns v Merton London B.C. [1978] A.C. 728

Antec International Ltd v Biosafety USA Inc

Askew v Intasun North [1980] CLY 637

BP Exploration Operating Co. Ltd. v. Chevron Transport (Scotland) [2001] UKHL
50

Bas Capital Funding Corporation and others v Medfinco Ltd and Others [2004] 1
Lloyd's Rep. 652

Bates v. Batey & Co. [1913] 3 K.B. 351

Behrens v Bertram Mills Circus Ltd. [1957] 2 Q.B. 1

Beresford v Royal Insurance Co. Ltd. [1938] AC 586

Bernstein of Leigh v Skyviews & General Ltd. [1978] 1 QB 479

Bishop v Bonham [1988] 1 W.L.R. 742

Blyth v Birmingham Waterworks Co. (1856) 11 Exch. 78; 156 ER 1047

Bragg v Yugotours [1982] CLY 777

Breams Trustees Ltd v Upstream Downstream Simulation Services [2004] EWHC
211 (Ch)

British Aerospace Plc v Dee Howard Co [1993] 1 Lloyd's Rep. 368

British Arc Welding Co. v L.N.E. Railway (1942) 73 Lloyd's L. Rep. 140

British Crane Hire Corporation v Ipswich Plant Hire [1975] Q.B. 303

Bury v Pope Cro. Eliz 18, 78 Eng Rep. 375 (Ex. 1587)
Bushby v. Munday (1821), 5 Madd. 297, 56 E.R. 908
Calico Printers Association v Barclays Bank (1931) 145 L.T. 51 (C.A.)
Cambridge Water Co. v Eastern Counties Leather plc. [1994] 2 A.C. 264
Canada Rice Mills Ltd. v Union Marine & General Insurance Co. [1941] AC 55
Canada SS Lines v R. [1952] A.C. 192
Caparo Industries plc v. Dickman [1990] 2 AC 605
Carpue v. London & Brighton Railway Company, (1844) 5 Q.B. 747
Castanho v. Brown & Root (U.K.) Ltd., [1981] A.C. 557 (H.L.)
Chappleton v Bray U.D.C. [1940] 1 K.B. 531
Chartered Bank of India v Netherlands India S.N. Co. (1883) 10 Q.B.D. 521
Circle Freight International v Medeast Gulf Exports [1988] 2 Lloyd's Law Rep. 427
Cleaver v Mutual Life Fund Assurance [1892] 1 QB 147
Connelly v RTZ [1998] A.C. 854
Continental Bank N.A. v. Aeokos Cia Naviera S.A [1994] 1 W.L.R. 588
Curtis v Chemical Cleaning Co [1951] 1 K.B. 805
Dominion Natural Gas Co. v. Collins and Perkins [1909] A.C. 640
Donoghue v Stevenson [1932] AC 562
DPP v Doot [1973] AC 807
Echostar Satellite Corporation v Ace Bermuda Insurance Co. (2004, arbitration in London and New York)
Edmund Murray Ltd. v B.P. International Foundations (1992) 33 Con L.R. 1
El Amria (The) [1981] 2 Lloyd's Rep. 119
Elder Dempster v Paterson Zochonis [1924] A.C. 522
Ellison v MOD (1996) 81 *Build. L. R.* 101 (Q.B.)
Erven Warnink BV v J. Townend and Sons (Hull) Ltd. [1979] A.C. 731
Evans v Glasgow DC [1979] SLT 270
Farr v Admiralty [1953] 1 W.L.R. 1285
Farrer v Nelson (1885) 15 Q.B.D. 258; 52 L.T. (n.s.) 766
Fosbroke-Hobbs v. Airwork Ltd. And British American Airservices Ltd. [1937] 1 All ER 108, [1938] USAv.R. 194
Gardner v Moore [1984] AC 548
George v. Skivington L. R., 5 Ex. 1

George Mitchell (Chesterhall) v Finney Lock Seeds [1983] A.C. 803
Gillespie Brothers & Co. v Roy Bowles Transport Ltd. [1973] 1 All ER 193
Gillingham Borough Council v. Medway (Chatham) Dock Co. Ltd [1993] QB 343
Gray v Barr [1971] 2 Q.B. 554
Grosvenor Hotel v Alfred Mc Alpine Management (1992) 56 BLR 115 cf *The Flamer*
Pride [1990] 1 Lloyd's L. Rep. 429
Hall v Brooklands Auto Racing Club [1933] 1 KB 205
Hardy v Motor Insurer's Bureau [1964] 2 QB 745
Harris v Torchgrove Ltd., Manchester District Registry [1985] CLY 944
Re Harrods (Buenos Aires) Ltd. [1992] Ch 72
Heaven v. Pender 11 Q. B. D. 503
Henderson v. H.E. Jenkins & Sons [1970] AC 282
Hinton v Dibbin (1842) 2 Q.B. 646
Holliday v. National Telephone Company [1899] 2 Q.B. 392
Hollier v Rambler Motors [1972] 2 Q.B. 71
Hollingsworth v Southern Ferries Ltd. [1977] 2 Lloyd's Rep 70
Honeywill & Stein Ltd. v. Larkin Brothers [1934] 1 K.B. 191
Hunt v Hourmont [1983] CLY 983
Hunter v Canary Wharf Ltd [1997] AC 655; [1997] 2 All ER 426
Import Export Metro Ltd v Compania Sud Americana de Vapores SA [2003] 1
 Lloyd's Rep. 405
Interfoto Picture Library Ltd. v Stilletto Visual Programme Ltd. [1988] 1 All E.R. 34
Jackson v Horizon Holidays [1975] 1 W.L.R. 1468
Jarvis v Swan Tours [1973] Q.B. 233
Joyce v DPP [1946] AC 347; (1948) AD 12
Lancashire County Council v Municipal Mutual Ins Ltd. [1996] 3 All ER 545
Lathrope v Kuoni Travel Ltd. [1999] C.L.Y. 1381
L'Estrange v Graucob [1934] 2 K.B. 394
Levine v Metropolitan Travel [1980] CLY 638
Levison v Patent Steam Carpet Cleaning Co. [1978] Q.B. 68
Leyland Shipping Co. v Norwich Union Fire Insurance Society [1918] A.C. 350
Lloyd Instruments Ltd. v Northern Star Ins. Co [1987] 1 Lloyd's Rep. 32 (UK CA)
Lloyd's v. McDonnell Douglas; Mc Donnell Douglas v Union of India [1993] 1
 Lloyd's Rep. 48

Logan v. Bank of Scotland [1906] 1 K.B. 141 (C.A.)
Longmeid v Holiday 6 Ex. 761
Lubbe and Others v Cape PLC [2000] 1 W.L.R. 1545, [2000] 4 All E.R. 268, [2000] UKHL 41
Maharanees of Baroda v Wildenstein [1972] 2 QB 283
Marston Excelsior Ltd v Arbuckle Smith and Company Ltd. [1971] 1 Lloyd's Rep. 70
The Maratha Envoy [1978] A.C. 11
Marubeni Hong Kong & South China Ltd v Mongolian Government [2002] 2 All ER (Comm) 873
May v Burdett (1846) 9 Q.B. 101; 115 E.R. 1213
Mercury Communications Ltd v Communication Telesystems International [1999] 2 All ER 33
Miller v Midland Great Western Railway (1905) 5 N.I.J.R. 202
Molvan v AG for Palestine [1948] A.C. 351 PC
Monarch Airlines Ltd. v London Luton Airport [1997] CLC 98
Moore v. Yukeley Associates Ltd. [2000] T.C.L.R. 146
Morris v KLM Royal Dutch Airlines [2002] AC 628
The Mostyn [1928] A.C. 57
Motor Oil Hellas (Corinth) Refineries SA v Shipping Corporation of India (The Kanchenjunga) [1990] 1 Lloyd's L. Rep. 391
Mullen v. Barr & Co. 1929 S. C. 461
Murphy v Brentwood DC [1991] 1 AC 398
National Telephone Co. v. Baker [1893] 2 Ch. 186
Nichols v Marsland L.R. 10 Ex. 255
Olley v Marlborough Court Hotel [1949] 1 K.B. 532
Overseas Medical Supplies Ltd. v Orient Transport Services Ltd. [1999] 1 All E.R. (Comm) 981
Parker v SE Railway (1877) 2 C.P.D. 416; 46 LJQB 768, 36 LT 540; 41 JP 644
Peabody Fund v. Sir Lindsay Parkinson followed [1985] A.C. 210 (H.L.)
Pearce v. Round Oak Steel Works [1969] 1 W.L.R. 595
Pearson v Dublin Corporation [1907] A.C. 351
Peek v North Staffs Railway (1862-63) 10 H.L.C. 473
Penny v. Wimbledon Urban District Council and Another [1899] 2 Q.B. 72
Phillips v Eyre (1979) L.R. 6 Q.B. 1

Pinochet Case (The) [1999] 2 WLR 825
Polpen Shipping Co. v Commercial Union Insurance [1943] 1 K.B. 161; [1942] 74
 Lloyd's List Rep. 157
Preston & Anor v Hunting Air Transport Limited [1956] 1 Q.B. 454
Production Technology v Bartlett [1988] 1 E.G.L.R. 182
Pyman v H & B Railway[1915] 2 K.B. 729 (C.A.)
Read v Lyons & Co. Ltd. [1947] A.C.156
Readhead v. Midland Railway (1869) L.R. 4 Q.B. 379
Rhesa Shipping Co SA v Edmunds [1985] 2 Lloyd's Rep 1
Richardson Spence & Co. v Rowntree [1894] A.C. 298
Rio Tante Zinc Corp v Westinghouse Zinc Corporation [1978] 1 All ER 434
Ritchie v. Western Scottish M.T. Co., 1935 S.L.T. 13
River Wear Commissioners v Adamson (1877) 2 App Cas 743
Rutter v Palmer [1922] 2 K.B. 87, 93 (CA)
Rylands v Fletcher L.R.3 H.L. 330 (1868)
S & W Berisford Plc v New Hampshire Insurance Co. [1990] 1 Lloyd's Rep. 454
Sarrjo SA v Kuwait Investment Authority[1999] 1 A.C. 32
Shell Chemicals UK Ltd. v. P&O Roadtanks Ltd.[1995] 1 Lloyd's L. Rep. 297
Singer Co. (UK) Ltd. v Tees and Hartlepool Port Authority [1988] 2 Lloyd's L. Rep.
 16
Smith v Kenrick (1849) 7 C.B.515
Smith v South Wales Switchgear Ltd. [1978] 1 W.L.R. 165
Smith v UMB Chrysler (Scotland) 1978 S.C. 1 H.L
SNI Aérospatiale v. Lee Kui Jak [1987] 3 All E.R. 510 (P.C.)
Solomon v Solomon [1897] A.C. 22
Sonicare International Ltd. v East Anglia Freight Terminal Ltd. [1997] 2 Lloyd's L.
 Rep. 48
Southwestern General Property Co. v Marton (1982) 263 E.G. 1090
Spiliada Maritime Corporation v Cansulex Ltd. [1987] 1 A.C. 460
Sproule v Triumph Cycle Co. [1927] N.I. 83
Spurling v Bradshaw [1956] 1 W.L.R. 461
St. Alban's Council v International Computers [1995] F.S.R. 686
Taubman v Pacific SN Co. (1872) 26 L.T. 704

Taylor v Manchester, Sheffield and Lincolnshire Railway Co. [1895] 1 Q.B. 134; 11 T.L.R. 27
Thompson v LM & S Rly [1930] 1 K.B. 41
Thornton v Shoe Lane Parking [1971] 1 All E.R. 686
Transco v Stockport MBC [2003] 3 WLR 1467
Vodafone Group PLC v Orange Personal Communications Services Ltd. [1997] FSR 34
Waddell v Nortland and Anor. [1966] N.I. 85
Walker v Boyle [1982] 1 W.L.R. 495
Wallis, Son and Wells v Pratt and Haynes [1910] K.B. 1003
West v. Bristol Tramways Co. [1908] 2 K.B. 14
Wheeler v. JJ Saunders Ltd [1996] Ch.19
White v Warwick [1953] 1 W.L.R. 1285 (C.A.)
White Cross Equipment Ltd. v. Farrell (1983) 2 T.L.R. 21
Winterbotton v Wright 10 M. & W. 109
Witted v Galbraith [1893] 1 QB 577
Woodman v Photo Trading Processing (1981) 131 N.L.J. 933.
Yuen Kun-yeu v. A.G. Hong Kong [1987] 2 All E.R. 705 (P.C.)

U.S. (Federal and National)

A.J. Hodges Indus. Inc. v. US 355 F.2d 592 (Ct Cl 1966)
A. & M Produce Co. v. FMC Corp. (1982) 135 Cal.App. 3d 473
Aaron v. US 311 F. 2d 798 (Ct Cl 1963)
Adaman Mutual Water Co. et al. v. United States (1958) (U.S. Ct. Claims; 143 Ct.Cl. 921, 181 F.Supp. 658).
Adatia v Air Canada [1992] P.I.Q.R 238
Abramson v. Japan Airlines Co. 739 F. 2d 130 (3rd Cir 1984)
Ainsworth v. Shell Offshore, Inc., 829 F.2d 548, 549 (5th Cir. 1987)
In re Aircrash Disaster 635 F.2d 67 (2d Cir. 1980)
Air France v. Saks 470 U.S. 392, 84 L. Ed. 2d 289, 105 S. Ct. 1338 (1985)
Alabama v. King & Boozer, 314 U.S. 1, 62 S. Ct. 43, 86 L. Ed. 3 (1941)
Alaskan Village v. Smalley, 706 P2d 945 (Alaskan Supreme Court)

Alevizos v. Metropolitan Airports Commission [Alevizos I], Minn. 1974 298 Minn. 471, 216 N.W.2d 651

Allen v. Gulf Oil Refinery [1981] A.C. 1001

Alpha Lyracom Space Communications Ltd. v Communications Satellite Corp. 946 F. 2d. 168 at 176 (2d Cir. 1991)

Anderson v. Souza (1952) 38 Cal.2d 825, 243 P.2d 497

Appalachian Insurance Co. v McDonnell Douglas Corp., 262 Cal. Rptr 716; 214 Cal. Appl. 3d 1 (1989); (1990) 18(1) *Journal of Space Law* 41-44

Argent v. US 127 F 3d 1277 (Fed Cir 1997)

Armijo v. Ex Cam, Inc., 656 F.Supp 771 (D.N.M. 1987)

Asahi Metal Industries Co v Superior Court 480 US 102 (1987)

Ashland Oil, Inc. v. Miller Oil Purchasing Co., 5 Cir. 1982, 678 F.2d 1293

Ashville Contr. Co. v. Southern Rly. 19 F. 2d 32 (4th Cir. 1927)

AT&T v Martin Marietta (1995) 23 *Journal of Space Law* 177

Atlas Chemical Industries Inc. v Anderson 514 SW 2d 309 (Tex Civ App 1974)

B. & Q.R. Co. v Krayenbuhl (1902) 65 Neb.889 at 903-4; 91 N.W. 880

Baker v Landsell Protective Agency Inc. 590 F. Supp. 165 (D.C. N.Y. 1984)

Barr v. Game, Fish Parks Comm'n., 30 Colo. App. 482, 497 P. 2d 340 (1973)

Bartholomae Corp. v. United States 253 F. 2d 716 (9th Cir. 1958)

Batten v. US 306 F. 2d 580 (10th Cir, 1962)

Beck v. Bel Air Properties, Inc., 134 Cal.App.2d 842, 286 P.2d 503

Benjamin v British European Airways 572 F.2d 913 (2nd Cir. 1978)

Berg v. Reaction Motors Div., (1962) 37 N.J. 396, 181 A.2d 487

Bianchini v. Humble Pipeline Co. 480 F. 2d 251 (5th Cir. 1973)

Blansett v. Continental Airlines, Inc., F.3d , 2004 U.S. App. LEXIS 15120, 2004 WL 1627247 (5th Cir. Jul. 21, 2004), *rev'g* 246 F. Supp. 2d 596 (S.D. Tex.2002).

Boudreaux v. American Ins. Co., 262 La.721, 264 So.2d 621 (1972)

Boyd v. White 128 Cal. 2d 641; 276 P.2d 92 (1966)

Boyle v. United Technologies Corporation 487 U.S. 500 (1988)

Branning v. US 654 F. 2d 88 (Ct Cl 1981)

Brooke v. Patterson 159 Fla 263 (1947)

Brooks v. Ready Mix Concrete Co., 94 Ga. App. 791, 96 S.E. 2d 213 (1956)

Brown v. Duchesne, 60 U.S. (19 How.) 183, 15 L.Ed. 595 (1857)

Brown v. L.S. Lunder Const. Co., 240 Wis. 122, 2 N.W. 2d 859 (1942)

Brown v. US 73 F 3d 1100 (Fed. Cir 1996)
Bruno v. Employers Liability Assurance Corp., 67 So. 2d 920 (La.Ct.App. 1953)
Burkett v. Freedom Arms, Inc., 299 Or. 551, 704 P.2d 118, 122 (1985)
Capital Airlines inc. v. Barger 47 Tenn. App. 636, 341 S.W. 2d 579 (1962)
Carey v. United Airlines, 255 F.3d 1044 (9th Cir. 2001)
Caveny v. Raven Arms, 665 F.Supp. 530 (D.S.Ohio 1987)
Chan v Korean Airlines 490 U.S. 122. 109 S.Ct. 1676. 104 L.Ed.2d 113
Chavez v. Southern Pacific Transp. Co. 413 F. Supp.1203 (E.D. Cal. 1976)
Chutter v KLM Royal Dutch Airlines Inc., 132 F.Supp. 611 (S.D.N.Y.1955)
Cities Service Co. v. State 312 So.2d 799 (Fla. Dist Ct. App. 1975)
Citrola v. Eastern Airlines, Inc 264 F.2d 815 (2d Cir. 1959)
City and County of Denver v Kennedy (1970) 29 Col. App. 15; 47 P. 2d 760
Clark-Aiken Corp. v Cromwell-Wright Corp. 323 N.E. 2d 876 (Mass. 1978)
Cloyes v. Delaware Tp., 23 N.J. 324, 327 (1957)
Cohn v. United Air Lines Transportation Corp. 17 F. Sup 865 (D. Wyo 1937)
Collins v Otto 149 Colo. App. 489, 369 P. 2d 564
Colton v. Onderdonk (1886) 69 Cal. 155; 10 P. 395
Continental Bldg. Corp. v. Union Oil Co., 152 Ill. App. 3d 513, 504 N.E.2d 787; 105 Ill. Dec. 502 (1987)
Converse v. Portsmouth Cotton Oil Refining Corp 281 F. 985
Craig v. Montelepre Realty Co., 252 La. 502, 211 So. 2d 627 (1968)
In re Crash at Gander Newfoundland 600 F. Supp. 1202 (D.C. Ky.1987)
Crosby v Cox Aircraft Company of Washington 746 P.2d 1198 (Wash. 1987)
Curtis v. Mississippi State Highway Comm'n and Continental, Inc. 195 So.2d 497 (Miss.1967)
Dahelite v U.S. 346 U.S. 15 (1952)
D'Albora v. Tulane Univ., La.Ct.App., 274 So. 2d 825, *aff'd mem.*, 278 So. 2d 504, 505 (La. 1973)
D'Anna v U.S. 181 F. 2d 335 (4th Cir. 1950)
Delahanty v. Hinckley, Nos. 82-409 and 82-490 (D.C.D.C., Dec. 9, 1986,
Department of Environmental Protection v. Ventron Corporation, 94 N.J. 473, 468 A.2d 150 (1983)
DeRosa v. Remington Arms Co., 509 F.Supp. 762 (E.D.N.Y. 1981)
Des Marias v Beckman 198 F. 2d 550 (9th Cir.1952)

DeMarines v. KLM Royal Dutch Airlines, 580 F.2d 1193 (3d Cir. 1978)

De Vera v. Long Beach Pub. Transportation Co. (1986) 180 Cal. App. 3d 782, 793; 225 Cal. Rptr. 789

Dickens v U.S. 378 F. Supp. 845 (S.D. Tex. 1974) aff'd 545 F.2d 886 (5th Cir. 1977)

Doundoulakis v. Town of Hampstead 42 2d 448, 368 N.E. 2d 27, 398 N.Y.S. 2d 404 (1977)

Dow Chemical Co. v. Alfaro, 786 S.W.2d 674 (Tex. 1990), *certiorari* denied, 59 U.S.L.W. 3460 (1991)

Duchemin v. Pan American World Airways et al [1974] *Revue Générale de L'Air et L'Espace* 273

Duke Power Co. v Carolina Environmental Study Group 438 U.S. 59 (1978)

Eileen Dick v American Airlines, Inc. US District Court of Massachusetts Action No 05-10446-GAO, 12 March 2007

Eastern Airlines Inc. v. Floyd 499 U.S. 530; 111 S. Ct. 1489; 113 L. Ed. 2d 569; 1991 U.S. LEXIS 2222; 59 U.S.L.W. 4307; 91 Cal. Daily Op. Service 2740; 91 Daily Journal DAR 4413

Eastern Airlines v. Union Trust Co. 221 F. 2d 62;(DC Cir. 1955) *rev'd sub nom*

Eastman Kodak Co v. Kavlin 978 F. Supp. 1078, 1084 (SD Fla. 1997)

E.I. Dupont de Nemours & Co. v Cudd 176 F. 2d 855 (10th Cir. 1949)

El Al Israel Airline v Tseng 525 U.S. 155 (1999)

Ex-Cell-o Corp. v. Farmers Coop. Dairies Ass'n., 28 N.J. Super. 159 (*App. Div.* 1953).

Federoff v. Harrison Const. Co., 362 Pa. 181, 66 A. 2d 817 (1949)

Feres v US 340 U.S. 135, 146 (1950)

Fiella v. Bangor Punta Corp., No. 756 of 1984 (Pa.C.P. Beaver County Feb. 7, 1985)

First National Bank v. Nor-Am Agricultural Products, Inc., 88 N.M. 74 (Ct.App.1975)

Fontenot v. Magnolia Petroleum Corp., 227 La. 866, 80 So. 2d 845 (1955)

Foster v Preston Mill Co. 44 Wash 2d 440, 268 P. 2d 645 (1954)

Francis v. Diamond Int'l Corp., Nos. CV82-11-1279 & CV83-02-0215 (Ohio C.P. Butler County Mar. 22, 1983)

Freeman v. US 167 F Supp 541 (WD Oka 1958)

Fulop v. Malev Hungarian Airlines, 175 F. Supp. 2d 651 (S.D.N.Y. 2001)

Gezzi v. British Airways PLC, 991 F.2d 603 (9th Cir. 1993)
Gibraltar Factors Corp. v. Slapo, 23 N.J. 459, 461 (1957), appeal dismissed 355 U.S. 13, 78 S. Ct. 44, 2 L. Ed. 2d 20 (1957)
Goodwin v. Reilley (1985) 176 Cal.App.3d 86, 91; 221 Cal. Rptr. 374
Gotreux v Gary 232 La.373; 94 So.2d 293 (1957)
Grein v Imperial Airways [1937] 1 K.B. 50 (C.A.); [1936] US Aviation Reports 211
Grey v American Airlines 227 F.2d 282, 285 (2d Cir. 1955); [1950] US Av R 507
Griggs v. Allegheny County, 369 U.S. 84, 82 S. Ct. 531, 7 L. Ed. 2d 585 (1962)
Guille v Swan 19 Johns (NY) 381, 10 A. Dec. 234 (1822).
Gulf Ins. Co. v. Employers Liability Assurance Corp., 170 So. 2d 125 (La.Ct.App. 1965)
Gulf Oil Corporation v. Gilbert 330 U.S.501 (1947).
Hay v The Cohoes Company 2 N.Y. 159 (1849)
H.L. Properties Ltd. v. Aerojet-General Corp. 331 F. Supp. 1006 (S.D. Fla. 1971).
H.S. Perlin Co. v. Morse Signal Devices (1989) 209 Cal.App. 3d 1289
Haasman v Pacific Air Express 100 F. Supp. 1 (Alaska 1951), 198 F. 2d 550 (9th Cir. 1952)
Hampton v. Rubicon Chemicals, Inc., 458 So. 2d 1260 (La. 1984)
Hawkins v. Evans Cooperage Co., Inc., 766 F.2d 904, 907 (5th Cir. 1985)
Hero Lands Company v. United States (1983) (US Ct. Claims, 554 F. Supp. 1262)
Houghton v. Loma Prieta Lumber Co. (1907) 152 Cal. 500
Hughes Aircraft v US 29 Fed. Cl. 197 (1993)
Hulsey v. Elsinore Parachute Center 168 Cal. App. 3d 333; 214 Cal. Rptr. 194; 1985 Cal. App. LEXIS 2098; CCH Prod. Liab. Rep. P10 581
Hunziker v Scheidemantle 543 F. 2d 893 (7th Cir, 1967)
Hurdman v. North Eastern Rly. Co. (1878) 3 C.P.D. 168
Husain v. Olympic Airways, 116 F.Supp. 2d 1121 (N.D. Cal. 2000), *aff'd*, 316 F.3d 829 (9th Cir. 2002), *aff'd*, 157L. Ed. 2d 1146, 124 S. Ct. 1221 (2004)
Jackson v. Metropolitan Knoxville Airport Authority, Tenn., 1996 922 S.W.2d 860
James Stewart & Co. v. Sadrakula, 309 U.S. 94, 105, 60 S. Ct. 431, 84 L. Ed. 596, 603 (1940)
Kapar v Kuwait Airways Corp. 845 F.2d 1100 (D.C. Cir. 1988)
Kelley v R.G. Industries Inc., 304 Md. 2d 124; 497 A. 2d 1143 (1985)
Kent v. Gulf States Utilities Co., 418 So. 2d 493, 498 (La. 1982)

King v. Mississippi Power & Light Co., 244 Miss. 486, 142 So.2d 222 (1962).
Komlos v Air France 11 F. Supp. 393 (D.C. N.Y. 1952), 209 F. 2d 436 (2nd Cir 1953)
Kosters v. Seven-Up Co., 595 F.2d 347, 354 (6th Cir. 1979)
Lacey v. US 595 F 2d 614 (Ct. Cl 1979)
Laird v. Nelms, 406 U.S. 797, 32 L. Ed. 2d 499, 92 S. Ct. 1899 (1972)
Langan v Valicopters Inc. 88 Wash 2d855, 567 P.2d 218 (1977)
Langlois v. Allied Chemical Corp., 258 La. 1067, 249 So. 2d 133 (1971)
Lexington Insurance v. Mc Donnell Douglas No. 481713 (Cal. Super. Ct., Orange Co., May 1990).
Loe v Lenhart 227 Ore.242, 362 P.2d 218 (1977)
Loma Portal Civil Club v. American Airlines Inc. 61 Cal. 2d 582; 394 P. 2d 548 (1964)
Losee v Buchanan (1873) 51 NY 476
Luthringer v. Moore (1948) 31 Cal.2d 489
Lydecker v. Freeholders of Passaic, 91 N.J.L. 622 (E. & A. 1917)
M&J Coal Co. v United States 30 Fed Cl. 360 (1994)
Malman v. U.S. 207 F. 2d 897 (2nd Cir. 1953)
Malone v. Bowdoin 369 U.S. 643, 82 S. Ct. 980, 8 L. Ed. 2d 168 (1962)
Marginian v Allstate Insurance Co. (1985) 18 Ohio St 3d 345; 481 N.E. 2d 600
Margrave v. British Airways 643 F. Supp. 510, 512 (S.D.N.Y. 1986)
Martin v. Harrington & Richardson, Inc., 743 F.2d 1200 (7 Cir. 1984)
Martin v. Port of Seattle 64 Wash. 2d 309 (SCt WA, 1964)
Martin Marietta v. Intelsat 763 F. Supp. 1327 (D. Md. 1991), *aff'd* in part, *rev'd* in part, 978 F.2d 140 (4th Cir. 1992)
MacDonald v Air Canada 439 F.2d 1402 (1st Circ., 1971)
MacPherson v Buick Motor Co. 217 N.Y. 382, 111 N.E. 1050 (1916)
Majestic Realty Associates, Inc. v. Toti Contracting Co., 30 N.J. 425, 433-436 (1959).
Mancuso v. Rothenberg, 67 N.J. Super. 248, 257 (App. Div. 1961)
Matson v. US 171 F. Supp 283 (Ct. Cl. 1954)
Mavilia v. Stoeger Indus., D.Mass. 574 F. Supp. 107 (1983)
McAndrews v. Collerd, 42 N.J.L. 189 (E. & A. 1880)
McCabe v. N.J. Turnpike Auth., 35 N.J. 26, (1961)
Mc Dowell v Continental Airways 54 F Supp 1313 (SD Fla. 1999)

Mc Lane v Northwest Gas Co. 255 Ore. 324, 467 P. 2d 635 (1970)
Moore v. R.G. Industries, 789 F.2d 1326 (9th Cir. 1986)
Munro v. Dredging etc. Co. (1890) 84 Cal. 515; 24 P. 303
Nemitz v US <http://www.erosproject.com/appeal/apindex.html>.
Nichols v Jones 260 So. 2d 748 (La. 1971)
Noel v Linea Aeropostal Venezolana 144 F. Supp 359 (D.C. N.Y. 1956); 355 U.S. 907 (1957)
N.Y. Pacific Northwest Bell Tel. Co. v. Port of Seattle 80 Wash. 2d 59, 491 P. 2d 103
Oja & Assocs. v. Washington Park Towers Inc. 89 Wash. 2d 72; 569 P.2d 1141 (1977).
O'Neal v. International Paper Co., 715 F.2d 199, 201 (5 Cir. 1983)
Otero v. Burgess 84 N.M. 575, 505 P. 2d 1251 (1973)
Palin v. General Construction Company, 47 Wash. 2d 246, 287 P. 2d 325, 328 (1955)
Palsgraf v. Long Island Railroad 162 N.E. 99 (N.Y. 1928)
Pate v. Western Geophysical Co., 91 So. 2d 431 (La.Ct.App. 1956)
Patel v. Air Canada Docket No. 00-02168 (ND Cal, Sept 22, 2000)
Patterson v. Rohm Gesellschaft, 608 F. Supp. 1206 (N.D.Tex. 1985)
Perkins v. F. I. E. Corp. 762 F.2d 1250 (5th Cir. 1985) 1267-68; 1985 U.S. App. LEXIS 30610; CCH Prod. Liab. Rep. P10
People of Colorado v Emmert 597 P.2d 1025 (1979)
Pigott v Boeing Co. (1970) Miss 240 So. 2d. 63
Piper Aircraft Co. v. Reyno 454 US 250 (1981)
Platzer v. Mammoth Mountain Ski Area (2002) 104 Cal.App.4th 1253
Pope v. US 173 F Supp 36 (ND Tex 1959).
Price v. State, La.Ct. App.1984, 451 So. 2d 644 (La.Ct.App. 1984)
Public Prosecutor v DS ILR 26 (1958 II) 209
Pumphrey v. J.A. Jones Construction Company 250 Iowa 559, 94 N.W. 2d 737 (1959)
Ramada Inns Inc. v. Salt River Valley Waters Users Ass'n, 111 Ariz 65; 523 P.2d 496 (1974)
Reed v Wiser 535 F. 2d 1079 (2d Cir. 1977)
Rhodes v. R.G. Industries, Inc., 173 Ga. App. 51, 325 S.E.2d 465(1985),
Richards v U.S. 369 U.S. 1 (1961)

Richman v. Charter Arms Corp., 571 F. Supp. 192, 194 (E.D.La. 1983).

Riordan v. International Armament Corp. No. 81 L 27923 (Pa.Cir.Ct. Cook County July 21, 1983), *aff'd* 132 Ill.App.3d 642, 87 Ill.Dec. 765, 477 N.E.2d 1293 (1985)

Roberts v. Cardinal Services, Inc., 2000 U.S. Dist. LEXIS 13690, 2000 WL 1300390 (E.D.La. 2000)

Roberts et al v Cardinal Services 266 F.3d 368; 2001 U.S. App. LEXIS 21256; 2002 AMC 83

Robertson v. Grogan Investment Co., 710 S.W.2d 678 (Tex. App. 1986)

Rodriguez v. Ansett Australia et al 383 F.3d 914; 2004 U.S. App. LEXIS 18735, (US Court of Appeals, 9th Circuit, September 3rd, 2004, Tashima J.)

Roth v Garcia Marquez, 942 F 2d 617 (9th Cir 1991)

Rubin v. United Air Lines, Inc. (2002) 96 Cal.App.4th 364; Cal.App.4th 364

Rugani v KLM 4 Av. Cas. (CCH) 17257 (N.Y.C. Ct. 1954)

Russell v. Windsor Properties, Inc., 366 So. 2d 219, 223 (La.Ct.App. 1978)

Sammons Enterprises Inc v Superior Court 205 Cal App 3d 1435

Scherer v. Pan Am. World Airways, Inc. 54 A.D.2d 636, 387 N.Y.S.2d 580, 581 (App. Div. 1976)

The Schooner Exchange v. McFaddon, 11 U.S. (7 Cranch) 116 (1812)

Schexnayder v. Bunge Corp. 508 F.2d 1069 (5th Cir. 1975)

Schwartz v. Stockton, 32 N.J. 141, 147 (1960)

Scranton v. L.G. DeFelice & Son 137 Conn. 580, 79 A. 2d 600 (1951)

Scribner v Kelley 38 Barb. 14

Seguritan v Northwest Airlines 454 N.Y.S.2d 994 (N.Y., 1982)

Siegler v Kuhlman 81 Wash. 2d 448, 502 P. 2d 1181 (1972)

Simon v. Henry, 62 N.J.L. 486 (Sup. Ct. 1898)

Simpson v. United States, 454 F.2d 691(6th Cir. 1972)

SKF Farms v. Superior Court (1984) 153 Cal.App.3d 902; 200 Cal. Rptr. 497

Smith v. Bd. of County Comm'ers, 5 Mich. App. 370; 146 N. W. 2d 702 (1966)

Smith v Lockheed Propulsion Co. (Cal. Ct of Appeal, 4th Dist. 2d., January 17th 1967 Tamura J.)

Smith v. Morton Thiokol, Inc. 712 F.Supp. 893 (M.D. Fla. 1988), *aff'd*, 877 F.2d 40 (11th Cir. 1989)

Southeastern Aviation Inc. v. Hurd 209 Tenn 639, 355 S.W. 2d 436 (1962)

Speir v. US 485 F 2d 643 (1973)

State Const. Co. v. Johnson, 82 Ga. App. 698, 62 S.E. 2d 413 (1950)
Stephens v. Beaver Dam Drainage District, 123 Miss. 884, 86 So. 641 (1920)
Swanson v U.S 229 F. Supp. 217 (N.D. Cal. 1964)
T&E Industries, Inc. v. Safety Light Corporation, Supreme Court of New Jersey.
 March 27th 1991
Taylor v. Cincinnati, 143 Ohio St. 426 (1944).
Taylor v. N.J. Highway Authority, 22 N.J. 454 (1956)
The Tennyson 45 JDI (1918) 739
Terry v Gower (1933) 47 Ll. L.Rep. 65
Thigpen v. Skousen & Hise, 64 N.M. 290, 327 P. 2d 802 (1958)
Thompson v. Jannarone Contracting Co., 6 N.J. Misc. 320, 141 A. 25 (Sup. Ct. 1928)
Thornburg v. Port of Portland 233 Or 178 (SCt Or, 1962)
Tindall v U.S., 901 F.2d 53 (5th Cir. 1990)
Touchstone v. G.B.Q. Corp., 596 F. Supp. 805 (E.D.La. 1984)
Trespalacios v. Valor Corp., 486 So.2d 649 (Fla. 1986)
Turner v Big Lake Oil Co. 128 Tex 155, 96 S.W. 2d 221 (1936)
Re: Union Carbide Corp. Gas Plant Disaster at Bhopal, India, 634 F.Supp. 842
 (S.D.N.Y. 1986)
United Oilseed Products v Royal Bank (1988), 29 C.P.C. (2d) 28; 60 Alta. L.R. (2d)
 73
United States v Alberty 63 F.2d 965 (10th Cir. 1933)
United States v Aluminium Co of America 148 F 2d 416 (1945)
United States v. Causby, 328 U.S. 256, 66 S. Ct. 1062, 90 L. Ed. 1206 (1946)
United States v. Coffey, 233 F.2d 41 (9th Cir. 1956)
United States v Kesinger 190 F. Supp. 529 (10th Cir. 1951)
United States v. One Lucite Ball Containing Lunar Material, 252 F. Supp. 2d 1367
 (S.D.Fla. 2003).; 2003 U.S. Dist. LEXIS 4672; 16 Fla. L. Weekly Fed. D 342 (2003)
 (the Honduran Lunar Rock Case).
United States v. Union Trust Co. 350 U.S. 907 (1952)
United States v Yunis (No.2) (1988) 82 ILR 344.
Valley Forge Gardens v. James D. Morrissey, Inc. 385 Pa. 477, 123 A. 2d 888
 (1956)
Vaughan v Miller Bros. 101 Ranch Wild West Show (1930) 109 W. Va. 170, 153
 S.E. 289

Voytas v. United States, 256 F.2d 786 (7th Cir.1958)
Vincent d'Anna v United States 181 F.2d 335
Virginians for Dulles v. Volpe 344 F. Supp. 573 (ED Va. 1974)
Wallace v. Korean Air 214 F.3d 293 (2d Cir. 2000)
Warshaw v. Trans World Airlines, Inc., 442 F. Supp. 400 (E.D. Pa. 1977)
Wheatland Irrig. Dist. v. McGuire 437 P. 2d. 1128 (Wyo. 1975)
White v. McLouth Steel Corp., 18 Mich. App. 688, 171 N.W.2d 662 (1969)
Whitefield v Stewart 577 P. 2d 1295 (Okla. 1978)
Whitla v. Ippolito, 102 N.J.L. 354 (E. & A. 1926)
Whitman Hotel Corp. v. Elliott & Watrous Eng. Co., 137 Conn. 562, 79 A. 2d 591 (1951)
Whitney v. Ralph Myers Contracting Corporation, 118 S.E. 2d 622 (W. Va. 1961)
Widmyer v. Southeast Skyways Inc., 584 p. 2d 1 (Alaska 1978)
Williams v. Detroit Edison Co., 63 Mich. App. 559, 234 N.W.2d 702 (1975)
Wright v. Superior Oil Co., 138 So. 2d 688 (La.Ct.App. 1962);
Yoerg v. Northern New Jersey Mtg. Associates, 44 N.J. Super. 286, 289 (App. Div. 1957)
Yommer v McKenzie 255 Md 220,257 A. 2d 138 (1969)
Young v Darter 363 P.2d 829 (Okla. 1961)
Yukon Equip., Inc. v Fireman's Ins. Co. 585 P. 2d 1206 (Alaska 1978)

Vanuatu

Patunvanu v Government of Vanuatu [2005] VUCA 18

TABLE OF INTERNATIONAL MATERIALS

International Documents

Agreements, Conventions, Declarations and Treaties

Agreement of the Arab Corporation for Space Communications (ARABSAT); done at Cairo on Wednesday, 14 Rabi Al Akhar 1396 H. *Space Law and Related Documents*, U.S. Senate 101st Congress 2nd session, 395 (1990). Entered into force on July 16, 1976

Agreement among the Government of Canada, the Governments of Member States of the European Space Agency, the Government of Japan, the Government of the Russian Federation and the Government of the United States of America concerning Cooperation on the Civil International Space Station

Agreement Governing the Activities on the Moon and Other Celestial Bodies 1979 [The Moon Treaty 1979] 18 I.L.M. 1434; 1363 U.N.T.S. 3. Entered into force 11th July 1984.

Agreement on the Basic Principles and Conditions of the Utilization of the Baikonur Cosmodrome between the Russian Federation and the Republic of Kazakhstan.

Agreement on Cooperation in the Exploration and Use of Outer Space for Peaceful Purposes ('INTERCOSMOS') 16 I.L.M. 1. Entered into force on 25 March 1977.

Agreement on the Establishment of the 'Intersputnik' International System and Organization of Space Communications 860 U.N.T.S. 3. Entered into force 12th July 1972.

Agreement between the European Space Agency and the Centre National d'Etudes Spatiales on the execution of the Ariane-5 Development Programme, 3 October 1989

Agreement Relating to the International Telecommunications Satellite Organization ('INTELSAT') TIAS 7532, 23 UST 3813; 860 U.N.T.S. 3

Agreement Relating to the International Telecommunications Satellite Organisation ('ITSO'). 23 UST 3813/4901; TIAS 7532. Entered into Force 12th February 1973.

Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space [the Rescue and Return Agreement] 19 U.S.T. 7570; TIAS 6599; 7 I.L.M. 149 (1968); 672 U.N.T.S. 119; [1968] Irish Treaty Series No. 16. Entered into force 3rd December 1968.

Agreement on Trade-Related Aspects of Intellectual Property Rights (1994) 33 I.L.M.1125

Brussels Additional Protocol to the International Convention for the Unification of Certain Rules Relating to Damage Caused by Aircraft to Third Parties on the Surface [1939] JALC 281 [The Brussels Insurance Protocol 1938]

Brussels Convention Relating to the Distribution of Programme-Carrying Signals transmitted by Satellite 1144 UNTS 3.

ASEAN Agreement on the Conservation of Nature and Natural Resources 15 EPL 64, 985 EMuT 51

Athens Protocol for the Protection of the Mediterranean Sea Against Pollution from Land-Based Sources and Activities (1980) 19 I.L.M. 869

Athens Convention relating to the Carriage of Passengers and their Luggage by Sea 1974 (PAL) 1463 UNTS 19

Cartagena Protocol on Biosafety to the Convention on Biological Diversity, Jan. 29, 2000, 39 I.L.M 1027

Charter of the United Nations, 24 October 1945, 1 UNTS XVI

Convention on Access to Information, Participation in Decision-Making and Access to Justice in Environmental Matters (Aarhus Convention) ECE/CEP/43

Convention concerning International Carriage by Rail (COTIF) 1397 UNTS 76 as amended by the Vilnius Protocol of 1999

Convention Concerning International Carriage by Rail 1980 1397 UNTS 76

Convention Concerning the Protection of the World Cultural and Natural Heritage (27 USTS 37; TIAS 8226

Convention on the Conservation of Migratory Species of Wild Animals (June 23rd, 1946) BGBI 1984 II, 571, (1991) 19 I.L.M. 15

Convention on Civil Liability for Damages Resulting from Activities Dangerous to the Environment 1993 ETS no. 150

Convention on Damage Caused by Foreign Aircraft to Third Parties on the Surface, Oct. 7, 1952, ICAO Doc. 7364 [The Rome Convention 1952]

Convention for the Establishment of a European Organization for the Exploitation of Meteorological Satellites ('EUMETSAT') (Federal Republic of Germany Bundesgesetzblatt, Jahrgang 1987, Teil 11, p. 256 (1987). 1990 U.K.T.S. 32. Entered into force on 19 June 1986.

Convention for the Establishment of a European Space Agency (ESA) 14 I.L.M. 864. Entered into force 30th October 1980.

Convention Establishing the European Telecommunications Satellite Organisation ('EUTELSAT') 1982 B.G.B.1 1984 II at 683 XI; Annals of Air and Space Law 416 (1986); UK Misc. No. 4, Cmnd. 9154 (1984). Entered into force 1st September 1985.

Brussels International Convention on the Establishment of an International Fund for Compensation of Oil Pollution Damage IMO/Leg.CONF.9/16

Convention Establishing the World Intellectual Property Organization, done at Stockholm on July 1967

Convention of the European Space Vehicle Launcher Development Organisation 1964 [1964] UKTS 30 Cmnd 2391

Convention on the Exploration and Use by States of Outer Space including the Moon and other Celestial Bodies 18 U.S.T.2410; TIAS 6347; 610 U.N.T.S. 205; I.L.M. (1967):6, 386 [1968] Irish Treaty Series No. 7. Entered into force 10th October 1967.

Convention on International Civil Aviation, signed at Chicago, on 7 December 1944 [Chicago Convention] 61 Stat. 1180, 15 UNTS 295

Convention on Civil Liability for Oil Pollution Damage 1992 IMO/Leg.CONF.9/15

Convention on the International Liability of Damage Caused by Space Objects 1972 [Liability Convention 1972] 24 U.S.T. 2389; TIAS 7762; 961 U.N.T.S. 187; I.L.M. (1971):1; [1972] Irish Treaty Series No.7. Entered into force 1st September 1972

Convention of the International Maritime Satellite Organisation 1976 ('INMARSAT')1979 T.I.A.S. 9605. Entered into force 16th July 1979

Convention on the International Mobile Satellite Organization ('IMSO') 31 UST1; TIAS 9605. Entered into Force 16th July 1979

Convention on International Trade in Endangered Species of Wild Fauna and Flora 1973 973 UNTS 243, 27 USTS 1097, TIAS 8249; [2007] Irish Treaty Series 29

Convention on the Law of Treaties 1155 U.N.T.S. 331, 8 I.L.M. 679 (The Vienna Convention)

Convention on the Protection of the Alps (1992) 31 I.L.M. 767

Convention regarding the Unification of Certain Rules Relating to Damage Caused by Aircraft to Third Parties on the Surface [1937] JAL 312 [the Rome Convention 1933]

Convention regarding the Unification of Certain Rules of Law regarding Collisions between Vessels, Bruxelles, Sept. 23rd 1970. T.S. 576

Convention on the Registration of Objects Launched into Outer Space 1975 [The Registration Convention 1976] 28 U.S.T. 695; TIAS 8480; 1023 U.N.T.S. 15. Entered into force 15th September 1976.

Convention Relating to the Regulation of Aerial Navigation, Signed at Paris, on 13 October 1919 [Paris Convention 1919] 11 L.N.T.S. 174; 1 International Legislation 339. No longer in force.

Convention for the Regulation of Whaling 161 UNTS 72 (December 2nd, 1946); [1938] Irish Treaty Series 3

Convention on Third Party Liability in the Field of Nuclear Energy [1968] UKTS 69

Convention for the Protection of Birds Useful to Agriculture 19 March 1902, 102 BFSP 969, 191 CTS 91

Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR) (1993) 32 I.L.M. 1069

Convention for the Protection, Management and Development of the Marine and Coastal Environment of the East African Region (1985) 2 SMT 234

Convention for the Protection of the Natural Environment of the South Pacific 1986
(1987) 26 I.L.M. 38

Convention on the Protection and Use of Transboundary Watercourses and
International Lakes [1992] 31 I.L.M. 1312

Convention for the Unification of Certain Rules for International Carriage by Air
1929 578 UNTS 371

Convention for the Unification of Certain Rules for International Carriage by Air
1999 [Montreal Convention 1999] (2000) 2242 UNTS 309

Convention on Wetlands of International Importance 1971 996 UNTS 244, [2007]
Irish Treaty Series 101

Civil Liability Convention 1969 973 UNTS 3

Declaration of Acceptance of the United Nations Convention by the Agency
(operative since 20 September 1976)

Declaration of the First Meeting of Equatorial Countries. Adopted on December 3rd,
1976 (Bogotá Declaration 1976) (1978) 6 *Journal of Space Law* 194

Declaration on International Cooperation in the Exploration and Use of Outer Space
for the Benefit and the Interest of All States, Taking into Particular Account the
Needs of Developing Countries A/ Res/51/122, 83rd Plenary Meeting

Declaration of Legal Principles Governing the Activities of States in the Exploration
and Use of Outer Space Resolution 1962 (XVIII) 1280th plenary meeting, 13
December 1963

Declaration of the UN Conference of the Human Environment UN Doc. A/CONF
48/14 (1972); (1972) 11 I.L.M. 1416 (Stockholm Declaration 1972)

ELDO Convention, 507 UNTS 177 (1964), [1964] U.K.T.S. 30 Cmnd 2391

Energy Charter Treaty Annex I, Sept 14, 1994, 27/94 CONF/104

Framework Agreement between the European Community and the European Space Agency: approved on the EC side by Council Decision (12858/03 RECH 152 7 October 2003).

Framework Convention on Climate Change 31 I.L.M. 849

Geneva Convention on the High Seas 1958 450 UNTS 82; UKTS 5 (1963), Cmnd 1929

Hague Convention of 15th November 1965 on the Service Abroad of Judicial and Extrajudicial Documents in Civil or Commercial Matters

Helsinki Convention on the Transboundary Effects of Industrial Accidents (1992) 31 I.L.M. 1330

Law of the Sea Convention 1982 U.N.Doc. A/CONF.62/122 (1982), 21 I.L.M. 1261; Misc 11 (1983), 8941; 1833 UNTS 3 (1994)

London Protocol on Preparedness, Response and Co-Operation to Pollution Incidents by Hazardous and Noxious Substances IMO Doc HNS-OPRC/CONF/11/Rev 1(2000)

Lugano Convention on Civil Liability for Damage Resulting from Activities Dangerous to the Environment (1993) 32 I.L.M. 1228

Nairobi Declaration UNEP Report 37 UN GAOR Annex 2 Supp. (No. 25), 49; UN Doc A/37/25 (1982)

Oil Pollution Preparedness, Response and Co-Operation Convention (1991) 30
I.L.M. 735

Porto Agreement to Establish the EEA (1988) 27 I.L.M. 281

Protocol to amend the Athens Convention relating to the Carriage of Passengers and
their Luggage by Sea, 1974 (PAL PROT 2002)

Protocol to the Convention on Long Range Transboundary Air Pollution on the
Reduction of Sulphur Emissions (1979) 18 I.L.M. 144

Protocol between the European Space Agency, the Government of the Republic of
Italy and the Government of the Republic of Kenya on the setting up and operation
of European Space Agency equipment within the perimeter of the San Marco
Satellites Tracking and Launching Station in Malindi, Kenya, and on the cooperation
between the Government of the Republic of Kenya and ESA for peaceful purposes,
13 September 1995

Protocol on Substances that Deplete the Ozone Layer (1987) 26 I.L.M. 154

Stockholm Convention on Persistent Organic Pollutants, May 22, 2001, 40 I.L.M.
532

Stockholm Declaration on the Human Environment, *Report of the UN Conference on
the Human Environment, Stockholm, June 5th-16th, 1972, U.N. Doc.*
A/CONF.48/14/Rev. 1; (1972) 11 I.L.M. 1416

Telemedicine Agreement between the World Health Organisation and the
International Telecommunications Union 1995

Toyko Convention (1969) U.K.T.S. 126, Cmnd. 4230; 704 U.N.T.S. 219

Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under
Water 1963. 480 UNTS 43

Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies 610 UNTS 205; 6 I.L.M. 386.

World Charter for Nature 1982 UN November 9th, 1982, UNGA Res 37/7; 37 UN GAOR Supp (No. 51) 17 UN Doc A/37/51/1982

Vienna Convention on Civil Liability for Nuclear Damage (1963) 2 I.L.M. 727 (Additional Protocol to the Paris Convention on Nuclear Damage)

Other International Materials

Bergen Ministerial Declaration on Sustainable Development in the EEC UN Doc. A/CONF.151/PC/10; (1990) 1 *Yearbook on International Environmental Law* 429

Belgian Working Paper on the Unification of Certain Rules Governing Liability for Damage Caused by Space Vehicles in 1963 U.N. Doc. A/AC/105/C.2/L/7, 30 April 1963

Claim against the Union of Soviet Socialist Republics for Damage Caused by Soviet Cosmos 954, 18 I.L.M. 899, 901 (1979)

Committee on Space Debris of the National Research Council, *Orbital Debris: A Technical Assessment*, National Academy Press, 1995

Conference Resolution 3 of the International Maritime Organisation Conference 2002

Constitution of the World Health Organisation, 2 Official Records 100 (1948)

European Space Debris and Mitigation Standard, Issue 1 rev.3, 2001

Draft Articles on the Prevention of Transboundary Harm by Hazardous Activities, Official Records of the General Assembly, Fifty-sixth Session, Supplement No. 10 (A/56/10)

Historical Responsibility of states for the Preservation of Nature for Present and Future Generations UN Doc. A/RES/35/8

IAA, *Positional Paper on Orbital Debris*, 2001

IADC, *Space Debris Mitigation Guidelines*, IADC-101502, 2002

IATA, *Intercarrier Agreement on Passenger Liability* 1995

ICAO Doc. 7379- LC/34 (Rome September/October, 1952)

International Law Association, *Report of the 52nd Conference*, Helsinki, 1966

International Law Association, *Report of the 53rd Conference*, Buenos Aires, 1968

ILC's Draft Articles on International Responsibility for Wrongful Acts [2001] *Yearbook of the International Law Commission* vol. II (Part Two). Annex to General Assembly resolution 56/83 of 12 December 2001, and corrected by document A/56/49(Vol. I)/Corr.4

ILC's Draft Articles on the Prevention of Transboundary Harm by Hazardous Activities Official Records of the General Assembly, Fifty-sixth Session, Supplement No. 10 (A/56/10)

ILC's Draft Principles on the Allocation of Loss in the Case of Transboundary Harm arising out of Hazardous Activities [2006] II *Yearbook of the International Law Commission*, Part Two

ILC Report A/52/10, 1997

Ministerial Directions of the International North Sea Conferences, 1987, 1990 and 1995

OECD's Recommendation 75/436

OECD Council Recommendation Concerning Transfrontier Pollution C(74) 224 Nov 14th, 1974, Title B(2)

OECD Recommendation on Guiding Principles Concerning International Economic Aspects of Environmental Protection 1972

OECD, *Recommendation for the Implementation of a Regime of Equal Right of Access and Non-Discrimination in Relation to Transfrontier Pollution*, C(77)28(Final), adopted May 17, 1977, Annex (c)

Official Records of the General Assembly, Fifty-sixth Session, Supplement No. 10 (A/56/10)

Principles Governing the Use by States of Artificial Earth Satellites for International Direct Television Broadcasting A/RES/37/92, 10th December 1982, 100th plenary meeting, 37th Session

Principles Relevant to the Use of Nuclear Power Sources in Outer Space A/Res/47/68, 85th Plenary Meeting

Principles Governing Remote Sensing of the Earth from Outer Space Resolution 41/65 of 3rd December 1986

Protocol on Settlement of Canada's Claim for Damages Caused by 'Cosmos 954', Apr. 2, 1981, Can.-U.S.S.R., 20 I.L.M. 689 (1981)

Resolution of the Council of the European Space Agency on the Agency's Legal Liability (ESA/C/XXII/Res.3, 13 December 1977)

Resolution 62/217 International Co-Operation in the Peaceful Uses of Outer Space, 62nd Session, 1st February 2008

Resolution 63/90 International Co-Operation in the Peaceful Uses of Outer Space, 63rd Session, 18th December 2008

Second World Climate Conference: Ministerial Declaration of the Second World Climate Conference (1990) 473 *Yearbook of International Environmental Law* 475

United Nations Environment Programme Report of the Governing Council on the Work of its Fifteenth Session, United Nations Environment Programme, UN GAOR, 44th Session, Supp No 25, 12th mtg at 153, UN DOC A44/25

U.N., *Technical Report on Space Debris*, United Nations publication, Sales No. E.99.I.17

U.N. Doc. A/AC.1/SR4393 (1966)

UN Doc. A/AC.105/19, Annex II, 26th March, 1964

U.N. Doc. A/AC/105/C.2/L/7, 30 April 1963

UN Doc. A/AC-105/G2/SR-131

U.N. Doc A/AC.105/890, Annex IV, Space debris mitigation guidelines of the Scientific and Technical Subcommittee of the Committee on the Peaceful Uses of Outer Space

U.N. Doc. A/AC.105/C.2/SR.29-37 U.N. Doc. A/3902 of Sept. 2nd, 1958

U.N. Doc. A/C.1/PV.982 (12.11.1958)

U.N. Doc. A/AC.105/C.2/L.76 (9.3.1964) reprinted in [1965] *Yearbook of Air and Space Law* 544

U.N. Doc. Working Paper: Approach to the Solution of the Problems of the Delimitation of Airspace and Outer Space, 1979. A/AC.105/C.2/L.76 (XIII)

UNESCO, *Experts Meeting Freedom of Information and Sustainable Development, Sealing the Link* (Paris, 2008)

U.N.G.A. Resolution 63/90 International Co-Operation in the Peaceful Uses of Outer Space, 63rd Session, 18th December 2008

U.N.G.A. Resolution 62/217 International Co-Operation in the Peaceful Uses of Outer Space, 62nd Session, 1st February 2008

U.N.G.A. Resolution 1348 (XIII), U.N. G.A.O.R., 13th Session, Supp. No. 18, U.N. Doc. A/4090, 195

U.N.G.A. Resolution 1472 (XIV) of the 12th December 1959

U.N.G.A. Resolution 1472A (XIV) of Dec. 12, 1959.

U.N.G.A. Resolution 1721 (XVI) of the 20th December 1962

U.N.G.A. Resolution 1721 A (XVI) of December 1961

U.N.G.A. Resolution 1884 (XVIII)

U.N.G.A. Resolution 1962 (XVIII) (Dec. 13, 1963)

U.N.G.A. Resolution 2398 (XXIII) 1968

U.N.G.A. Resolution 3129 (XXVIII) UNGAOR Supp. (No. 30A)

The Question of the Definition and/or Delimitation of Outer Space A/AC.105/C.2/7
Addendum, A/AC.105/C.2/7/Add.1

U.N. Study on the Altitude of Artificial Earth Satellites, A/AC.105/164 (1967)

US Draft Proposal on Liability for Space Vehicle Accidents A/AC.105/C.2/L.4 (4th
of June 1962) reprinted [1965] *Yearbook of Air & Space Law* 544

World Commission on Environment and Development, *Our Common Future*, (OUP,
1987)

Community Materials

Amsterdam Treaty (97/C 340/01) OJ C 340 of 10.11.1997

Lisbon Treaty OJ C306 17.12.2007

Single European Act, Feb. 17, 1986, OJ L 169/1, 29.06.1989, reprinted in 25 I.L.M.
506 (1986)

Treaty Establishing the Coal and Steel Community (1951) 261 U.N.T.S 140

Treaty Establishing the European Economic Community (1957) 298 U.N.T.S.11

Treaty on European Union 31 I.L.M. 247

Regulations

Regulation (EC) No. 1348/2000 OJ L 160/37 of 30th June 2000

Council Regulation (EC) No. 44/2001 as amended Commission Regulation (EC) No
1937/2004 of 9 November 2004 Official Journal L 334 of 10.11.2004

Regulation 889/2002 OJL 140/2 30.05.2002

Regulation 889/2002 OJL 140/2 30.05.2002

Council Regulation (EC) No 876/2002 of 24 May 2002 setting up the Galileo Joint Undertaking O J L 138, 28.5.2002

Commission Regulation (EC) No. 1496/2002, of 21 August 2002 OJ L 225/13 of 22.8.2002

Council Regulation (EC) No 1321/2004 of 12 July 2004 on the establishment of structures for the management of the European satellite Radio Navigation programmes OJ L 246, 12.07.2004

Commission Regulation (EC) No. 1937/2004 OJ L 334/3 of 10.11.2004
Regulation 864/2007 [2007] OJ L 199/40

Directives

Directive 2005/29/EC concerning unfair business-to-consumer commercial practices in the internal market [2005] OJ L 149

Directive 2002/65/EC [1997] OJ L144/19

Directive 1999/44/EC on consumer sales and guarantees

Directive 1999/34/EC OJ L 141/20, 4.6.1999

Directive 97/7/EC on distance contracts

Directive 94/47/EC [1994] OJ L 280/83.

Council Directive 93/13/EEC of 5 April 1993 on unfair terms in consumer contracts OJ L 95/29-34

Directive 90/314/EEC on Package Travel, Package Holidays and Package Tours [1990] OJ L 158/59.

Council Directive 89/104/EEC to approximate the laws of the Member States relating to trade marks [1989] O.J. L40/1

Directive 87/102/EEC [1987] OJ L 42/48.

Directive 85/577/EEC on contracts negotiated away from business premises

Directive 85/375/EEC OJL 210/29, 7.8.1985

Council Directive 84/450/EEC of 10 September 1984 relating to the approximation of the laws, regulations and administrative provisions of the Member States concerning misleading advertising OJ No L 250/17, 19.9.1984

Other Community Materials

EC Council Decision 2001/539/EC O.J.L 194/ 38, 18.07.1998

EC Commission, *Communication from the Commission to the Council and the European Parliament: European Space Policy, Preliminary Elements*, {Sec(2005)664} COM(2005) 208 final

Report from the Commission on the Implementation of Council Directive 93/13/EEC of 5 April 1993 on Unfair Terms in Consumer Contracts, COM 2000/0248/final

EC Commission, *Community Programme for Health and Consumer Protection 2007-2013* COM (2005) 115 final

EU Commission White Paper, *Space: A New European Frontier for an Expanding Union – An Action Plan for Implementing the European Space Policy* COM (2003) 673

EC Commission, *Green Paper on European Union Consumer Protection*, Brussels, 2.10.2001, COM (2001) final

EC Commission, *Report from the Commission to the European Parliament on Consumer Complaints in Respect of Distance Selling and Comparative Advertising*, Brussels 10.3.2000, COM (2000)127 final

EC Commission Staff Working Document, Communication from the Commission to the Council and the European Parliament: European Space Policy, Summary of the Impact Assessment, Brussels, 26.2.2007, SEC (2007) 506

Explanatory Memorandum of the Proposal for a Council Regulation (EC) on jurisdiction and the recognition and enforcement of judgments in civil and commercial matters COM/99/0348 final, O.J. C 376 E, 28th December 1999

Framework Agreement between the European Community and the European Space Agency: approved on the EC side by Council Decision (12858/03 RECH 152 7 October 2003)

Health and Consumer Directorate-General, *Consumer Protection in the European Union: Ten Basic Principles*, 20th July 2004 available at <http://europa.eu.int/comm/consumers/cons_info/10principles/en.pdf>

Proposed Directive on Consumer Rights 2008/0196 (COD)

Proposal for a Council Decision for a Regulation on International Rail Passengers' Rights COD 2004/0049 COM(2003) 696 final, 17.11.2003

Recommendation on the Transparency of Banking Conditions relating to Cross-Border Financial Transactions Rec. 90/109 [1990] OJ L67/39

Resolution on the Space Policy as adopted by the Space Council 22 May 2007, RECH 153, COMPET 165, ENV292, COSDP 443, TRANS 185

The Seventh EC Framework Programme for Research and Technological
Development (COM)

TABLE OF NATIONAL LEGISLATION, PROPOSED LEGISLATION AND REGULATIONS

Alaska

Statute HB 214 Punitive Damages against Employers

Argentina

Decreto Nacional 125/95 Creacion del Registro Nacional de Objetos Lanzados al Espacio Ultraterrestre, Buenos Aires, 19 de Julio de 1995

Australia

Civil Aviation (Carrier's Liability) Acts 1959-1973

Common Carriers Act 1902 (repealed 2002).

Space Activities Act 1998

Space Activities Amendment Act 2002 (Australia).

Space Activities Regulations 2001 (Statutory Rules 2001 No. 186)

Austria

Gesetz gegen den unlauteren Wettbewerb BGBl 1988 No.422

Gesetz über Preisnachlässe Rabattgesetz RGBI 1933 I 1011

Zivilprozessordnung

Zugabengesetz BGBl 1971 II No.196

Belgium

Law on the Activities of Launching, Flight Operations or Guidance of Space Objects 2005.

Trade Practices Act

Wet betreffende de handelspraktijken en de voorlichting en bescherming van de consument

Brazil

Resolution No. 51 Resolution on Commercial Launching Activities from Brazilian Territory (26 January 2001)

California

California Health & Safety Code § 12005
California Water Code § 13350(b).

Chile

Supreme Decree No. 338, Establishment of a Presidential Advisory Committee known as the Chilean Space Agency.

Denmark

Marketing Practices Act

Finland

Act on the Delimitation of the Territorial Waters of Finland (No. 463 of 18 August 1956 as amended)
Kuluttajansuojalaki
Laki sopimattomasta menettelystä elinkeinotoiminnassa,

France

Code de la Propriété Intellectuelle
Decree Law (Ordonnance) of December 18, 1986
Environmental Code
Loi no. 2008-518 du 3 Juin 2008 relative aux opérations spatiales

Florida

Informed Consent to Spaceflight Act (Florida Statutes §331.501)

Germany

Grundgesetz/ Federal Constitution
Gesetz gegen den unläuterer Wettbewerb

Gesetz zur Uebertragung von Verwaltungsaufgaben auf dem Gebiet der Raumfahrt
(Raumfahrtaufgabenuebertragungsgesetz) 1998
Luftfahrtrecht des Bundes/Federal Aviation Law
Zivilprozessordnung
Zugabeverordnung.

Greece

Peri Athemitou Antagonismou, Art.3.

Hong Kong

Supply of Services (Implied Terms) Ordinance (CAP. 257)

India

The Carriers Act 1865

Ireland, Republic of

Air Navigation (Airworthiness of Aircraft) Order. 1964 (S.I. No. 141 of 1964)

Air Navigation and Transport Act 1936

Air Navigation and Transport Act 1988

Air Navigation (Carriage of Munitions of War, Weapons and Dangerous Goods)

Order 1973 S.I. No. 224 of 1973

Air Navigation (Definition of Aircraft) Order 1968

Air Navigation (Nationality and Registration of Aircraft) Order, 1963 (S.I. No. 88 of 1963)

Air Navigation (Operations) Order, 1964 (S.I. No. 140 of 1964)

Air Navigation (Personnel Licensing) Order, 1966 (S.I. No. 165 of 1966)

Air Navigation (Rules of the Air) Order 1992 Schedule.

Air Pollution Act 1987

Búnreacht na hÉireann 1937/ The Irish Constitution 1937

Civil Liability Act 1961

Contractual Obligations (Applicable Law) Act 1991, No. 8 of 1991

District Court (EU Regulations) Rules 2005 SI 635 of 2005

European Communities (Misleading Advertising) Regulations 1988 (SI No. 134 of 1988)

Fisheries Act 1977

Irish Aviation Authority (Rules of the Air) Order 2001

Maritime Jurisdiction (Amendment) Act 1988

Nuclear Test Ban Act 2008

Occupiers Liability Act 1995

Package Holidays and Travel Trade Act 1995

Package Travel, Package Holidays and Package Tours Regulations (SI 1992/3288)

Products Liability Act 1991

Rules of the Circuit Court

Rules of the Superior Courts

Sale of Goods Act 1893

Sale of Goods and Supply of Services Act 1980

Water Pollution Act 1990

Isle of Man

Supply of Goods and Services Act 1996

Japan

Law Concerning Japanese Aerospace Exploration Agency (Japan)

Law of the National Space Development Agency of Japan (Law No. 150, June 23rd, 1969, Japan)

Korea, Republic of

Space Development Promotion Act 2005 (No.7538)

Space Liability Act 2007 (No.8852)

Luxembourg

Law of November 27, 1986 on Unfair Competition

Malaysia

Consumer Protection Act 1999

New Mexico

Space Flight Liability and Immunity Act (New Mexico Senate Bill 37, 2009)

Spaceflight Informed Consent Act SB 9

New York

Consumer Protection Law 1969

New Zealand

Consumer Guarantees Act 1993

Netherlands

Gedragsregelen voor het Reclamewezen

Space Activities Act 2006: Rules Concerning Space Activities and the Establishment of a Registry of Space Objects

Norway

Act on Launching Objects from Norwegian Territory into Outer Space, No. 38, 13 June 1969

Mississippi

Mississippi Constitution (1890)

Portugal

Lei de Defesa do Consumidor Law 29/81 of August 21, 1981

Russia

Commercialization of Space Activity and Commercial Space Activity Legislation
Law of the Russian Federation on Space Activity (August 20th, 1993) (Space Activities Act 1993)

South Africa

Space Affairs Act 1993

Spain

Royal Decree 278/1995, dated 24th February 1995, establishing in the Kingdom of Spain of the Registry foreseen in the Convention adopted by the United Nations General Assembly on 2nd November 1974

Sweden

Act on Space Activities 1982

Decree on Space Activities 1982

Switzerland

Swiss Federal Law on Environmental Protection 1983

Ukraine

Ordinance of the Supreme Soviet of Ukraine: On Space Activity Law of Ukraine of 15 November 1996

United Kingdom

Air Navigation Order 1949 U.K. (S.I. No. 349 of 1949)

Canal Carriers Act 1845

Carriage by Air Act 1962

Carriers Act 1830

Crimes Act 1914

Harbours, Docks and Piers Clauses Act 1847

Outer Space Act 1986

Sale of Goods Act 1893

Sale of Goods and Services Act 1982

Unfair Terms Act 1977

U.K. Radio Authority's Advertising and Sponsorship Code RAC 9

Zetland County Council Act 1974

United States

Air Navigation Act 1920

Alien Tort Claims Act

Civil Aviation Act 1982

Commercial Space Act 1998
Commercial Space Launch Activities Act 1984
Commercial Space Launch Amendments Act 1988
Commercial Space Launch Amendments Act 2004 (US)
Crimes and Criminal Procedure Act 1948 18 U.S.C. ch.1 §7
Cross-Waiver of Liability for Space Station Activities Act 1994
Federal Aviation Act 1958
Federal Aviation Regulations FAR 52.228-7
Federal Aviation Regulation FAR 28.307-2
Federal Aviation Regulation FAR 28.311-1
FAA Procurement Regulations Subpart 1828.307-2
Federal Employees Compensation Act
Federal Tort Claims Act
NASA Act 1958
NASA Act of 1985
NASA Federal Aviation Regulation Supplement NFS clause 1852.228-81/82
Patents Act 2003
Price Anderson Act 1976
Trans-Alaskan Authorisation Act
Uniform State Aeronautics Act

Virginia

Spaceflight Liabilities and Immunities Act (Virginia Ch.3 Code of Virginia 8.01-227.8-10.
Zero Gravity Zero Tax Act 2008

CHAPTER I: HISTORY, DEFINITION AND FUTURE TRENDS

CHAPTER I: HISTORY, DEFINITION AND FUTURE TRENDS	1
1. INTRODUCTION.....	1
2. A BRIEF HISTORY OF SPACE ACTIVITIES.....	2
2.1 Early and Modern Rocketry	2
2.2 The Space Race	3
3. THE SPACE INDUSTRY	8
3.1 The Irish Space Industry	8
3.2 The European Space Industry	10
3.3 The American Space Industry	11
3.4 The Global Space Industry	13
4. THE DEVELOPMENT OF INTERNATIONAL SPACE LAW	14
5. DEFINITION OF SPACE ACTIVITIES.....	18
5.1 Definition of Space	18
5.1.1 <i>Functionalism</i>	20
5.1.2 <i>Spatialism</i>	22
5.1.3 <i>Current Practice</i>	26
5.2 Definition of Activities	28
6. FUTURE TRENDS	30
6.1 THE OECD'S VIEW	30
7. CONCLUSION.....	31

1. Introduction

This thesis is focused on the liability and regulation of civil, peaceful space activities in law. To this end, it is necessary to define ‘space activities’ as it is to be understood within the thesis and to understand the development of both the space industry and space law. First an excursus into the history of space activities provides some indications of the kind of activities accepted with the definition historically and illuminates the backdrop against which the term itself has come to be understood. Second, the current space industry will be examined to assess what activities are now embraced. The value of the industry at national, regional and global levels in monetary terms will also be assessed at this point to demonstrate the economic merit of engaging in space activities. The thesis endorses the view that space activities although risky do bring significant financial rewards. Thirdly, the thesis will consider the development of space law in regulating the space industry, setting out the

relevant international law that will be considered in the thesis and some of the national law. In considering the definition of ‘space activities,’ it is clear that it must incorporate some understanding of ‘space’ itself. The fourth aspect of this chapter will examine the two rival theories which colour the understanding of ‘space’ or more particularly ‘outer space’: functionalism and spatialism. While functionalism, as the name indicates, applies space law to those objects with a space function rather than the location of the object, spatialism, requires delineation between air and space in legal terms. Functionalism is reflected in the *corpus iuris*, that is, in the Outer Space Treaty, the Registration Convention, the Rescue and Return Agreement and the Liability Convention, however more recent practice appears to be more cognisant of the need for demarcation. Both approaches and their merits and demerits are considered here. The fifth issue that arises is what is understood by the term ‘activities’. Finally, the future trends in the space industry as projected by the Organisation for Economic Co-Operation and Development will be examined to assess the prospects for space activities to come and what they may envisage.

2. A Brief History of Space Activities¹

2.1 Early and Modern Rocketry

Rockets were first created by the ancient Chinese and were used by the Chin Tartars against the Mongols in the battle at Kai-feng-fu in 1232 AD.² Between the 13th and the 18th centuries there are numerous historically-recorded experiments with rockets by individuals such as Przepkowski (1380), Kyser von Eichstädt (1405 AD), Fontana (1420 AD) and von Geissler (1668 AD). Rockets were also used by the Indian Sultan Tipu against the English in 1792 and again in 1799. The first attempt to

¹ See Reynolds, Glenn H. and Merges, Robert P., *Outer Space – Problems of Law and Policy* 2nd ed., (Westview Press, Oxford, 1997) pp.1-10.

² See Graham, *Space Exploration: From Talisman of the Past to Gateway of the Future* (NASA, Washington DC, 1995), ch.7. On rocket propulsion generally, see Turner, M.L.J., *Rocket and Spacecraft Propulsion: Principles, Practice and New Developments* (Praxis, Chichester, 2000) and Langton, *Space Research and Technology* (University of London Press, 1970), Vol.II: Rocket Propulsion.

reach space using rockets according to legend was made by a minor Chinese official of the Ming Dynasty called Wan-Hoo (meaning 'Crazy Fox') who attached two kites and forty-seven fire-arrow rockets to a chair. These rockets were lit simultaneously by forty-seven assistants. When the noise ceased and the billows of smoke cleared, Wan-Hoo and his chair were indeed gone, never to be seen again.³ A lunar crater has been named after this first martyr to space travel.

Modern rocketry was born in 1883 when Russian scientist Konstantin Tsiolkovsky, the father of modern astronautics, showed how rockets could operate in a vacuum. He also developed the idea of multi-staging the rockets in order to generate sufficient power to break free from the earth's gravity. Later in 1915 the American, Robert H. Goddard, conducted practical experiments with solid fuel rockets with the first successful launch of a liquid-fuel propelled rocket on March 16th 1926. In Europe, *Die Rakete zu den Planetenraumen* by Herman Oberth inspired the formation of a number of small-rocket societies around Germany, including the *Verein für Raumschiffahrt* that developed the A-4/V-2 rocket used in WWII although it was Germany's Eugen Sänger who pioneered long-range rocket bombers before the war.⁴ Following the war, many of the leading German rocket scientists came and worked in the US. Space activities from the 1950s onwards must be viewed in light of the political polarisation of the cold war. However, rocket science continued to develop in other nations. In 1955, the University of Tokyo's Institute of Industrial Science's Aeronautics Electronics Supersonic Industry Association developed and successfully horizontally launched twenty-nine 'Pencil' rockets, followed by thirty-six 'Baby' rockets.

2.2 The Space Race

The space race commenced around 1957, the International Geophysical Year, when the U.S.S.R. launched both Sputnik 1 and 2. The US sought to launch the Vanguard but though the satellite functioned correctly the launch vehicle was to fail causing the

³ See Zim, Herbert S., *Rockets and Jets* (Harcourt and Brace Co., New York, 1945).

⁴ See Gatland, Hewish and Wright, *The Space Shuttle Handbook* (Hamlyn, London, 1979), ch.2.

state much public embarrassment. The following year America redeemed itself and successfully launched von Braun's Jupiter-C within 60 days of the Vanguard fiasco. This was followed by the launch of Explorer 3 and 4, Vanguard 1, Pioneer 1 and 3 in 1958. In that same year, National Aeronautics and Space Administration was formed by act of congress. In 1960, the first animals (dogs) in space were launched into space by the U.S.S.R. The U.S.S.R. followed this up by launching the first man, Yuri Alekseyevich Gagarin. Within a month, the US launched Alan Shepherd into space. That year, the world's first non-military communications satellite (Echo 1) was launched along with weather and navigation satellites. Gherman Titov, Gagarin's back-up pilot, was also launched into space and became the first man to suffer space sickness. In 1962, John Glenn, Scott Carpenter and Walter Schirra flew into space. In 1963, Valery F. Bykovsky broke records by remaining in space for five days, Gordon Cooper flew into space on the last of the Mercury capsules and on June 16th Valentina Tereshkova became the first woman in space. 1964 marks the year of the first space walk, which was conducted by Alexi Leonov, while Pavel Belyayev remained aboard the Vokshod 1. It also marks the year of the first steps by European Nations and Australia to design their own space programmes with both ESRO and ELDO being formed. The Americans initiated the Gemini programme, with Gus Grissom, John Young, James McDivitt, Ed White, Peter Conrad, Gordon Cooper, Wally Schirra, Tom Stafford, Frank Borman and Jim Lovell all flying into space.⁵ In 1967, both the American and the U.S.S.R. lost men, either while in space or on re-entry, with the Apollo 1 and Soyuz 1 disasters, respectively. As a result, the manned space programmes of both were stalled while investigations were carried out.

Manned space flight re-started in 1968 with the launch of the Soyuz 3 and Apollo 7. 1969 brought us Armstrong and Aldrin's historic moon walk as part of the Apollo 11 mission. Other notable missions of the year included the launches of the Soyuz 4 and 5 and the Apollo 9, 10 and 12. 1970 is remembered for the rescue of the Apollo 13 astronauts, the launch of China's first satellite and the landings of the Venera 7 and LUNA 16 and 17. It also marks the first attempt by ELDO to launch a spacecraft, albeit unsuccessful. Its failure led to the departure of the British from ELDO and the

⁵ See Cortright, E.M.(ed.), *Apollo Expeditions to the Moon* (NASA, Washington D.C., 1975), ch. 2.4 available on-line at <<http://www.planetscapes.com/solar/history/SP-350/ch-2-4.html>>.

movement of the testing range from Woomera to Kourou. The first space station, the Salyut, was built by the U.S.S.R in 1971. But the deaths of the cosmonauts aboard the Soyuz 11 set the U.S.S.R.'s space programme back by two years. ELDO sustained continued setbacks with the loss a communication satellite on November 5th. This was in contrast to ESRO which successfully launched seven satellites (on US launchers) between 1968 and 1972. In 1972, the final manned Apollo missions were carried out, Apollo 16 and 17.⁶ In 1973, the GPS (Global Positioning System) programme began and Pioneer 10 and 11, Mars 4-7, Mariner 10 and the Skylab were launched. The first docking between the U.S.S.R. Soyuz craft and the American's Apollo took place in 1975 as part of a joint test programme. In the same year European Space Agency (ESA) was formed as a result of a fusion of two separate entities, ESRO (which specialised in the development and construction of satellites) and ELDO (which specialised in the development of rocket launchers). In 1978, ESA launched the International Ultraviolet Explorer In 1979, the first European launcher, the Ariane 1, with a payload capacity of 1,850kg was launched.

In 1981, on the twentieth anniversary of Gagarin's flight, the Americans launched the *Columbia*, the first space shuttle,⁷ manned by John Young and Robert Crippen. In 1983 the first human spaceflight with a crew of five took place on *Challenger*. The crew included Sally Ride, the first American woman in space. In 1984, Arianespace was formed to manage commercial launches using the Ariane launcher and soon captured a dominant share of the market. In 1985, the Giotto probe was launched to observe Halley's comet, later also observing 26P/Grigg-Skjellerup. In 1986, *Challenger* exploded in mid-air killing all seven on-board and resulting in the

⁶See Cortright, *ibid* and Brooks, C.G., Grimwood, J.M., Swenson, L.S., *Chariots for Apollo: A History of Manned Lunar Spacecraft* (NASA, Washington D.C., 1979), available on-line at <<http://www.planetscapes.com/solar/history/SP-4205/contents.html>> (last visited November 1st, 2004) and Compton, W.D., *Where No Man Has Gone Before: A History of Apollo Lunar Exploration Missions* (NASA, Washington D.C., 1989), text available on-line at <http://www.planetscapes.com/solar/history/SP-4214/contents.html> (last visited 1st November, 2004).

⁷ See Gatland, Hewish and Wright, *The Space Shuttle Handbook* (Hamlyn, London, 1979), Wilson, Andrews, *Space Shuttle History* (Hamlyn, London, 1980) and DeSaussure, "The New Era in Outer Space," (1980) 13 *Akron L. Rev.* 593.

grounding of the entire shuttle fleet.⁸ MIR space station was started in the same year. As the cold war drew to a close, the political will to continue with human spaceflight programmes waned. Space launches in the early 1990s were largely confined to interplanetary probes or satellites or commercial payloads. In 1990, Discovery launched ESA craft Ulysses to investigate the polar regions of the sun. In 1995, the Solar Helospheric Major state space agencies (most notably NASA⁹) were either disinterested or actively against the development of space tourism.¹⁰ In 1988, the first Intergovernmental Agreement concerning the international space station was signed. This was revised in 1998. The construction of the ISS has suffered a number of set-backs not least of which include the grounding of the shuttle fleet following the destruction of the Columbia on re-entry. While the flight of Discovery was to mark the recommencement of flights to the ISS, the difficulties with that mission have resulted in a renewed grounding of the shuttle fleet. Currently the ISS is reliant on the Soyuz module which has significantly less payload than the shuttle. ESA's ATV is still being tested at ESTEC and may be ready in another year. Nonetheless, the extensive payload capacity of the shuttle is required for the launch of the Japanese KIBO module to the ISS.

In 1999, ESA launched the XMM-Newton X-ray observatory satellite. In 2000, Cluster 2 was launched by ESA to measure earth's magnetosphere. This now operates simultaneously with the CNSA's Double Star mission which was launched in 2004. In 2002, the Envisat, one of the most sophisticated environmental earth-observation satellites, was launched on the Ariane 5 by ESA. In the same year, Integral was launched (a joint ESA/NASA/Rosaviakosmos mission), the most advanced gamma-ray observatory. On October 15th 2003, China became the third nation to independently launch its own taikonaut into space on the Shenzhou 5.

⁸ See Torres, George, *Space Shuttle: The Quest Continues* (Presidio Press, California, 1989), ch.1 and Reichardt, Anthony, *Space Shuttle: The First Twenty Years* (DK Publishing, London, 2002), p.57.

⁹ NASA only became able to consider the advancement of commercial space activity under the NASA Act of 1985, Pub. L. 98-361, 98 Stat 422, codified as amended at 42 USC §2451 (2000).

¹⁰ Collins, Patrick, "Growing Popular Interest in Space Tourism: Challenge and Opportunity for Space Agencies", (54th IAF Congress, Bremen, 2003, IAF-03-LBN.1.08) available at <
http://www.spacefuture.com/archive/growing_popular_interest_in_space_tourism_challenge_and_opportunity_for_space_agencies.shtml>

Interest in the space industry in general has also enjoyed a resurgence of popular support in the wake of a number of high profile successful missions, such as Sojourner (1997),¹¹ Mars Express (2004), SOHO,¹² Cassini-Huygens (2004/2005, launched: 1997),¹³ Opportunity and Spirit (2004),¹⁴ notwithstanding the loss of *Columbia*, the subsequent grounding of the shuttle fleet, and the loss of Beagle II. Planned and publicised missions for the future include the work of Rosetta (launched March 2004, arrival 2015), Darwin,¹⁵ Gaia (2011), Bebi-Columbo (2011/2012), James Webb Space Telescope (2011) and America's planned Moon to Mars mission. But aside from these high-profile missions, the most significant development in the space industry is the emergence of space tourism. Current thinking accepts Dennis Tito as the first space tourist although there were other civilians in space, such as Toyohiro Akiyama and Helen Sharman though this is disputed as he was sent to conduct private research rather than for recreation.¹⁶ Tito was followed by Mark Shuttleworth. The flight of *SpaceShipOne* and its subsequent success in winning the X-Prize marks a watershed for the space tourism industry as the first private commercially funded space vehicle to fly into space and return twice. Other entrepreneurs expect to follow such as Armadillo Enterprises and Rocketplane Ltd. However, given that *SpaceShipOne* has only flown under a test licence, its economic contribution to the space and the space tourism industry has not been included in

¹¹ See NASA, "Mars Exploration Programme," < <http://sohowww.nascom.nasa.gov/>> and NASA, "Mars Pathfinder Rover: Sojourner," available at <<http://www.planetscapes.com/solar/eng/rover.htm>> (last visited November 1st, 2004).

¹² See ESA/NASA, "SOHO: Exploring the Sun", at < <http://sohowww.nascom.nasa.gov/>> (last visited November 1st, 2004).

¹³ See the NASA/JPL, "Cassini-Huygens", at <<http://saturn.jpl.nasa.gov/home/index.cfm>> (last visited November 1st, 2004) and Balenbois, *The European Space Agency* (N.A.N. Editions, Paris, 2003), pp. 26.

¹⁴ See NASA, "Mars Exploration Rover Mission," at < <http://www.planetscapes.com/solar/eng/explorationrover.htm>> (last visited November 1st, 2004).

¹⁵ Fridlund, C.V.M., "Darwin – The Infrared Space Interferometry Telescope" (2000) 103 *ESA Bulletin* 20-25.

¹⁶ O'Brien, Zeldine, "Consumer Law and Space Tourism," Paper presented at the Gibraltar Session of the *Society of Legal Scholars Centenary Conference*, 7th September 2009.

estimates for the industry generally. Research supports the assumption that the space tourism industry is a viable industry with a strong market base.¹⁷

3. The Space Industry

3.1 The Irish Space Industry

Unlike other States,¹⁸ Ireland does not have a designated national agency to regulate its space activity policy nor does it have a specialised governmental unit.¹⁹ Ireland has been a member of the European Space Agency (ESA) since 1975, although it was not a founding state and participation by commercial entities is overseen by Enterprise Ireland. This is managed directly by the Department of Enterprise Trade and Employment. ESA's entire budget for 2009 amounted to €3,591.781m, with €2,819m from Member State contributions, of which Ireland provided 0.47%.²⁰ This participation has many advantages in terms of intellectual property acquisition and economic benefits to Irish companies; indeed it is ESA's policy to operate on a basis of geographical return. Ireland's space policy strategy which has been implemented since 1995 has two main elements:

¹⁷ See generally Abitzsch, "*Prospects of Space Tourism*", 9th European Aerospace Congress, May 15th, 1996, Berlin, available at http://www.spacefuture.com/archive/prospects_of_space_tourism.shtml; Muller, H. *et al.*, "Space Tourism - New Business Opportunity or a Remaining Fiction" (Proceedings of the 49th International Astronautical Congress); O'Neill D., Bekey I., Mankins J., Rogers T.F. and Stallmer E.W., *General Public Space Travel and Tourism*, Vol 1 Executive Summary (NASA/ ISTA, Washington DC, 1998), NP-1998-03-11- MSFC; Futron Corporation, *Space Tourism Market Study* (Futron Corporation, Bethesda, 2002).

¹⁸ These include Argentina (CONAE), Australia (CSIRO; Space Policy Unit Australia), Austria (ASA), Brazil (AEB), Canada (CSA/ASC), Chile (Chilean Space Agency) China (CNSA, CALT), Denmark (DSRI), Finland (TEKES, VTT), France (CNES), Germany (DLR), India (ISRO), Indonesia (LAPAN), Italy (ASI, Italian Aerospace Research Centre), Japan (JAXA), Netherlands (NIVR; SRON), Norway (Norsk Romsenter: NSC), Peru (CONIDA), Spain (CDTI; INTA), Sweden (SNSB), Taiwan (NSPO), Romania (ROSA), Russia (Rosavia Kosmos), United Kingdom (BNSC) and United States (NASA).

¹⁹ Like the SSO in Switzerland or Pakistan's SUPARCO (<http://www.suparco.gov.pk/>).

²⁰ ESA, *ESA Budget for 2009*, (ESA, 2009).

- Support for industrial competitiveness through technology development within Irish high technology companies, with a view to commercial exploitation in global aerospace and telecommunications markets.
- The development of a medium to long term research capability in space related technologies.²¹

Irish space activities are varied and include software systems and services, provision of precision mechanical components, advanced materials testing (involving Trinity College), electronics and microelectronics, telecommunications systems and service engineering and scientific involvement in ESA missions. Adtec Teoranta for instance supplied fueling valves for the Ariane 4 launch vehicle (1988-2003).²² Devtec Ltd. has the contract for the supply of soleoid valves on the Ariane 5 launch vehicle. As to commercial space carriage, the Irish company Astrocourier (Ireland) Ltd. offers space carriage contracts for *inter alia* research experiments with prices starting at \$27,500 for 135cc for flight in an integrated cargo carrier.²³ The European launch industry is operated by Arianespace which was established for that purpose with some 180 satellite launches on the Ariane 4 alone. Ireland currently has no launch site however Shannon International Airport is an emergency landing site for the US space transportation system's orbiter.

The estimated turnover of Irish space activities was €5.7m in 1998 this increased to €6.2m in 2002 but decreased to €4.668m for 2003.²⁴ In 2008, the consolidated sales for Ireland was €4.223m divided into launcher development and production (€1.9m), scientific programmes (€1.14m), support and test activities (€0.92m) and satellite

²¹ DETE, *European and International Programmes*, available at <http://www.entemp.ie/science/technology/europeanprogrammes.htm#esa> (last updated 28th June 2007)

²² See <http://www.enterprise-ireland.com/space/precision/adtec.htm>.

²³ See <http://www.astrocourier.com/>. For additional companies see Space Ireland, *Directory of Irish Companies with Development in Space related Fields* (Space Ireland, 2002), available at <http://www.enterprise-ireland.com/space/directory.htm>.

²⁴ Lionnet, Pierre, *Facts and Figures: The European Space Industry in 2004*, 2nd ed., (Eurosace, Paris, 2005) at p.6 available at <http://perso.wanadoo.fr/eurosace/eurosacefandfdata2004.pdf> (Last updated June 2005; last visited 18th January 2006).

applications (€0.174m).²⁵ Employment directly within Ireland in the space industry remains low with the highest being 71 in man/per year in 1998; in 2008 employment levels stood at 42 in man/per year. France has the highest number employed (11, 641 for 2008) and the highest turnover (€2,758.4m for 2008), followed by Germany. As with most other European states,²⁶ the Irish institutional market (€2.7m) remains larger than the commercial market (€1.8m).

3.2 The European Space Industry

Total employment in space industries in Europe²⁷ in man/per year for the year 2008 was 30,301 with total consolidated sales of €5,884.978m, up from 2007.²⁸ The greatest proportion of this was in the spacecraft segment (€4,036m) with the remainder in the launcher segment (€1,319m) and ground segment (€528m). Commerce and export sales were up in 2008 from the drop taken in 2003 but have yet to return to the levels prior to the market downturn in 2000.²⁹ The European institutional market has remained stable and evidences an absence of growth due to the stabilisation of European institutional budgets. The only growth in the institutional sector has been due to defence programmes. Commercial space markets including Arianespace sales show a cyclical profile.³⁰ The European Union in addition has a dedicated space budget included in both the 6th and 7th Framework Programmes and a Space Policy Unit and held its first Space Council in November 2004.³¹ The E.C.'s role in space activities has many aspects, including ensuring the

²⁵ ASD-Eurospace, *Facts and Figures: The European Space Industry in 2008*, 13th ed. rev. 1 (Eurospace, Paris, 2009) [hereafter ASD-Eurospace, *Report*], p.9.

²⁶ With the exception of Belgium.

²⁷ Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

²⁸ ASD-Eurospace, *Report*, p.14.

²⁹ ASD-Eurospace, *Report*, p.4.

³⁰ *Ibid.*

³¹ 2624th meeting of the Council of the EU Competitiveness, (15259/04, paragraph 31). The second was held on June 7th 2005 and a third is planned. On EC space policy see, the Commission's White Paper, *Space: A New European Frontier for an Expanding Union – An Action Plan for Implementing the European Space Policy* COM(2003) 673.

availability and continuity of services supporting the EC, the integration of space-based systems as well as promoting the co-ordination of the European Position in international co-operation.³² Under the 6th Framework policy 2002-2006, aeronautics and space research has been identified as one of the pillars of European Research areas. The three selected research fields include Galileo, GMES and long-term research in satellite telecommunications (in the context of i2010).

3.3 The American Space Industry

The current State plans for the American space policy have been outlined in NASA's *Vision for Space Exploration*.³³ Its goals include implementing a sustained and affordable human and robotic program to explore the solar system and beyond, extending human presence across the solar system, with a return to the Moon by the year 2020 in preparation for the human exploration of Mars and other destinations, to develop innovative technologies, knowledge and infrastructures to explore and support decisions about destinations for human exploration and to promote international and commercial co-operation to further US scientific, security and economic interests.³⁴ Current US space policy has been described as presenting 'a paradoxical picture of high ambition and diminishing commitment.'³⁵ The current plans aim to achieve this with regard to the space shuttle envisage completion of the ISS and the retirement of the fleet (currently only three are operable).³⁶ Robotic missions to the moon have commenced, with humans returning as soon as 2015

³² See Commission, *Communication from the Commission to the Council and the European Parliament: European Space Policy, Preliminary Elements*, {Sec(2005)664} COM(2005) 208 final at p.6.

³³ NASA, *The Vision for Space Exploration* (NASA, Washington DC, 2004).

³⁴ *Ibid*, p.iii.

³⁵ Abbey, George and Lane, Neal, *US Space Policy: Challenges and Opportunities*, *American Academy of Arts and Sciences*, (Cambridge MA, 2005), p.5

³⁶ On the history of the shuttle itself in commercial operations, see Hosenball, S. O'Neill, "The Space Shuttle in Perspective: Commercial Aspects," in *Space Shuttle and the Law*, Monograph No.3, (University of Mississippi Law Centre, 1980), p.117 *et seq*, Stevenson, "Future Directions in Space" (1978) 10 *Astronautics and Aeronautics* 18 and Brown, Bruce A., "Commercial Law and Liability Issues of the Space Transport System," (1982-1983) 23 *Air Force Law Review* 424.

(though no later than 2020). Robotic missions are also planned to Mars, Jupiter's moons (the Jupiter Icy Moons Orbiter Project Prometheus), asteroids and other bodies. Advanced telescopic searches for Earth-like planets and other habitable planets will occur aided by the planned space telescope: the Terrestrial Planet Finder. Additional deep space telescopes (Life Finder and Planet Imager) are also planned. This is similar to ESA's aim to be achieved through Darwin. NASA also plans to develop a new crew exploration vehicle, a necessity with the retirement of the shuttle, with initial test flights before the end of the decade.

The US public space industry is proceeding in accordance with its space policy of January 2004 as authorised on December 21st 2004.³⁷ From 1958 to 2008, NASA received a total of \$416b. Under the Bush Administration between 2002 and 2006, NASA has received \$78.3b in funding an increase from the previous \$68.9b received between 1997 and 2001.³⁸ But this was below the amounts requested and several programs were cut. Abbey and Lane point out the inadequacies of such increases to cover the programmes that are envisaged.³⁹ The estimated discretionary budget for 2009 is \$17.614 b,⁴⁰ a rise from \$17.116 in 2008 with a further increase proposed in 2010 to €18.7b.⁴¹ Commercial space transportation and enabled industries contributed some \$139.3b in US economic activity in 2006, with over \$35.6b in earnings alone.⁴² The greatest revenue derived from satellite services (\$88.4b) which has experienced significant growth.⁴³ Employment levels in the US space industry

³⁷ See *US Space Transportation Policy Fact Sheet*, January 6th 2005 available at <http://www.ostp.gov/html/SpaceTransFactSheetJan2005.pdf>

³⁸ Office of Management and Budget, *Five Year Comparison Charts: NASA*, available at: <http://www.ostp.gov/html/budget/2006/Five-Year%20Comparison%20Charts/NASACHart.pdf>

³⁹ Abbey and Lane, p.20.

⁴⁰ NASA sought \$19.358b for 2009: See NASA, *Fiscal Year 2009: Budget Request Summary* (NASA, 2009), p.6.

⁴¹ Office of Management and Budget, *A New Era of Responsibility: Renewing America's Promise* (US Government Printing Office, Washington D.C., 2009), p.104

⁴² F.A.A. /C.S.T., *The Economic Impact of Commercial Space Transportation on the US Economy*, (FAA/AST, 2008), p.1.

⁴³ *Ibid.*, p.2.

stand at 729,240 in 2006 with over half in DTH TV services.⁴⁴ Seven of the top ten space sales companies have their headquarters in the US.⁴⁵ Satellite industry revenues have decreased from 2003 to \$97.2b in 2004⁴⁶ although there are concerns that US export control policy may damage the commercial satellite industry.⁴⁷ The split procedure and delays associated with licensing have also had a negative impact on the US satellite industry with a reduction of its market share from 50% in 2003 from 66% in 2002, although this must be viewed in the context of a general global downturn in the market, particularly in GEO launcher services. Overall US satellite industry revenues decreased by 15% in 2004 owing in part to reduced government spending and in part to reduced orders. The launch services industry in the US has also declined and the majority of launches are conducted by the government.⁴⁸

3.4 The Global Space Industry

Currently there are more than 800 operational satellites in orbit today.⁴⁹ Globally, the space industry has increased revenues from \$2.1b in 1980 to more than \$144.4b in 2008.⁵⁰ Growth has been primarily driven by the satellite services industry which accounted for \$84.4b of global revenue for 2008.⁵¹ The satellite launch industry took

⁴⁴ F.A.A./C.S.T., *The Economic Impact of Commercial Space Transportation on the US Economy*, (FAA/AST, 2008).

⁴⁵ The top ten for 2002 are: Boeing Co, Lockheed-Martin Corp., Raytheon Co., Northrop Grumman Corp., EADS Space, Arianespace, Alcatel Space, Alliant Techsystems Inc., Hughes Electronic Corp. and Loral Space & Communications. Source: Lum, Wei Kuan and Pritchford, Larry, *One Giant Leap: Launching and IT Career in the Space Industry* (NOVA, Sunnyvale CA, 2003), p.25.

⁴⁶ Satellite Industry Association, *State of the Satellite Industry Report*, SIA, 2005. See West, Jessica (ed), *Space Security 2009* (SSO, 2009).

⁴⁷ Abbey and Lane, p.12

⁴⁸ For more on the state of the US launch industry see van Fenema, Peter, *The International Trade in Launch Services*, (IASL, Leiden, 1999).

⁴⁹ West, Jessica; Huntley, Wade; Jahku, Ram; Marshall, William; Siebert, John and Williamson, Ray, *Space Security 2009* (Space Security Organization, Ontario, 2009), p.10. But the UCS estimates there are 888 operational satellites in orbit: UCS, Satellite Database, (UCS, July 2009) available at <http://www.ucsusa.org/assets/documents/nwgs/quick-facts-and-analysis-4-13-09.pdf> (Last visited 14th October, 2009)

⁵⁰ See Futron, *State of the Satellite Industry Report 2009* (SIA/Futron, 2009).

⁵¹ Ibid.

a downturn in 2004 but it appears to be recovering. Global satellite manufacturing revenue amounted to \$10.5b in 2008.⁵² The industry's revenue growth was 19% from 2007 to 2008 which represents an increase of 4% from 2006 to 2007. While satellite manufacturing is in decline globally,⁵³ launch industry revenues continue to grow and there has been significant growth of 34% from 2007 in ground equipment revenues for 2008. Global revenues for commercial Earth imaging data has also been on the increase standing at \$735million in 2007.⁵⁴ While the majority of launches globally were governmental (53%) rather than commercial (47%) in 2004, a shift to commercial launches is evident with 66% of total global launches being governmental and 34% commercial in 2000. In 2008, a total of 78 spacecraft were launched, 37 on behalf of governments and 41 on behalf of commercial clients. The cost of launching a commercial satellite into GEO has decreased from approximately \$40,000/kilogram in 1990 to \$26,000/kilogram in 2000.⁵⁵

4. The Development of International Space Law⁵⁶

Books dealing with space law appeared as early as 1932 with Vladimír Mandl's text: *Das Weltraumrecht: ein Problem der Raumfahrt*,⁵⁷ with the first doctoral thesis on the subject produced in 1953.⁵⁸ The matter was also debated before ICAO in 1956 as was its competence in relation to the field. The development of space law gained new impetus with the launch of Sputnik, it became clear to the international community that international regulation of such was necessary. The development of space law

⁵² Futron, *State of the Satellite Industry Report* (SIA/Futron 2009).

⁵³ From \$11.6b in 2007 to \$10.5b in 2008: Futron, *State of the Satellite Industry Report* (SIA/Futron 2009)

⁵⁴ West et al, *supra*, p.94.

⁵⁵ West, Jessica *et al*, *supra*, p.15.

⁵⁶ See generally, Gál, Gyula, *Space Law* (A.W. Sijthoff, Leiden, 1969), pp.23 -31. Von Der Dunk, Frans, "The Changing Paradigm for Space Activities," [2005] 12 *Journaal Luchtrecht* 119 and Hagan, David Russell and Beach, Virginia, *Space Law, the U.N. and the Superpowers: A Study of International Legal Developments and Codification 1957-1969* (University of Virginia, 1970).

⁵⁷ Mandl Vladimír, *Das Weltraum-Recht: ein Problem der Raumfahrt* (Mannheim, J., Bensheimer, 1932).

⁵⁸ Heinrich, Welf, *Luftrecht und Weltraum*, (Georg-August University, 1953).

came at a propitious moment as “there were no vested interests to prevent the international community from embarking on a regime of co-operation rather than of conflict.”⁵⁹ Unlike other regimes, international space law had to be developed entirely and the international community was not faced with all the usual attendant difficulties of altering an existing system. This was particularly appropriate for the UN to take upon itself this task, as Jasentuliyana writes:

It was natural that this responsibility to regulate the new environment would fall upon the United Nations, which had been established to ‘maintain international peace and security’ and charged with the task of ‘encouraging the progressive development of international law and its codification’.⁶⁰

Calls for a programme for international cooperation in the field of outer space law to be placed on the UN General Assembly’s agenda came in 1958⁶¹ and in the same year, the General Assembly established the Committee on the Peaceful Uses of Outer Space (COPUOS) in an *ad hoc* capacity⁶² that later became permanent⁶³ which in turn had two subcommittees – the Legal Subcommittee and the Scientific and Technical subcommittee. The first significant instrument for the purposes of international law adopted by the General Assembly was Resolution 1721⁶⁴ but it was

⁵⁹ Per Rao, Krishna, U.N. Doc. A/AC.105/C.2/SR.29-37, p.78 August 24, 1964, quoted by Jasentuliyana.

⁶⁰ Jasentuliyana, N., *International Space Law and the United Nations* (Kluwer Law International, the Hague, 1999), p.1. See also Hagan, David Russell, *Space Law – The United Nations and the Spacepowers: A Study on International Legal Development and Codification 1957-1969* (University of Virginia, Virginia Beach, 1970) and Zhukov, *United Nations and Space Law, Soviet Association of International Law* (Moscow, 1970).

⁶¹ U.N. Doc. A/3902 of. 2nd September, 1958.

⁶² U.N.G.A. Res. 1348 (XIII), U.N. G.A.O.R., 13th Session, Supp. No. 18, U.N. Doc. A/4090, 1958. See also U.N.G.A. Resolution 1472 (XIV) of the 12th December 1959.

⁶³ U.N.G.A. Res. 1472A (XIV) of Dec. 12, 1959.

⁶⁴ U.N.G. A. Res. 1721 (XVI) of the 20th December 1962. See Herczeg, István, *Questions of International Law* (Hungarian Branch of the International Law Association, Budapest, 1971), at p.53 *et seq.*

the later Resolution 1962⁶⁵ that set out the principles which laid the foundations for the Outer Space Treaty 1967.⁶⁶ Four further instruments were drafted within COPUOS⁶⁷ and today they constitute the corpus iuris spatialis. They include the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space 1968,⁶⁸ the Liability Convention 1972,⁶⁹ the Registration Convention 1976⁷⁰ and the Moon Treaty 1979.⁷¹ There has been no hard law from the COPUOS since the Moon Treaty which took some ten years to draft. There are in addition a vast number of soft law instruments from the UN and bilateral and multilateral agreements, such as the Baikonur Cosmodrome Agreement or the Intergovernmental Agreement governing the ISS 1998. This may be seen as indicative of a move in the regulation of space activities away from binding international obligations to non-binding recommendations, though whether this is a welcome move has been doubted.⁷² The UN has adopted sets of legal principles in relation to Direct Television Broadcasting,⁷³ Remote Sensing,⁷⁴ Nuclear Power

⁶⁵ U.N.G.A. Res. 1962 (XVIII) (Dec. 13, 1963).

⁶⁶ 18 U.S.T. 2410; TIAS 6347; 610 U.N.T.S. 205; I.L.M. (1967): 6, 386 [1968] Ir. T.S. 7. Entered into force 10th October 1967.

⁶⁷ On the space law-making process within COPUOS, see Jasentuliyana, N., *International Space Law and the United Nations* (Kluwer Law International, the Hague, 1999), pp.23-41.

⁶⁸ 19 U.S.T. 7570; TIAS 6599; 672 U.N.T.S. 119; [1968] Ir. T.S. 16. Entered into force 3rd December 1968.

⁶⁹ 24 U.S.T. 2389; TIAS 7762; 961 U.N.T.S. 187; ILM (1971):1; [1972] Ir.T.S. No.7. Entered into force 1st September 1972.

⁷⁰ 28 U.S.T. 695; TIAS 8480; 1023 U.N.T.S. 15. Entered into force 15th September 1976.

⁷¹ 18 ILM 1434; 1363 U.N.T.S. 3. Entered into force 11th July 1984.

⁷² See Hobe, Stephen, "The Importance of the Rule of Law for Space Activities," [2008] 51 *Proc. Coll. L. Out. Sp.* 351.

⁷³ Principles Governing the Use by States of Artificial Earth Satellites for International Direct Television Broadcasting A/RES/37/92, 10th December 1992, 100th plenary meeting. See generally, Queeney, Kathryn M., *Direct Broadcasting Satellites and the United Nations*, (Sijthoff and Noordhoff, Alphen aan den Rijn, 1978) and Christol, Carl Q., "Prospects for an International Legal Regime for Direct Television Broadcasting" (1985) 34 *I.C.L.Q.* 141.

⁷⁴ Principles Governing Remote Sensing of the Earth from Outer Space Resolution 41/65 of 3rd December 1986. See generally Jasentuliyana, N., "UN Principles on Remote Sensing" (1988) 4 *Space Policy* 81, pp.81-84.

Sources Principle⁷⁵ and the Declaration on Outer Space Benefits.⁷⁶ Other branches of the UN have also adopted resolutions with space law aspects, such as UNESCO and the ITU as well as other organizations, such as the ITSO,⁷⁷ IMSO,⁷⁸ WIPO,⁷⁹ WMO⁸⁰ and WHO.⁸¹ Regional organizations and their constitutions and multilateral agreements, such as INTELSAT,⁸² INTERSPUTNIK,⁸³ INTERCOSMOS,⁸⁴ INMARSAT,⁸⁵ EUTELSAT,⁸⁶ ESA,⁸⁷ ARABSAT⁸⁸ and EUMETSAT,⁸⁹ continue to add to the growing body of space law outside of the UN forum. Other treaties extend

⁷⁵ Principles Relevant to the Use of Nuclear Power Sources in Outer Space A/Res/47/68, 85th Plenary Meeting.

⁷⁶ Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and the Interest of All States, Taking into Particular Account the Needs of Developing Countries A/Res/51/122, 83rd Plenary Meeting.

⁷⁷ Agreement Relating to the International Telecommunications Satellite Organization (ITSO) 23 U.S.T. 3813/4901; TIAS 7532. Entered into Force 12th February 1973.

⁷⁸ Convention on the International Mobile Satellite Organization ('IMSO') 31 UST1; TIAS 9605. Entered into Force 16th July 1979).

⁷⁹ World Intellectual Property Organization. For example, its 1974 Brussels Convention Relating to the Distribution of Programme-Carrying Signals transmitted by Satellite 1144 U.N.T.S. 3.

⁸⁰ World Meteorological Organisation.

⁸¹ For example, the Telemedicine Agreement 1995 with the ITU.

⁸² Agreement Relating to the International Telecommunications Satellite Organization ('INTELSAT') 23 U.S.T. 3813; TIAS 7532.

⁸³ Agreement on the Establishment of the 'Intersputnik' International System and Organization of Space Communications 860 U.N.T.S. 3. Entered into force 12th July 1972.

⁸⁴ Agreement on Cooperation in the Exploration and Use of Outer Space for Peaceful Purposes ('INTERCOSMOS') 16 ILM 1. Entered into force on 25 March 1977.

⁸⁵ Convention of the International Maritime Satellite Organization 1976 ('Inmarsat') 1979 T.I.A.S. 9605. Entered into force 16th July, 1979.

⁸⁶ Convention Establishing the European Telecommunications Satellite Organisation ('EUTELSAT') 1982 B.G.B.1 1984 II at 683.

⁸⁷ Convention for the Establishment of a European Space Agency (ESA) 14 ILM 864. Entered into force 30th October 1980.

⁸⁸ Agreement of the Arab Corporation for Space Communications (ARABSAT); done at Cairo on Wednesday, 14 Rabi Al Akhar 1396 H. *Space Law and Related Documents*, U.S. Senate 101st Congress 2nd session, 395 (1990). Entered into force on July 16th, 1976.

⁸⁹ Convention for the Establishment of a European Organization for the Exploitation of Meteorological Satellites ('EUMETSAT') (Federal Republic of Germany Bundesgesetzblatt, Jahrgang 1987, Teil 11, p. 256 (1987); 1990 U.K.T.S. 32. Entered into force on June 19th, 1986.

to apply specifically to outer space, such as the Nuclear Test Ban Treaty.⁹⁰ The proliferation of NGOs, such as the *Institut de Droit International*, the ILA and the International Institute of Space Law, have also aided the development of space law in providing drafts conventions, opinions and model agreements. The development of space law has not been entirely at the supranational level. National laws exist to bring into force the various treaties and conventions and to ensure that space-faring States meet their international obligations regarding the regulation and licensing of space activities. The US formulated its NASA Act in 1958 and the Commercial Space Launch Act in 1984. Other States have formulated domestic law recently, such as Belgium (2005),⁹¹ France (2008), Republic of Korea (2007)⁹² and the Netherlands (2006). The UK is currently reviewing its Outer Space Act 1986. Russia,⁹³ Germany,⁹⁴ South Africa,⁹⁵ Brazil,⁹⁶ Chile,⁹⁷ Norway⁹⁸ and Sweden⁹⁹ also have national laws in place. Ireland has no specific domestic space law. Litigation relating to space activities, such as failed satellite launches has also contributed to the development and understanding of space law and space activities in national law.

5. Definition of Space Activities

5.1 Definition of Space

⁹⁰ 14 U.S.T. 1313; TIAS 5433; 480 U.N.T.S. 43.

⁹¹ Law on the Activities of Launching, Flight Operations or Guidance of Space Objects 2005.

⁹² Space Liability Act 2007 (No.8852). See also the Space Development Promotion Act 2005 (No.7538).

⁹³ Decree 5663-1 About Space Activity.

⁹⁴ Gesetz zur Uebertragung von Verwaltungsaufgaben auf dem Gebiet der Raumfahrt (Raumfahrtaufgabenuebertragungsgesetz)

⁹⁵ Space Affairs Amendment Act 1995.

⁹⁶ Resolution No. 51 Resolution on Commercial Launching Activities from Brazilian Territory (26 January 2001).

⁹⁷ Supreme Decree No. 338, Establishment of a Presidential Advisory Committee known as the Chilean Space Agency.

⁹⁸ Act on Launching Objects from Norwegian Territory into Outer Space, No. 38, 13 June 1969.

⁹⁹ Act on Space Activities (1982:963) and Decree on Space Activities (1982:1069).

On of the immediate difficulties encountered with furnishing a definition of space activities is the absence of a clear definition of 'space'.¹⁰⁰ As Graham observes:

Answering this question depends upon with whom you are discussing the subject. A doctor would state that outer space begins when the human body can no longer survive in the atmosphere. A propulsion engineer might say that space begins when a jet engine which needs air from the atmosphere to function can no longer operate. An aerodynamic engineer might say that space begins when there is not enough of an atmosphere for an aircraft's control surfaces to operate the craft. A bureaucratic agency might have one definition and an international organization may have another. There is no set standard as to where space begins.¹⁰¹

He defines space as "that area beyond the Earth's measurable atmosphere which has very few particles of any size and is flooded with electromagnetic energy."¹⁰² Under the NASA 1958, space is defined as the area 'outside the earth's atmosphere'. Under the South African defined space as "the space above the surface of the earth from a height at which it is in practice possible to operate an object in orbit around the

¹⁰⁰ See generally, Harris, Alexander and Harris, Ray, "The Need for Air Space and Outer Space Demarcation," (2006) 22(1) *Space Policy* 3; Von der Dunk, Frans, "The Sky is the Limit – But where does it End? New Developments on the Issue of Delimitation of Outer Space," (2005) 48 *Proc. Coll L Outer Sp.* 84; Cheng, Bin "The Legal Status of Outer Space and Relevant Issues: Delimitation of Outer Space and Definition of Peaceful Use," (1983)11 *Journal of Space Law* 89-105; Peterson, M.J., *International Regimes for the Final Frontier* (State University of New York Press, 2005), pp.41-74; Malagar L., Odunta, Gbenga, "The Never Ending Dispute: Legal Theories on the Spacial Demarcation Boundary Plane between Airspace and Outer Space," 1(2) *Hertfordshire Law Journal* 64; Meyer, Alex, "Legal Problems of Outer Space," [1965] 28(4) *Journal of Air L. & Com.* 339, at p.342; Kopal, Vladimir, "The Question of Defining Outer Space," in Lyall, Francis and Larsen, Paul B., *Space Law: A Treatise*, (Ashgate, Dartmouth, 2009), at p.129; Ramey, Robert, "Outer Space Law" in Norton, John and Turner, Robert (eds), *National Security Law*, 2nd ed. (Academic Press, Carolina, 2005) 745; Voute, Caesar, "Boundaries in Space," in Jasani, Bhupendra, (ed.), *Peaceful and Non-Peaceful Uses of Outer Space* (Taylor and Francis, 1991), at p.19.

¹⁰¹ Graham, *op cit*, ch. 2.

¹⁰² Graham, *op cit*, ch. 2.

earth.”¹⁰³ However, it is the difference between aerospace and outer space which is the central source of controversy. While there is consensus that terrestrial airspace is synonymous with the earth’s atmosphere, its upper limit remains in doubt. The *corpus iuris spatialis* does not set down a clear delimitation of air space and outer space. This is unsurprising as the US functionalist philosophy was in ascendancy during the drafting of these treaties.

5.1.1 Functionalism

Functionalism draws its distinction on the basis of activities, rather than on actual location. Thus any form of space travel or attempted space travel is a space activity and subject to international space law. It avoids the need to delineate a clear boundary between air and space and thus limiting states’ territorial sovereignty in air space.¹⁰⁴ Supporters include Fawcett,¹⁰⁵ Mc Dougal, Lasswell, Vlasic¹⁰⁶ and Lipson.¹⁰⁷ For them the boundary issue was ‘a comedy of errors’ and a fallacy¹⁰⁸ owing to the difficulties attendant on drawing such a boundary, an argument seemingly supported by the fact that over forty years later no such clear boundary has been definitively set down at an international level. The Bagotá Declaration, where eight equatorial countries (Columbia, Equador, Brazil, the People's Republic of the Congo, Zaire, Kenya, Uganda, and Indonesia) laid claim to the GEO,

¹⁰³ Space Affairs Act 1993.

¹⁰⁴ Recognised in the Paris Convention 1919, Art.1 and the Chicago Convention 1944, Art.6. See UKMIL, 70 *BYIL*, 1999 at p.520; Mc Dougal, Myres S., Lasswell Harold D., and Vlasic, Ivan, *Law and Public Order in Space* (Yale U.P., 1963).

¹⁰⁵ See Fawcett, James, *International Law and the Uses of Outer Space* (Manchester U.P., 1968), p.2, where ‘outer space’ is defined as ‘that part of space where spacecraft do their essential work’.

¹⁰⁶ Mc Dougal, Myres S., Lasswell Harold D., and Vlasic, Ivan, *Law and Public Order in Space* (Yale U.P., 1963).

¹⁰⁷ See McDougal and Lipson, “Perspectives for a Law of Outer Space”, (1958) 52 *Am. J. of Int’l L.* 407.

¹⁰⁸ *Law and Public Order in Space, supra.*

highlighted the problem of not drawing boundaries and is described by Cheng, as “the chickens of functionalism coming home to roost”.¹⁰⁹

A functionalist approach can become grounded in technological distinctions making some functional distinctions appear arbitrary. Aerospace planes¹¹⁰ illuminate this problem.¹¹¹ The political attractiveness of this theory is increased by the absence of a right of innocent passage through sovereign airspace in customary international law. Unlike aircraft,¹¹² spaceplanes traversing through other states’ airspace to get to and from space, though operating for some time as “aircraft” i.e. using more lift than thrust, do not require any grant of permission from those states. Indeed the space shuttle itself demonstrates this cross-over, operating on ascent like a rocket, and in space, mostly on thrusters but on descent, returning as a glider.¹¹³ Commercial crafts like *SpaceShipOne* challenge the functional approach further, with jet-propelled horizontal take-off horizontal landing, rather than the shuttles rocket propelled vertical take-off horizontal landing, and only using rocket engines once in airspace and returning on descent like a shuttlecock and then as a glider. For Brown, the issue

¹⁰⁹ See Cheng, pp.397-398, Wadegaonkar, Damodar, *The Orbit of Space Law*, Stevens and Sons London, 1984.

p.45 and De Saint Lager, Olivier, “Les Pays en Développement et le droit de Activités Spatiales” in Dutheil de la Rochère, Jacqueline (ed.) *Droit de L’Espace – Aspects Récents* (Editions Pedone, Paris, 1988), p.315 at pp.322-323.

¹¹⁰ See Diederiks Verschoor, *An Introduction to Space Law*, 3rd ed. (Kluwer Law International, Alphen aan den Rijn, 2008), at pp.84-85, citing Christol C.Q., “Legal Aspects of Aerospace Planes” (*Proceedings of the International Conference on the Law, Policy of International Air Transport and Space Activities*) in *The Highways of Air and Outer Space over Asia* (Taipei, May 1991), pp.77-91. On the evolution of spaceplanes, see Jenkins, Dennis, “Designing for the Edge of Space and Beyond,” in Springer, Anthony (ed), *Aerospace Design – Aircraft, Spacecraft and the Art of Modern Flight* (Merrell, London, 2003), p.130.

¹¹¹ Noted by Horsford: “Current Aspects of Space Law” (1964) 27 *M.L.R.* 50.

¹¹² *The Nicaragua v. U.S.* (1986) ICJ Reports 14. See Jenks, C. Wilfred, *Space Law* (Stevens and Sons, London, 1965), pp.232-233, Lissitzyn, O., “The Treatment of Aerial Intruders in Recent Practice and International Law,” (1953) 47 *Am. J. Int’l L.* 554, Wright, Q., “Legal Aspects of the U-2 Incident” (1960) 54 *Am. J. Int’l L.* 836 and Shaw, *International Law* (C.U.P., 2003), p. 473.

¹¹³ Brown, Bruce A., “Commercial Law and Liability Issues of the Space Transport System,” (1982-1983) 23 *Air Force Law Review* 424, at pp. 428-429, Andem, *supra*, and Van Traa-Engelman, H.L., *Law & Practice: Commercial Utilization of Outer Space* (Martinus Nijhoff, London, 1993), p.47 *et seq.*

is 'deceptively simple': "[n]ew thinking is required because words impose a constraint." For him the shuttle is just that, neither aircraft nor spacecraft as then understood.

Humankind tends to be a product of its yesteryears and often limits its thinking unnecessarily. Retrospection reveals that the horseless carriage was not really a horseless carriage at all but an entirely new thing...¹¹⁴

Functionalism had the support of the major space powers during the drafting of the five main treaties¹¹⁵ and remains in vogue in the US.¹¹⁶ The issue was not considered a priority by the *Ad hoc* Committee on the Peaceful Uses of Outer Space in 1959¹¹⁷ although in 1966, the General Assembly did request that the Outer Space Committee to examine the issue.¹¹⁸ This request filtered down to the Scientific and Technical Sub-Committee of the Outer Space Committee which could not come to any consensus on the criteria to be applied. The issue has remained with the Legal Subcommittee since then and in 2009, some delegations expressed concern that so little progress had been made. However, since the drafting of the major Treaties, it appears that the alternate spatialist philosophy has gained some support.

5.1.2 Spatialism

Under spatialism, a clear line is drawn between application of law to air and space.¹¹⁹ Some formerly functionalist States have changed their mind to support spatialism,

¹¹⁴ Id at 429.

¹¹⁵ Also favoured by the Soviet Union in the 1960s: Crane, Robert D., "Soviet Attitude towards International Space Law", (1962) *Am. J. Int'l L.* 685.

¹¹⁶ See Lay and Taubenfield, *The Law Relating to the Activities of Man in Space*, (University of Chicago Press, London, 1970) pp.36-62 *c.f.* Johnson, John, *Remarks*, (1961) 55 *ASILP* 165.

¹¹⁷ Report of the *Ad Hoc* Committee on the Peaceful Uses of Outer Space, 1959. See Cheng, B., "The United Nations and Outer Space (1961) 14 *CLP* 247 at pp. 259.

¹¹⁸ See Resolution 2222 (XXI).

¹¹⁹ Cheng, pp. 425-426. See Meyer, *supra*, p.342. For a synopsis of the altitudes put forward by commentators until the late 1960s, see Gál, Gyula, *Space Law* (A.W. Sijthoff, Leiden, 1969), pp. 114-116.

such as Belgium and the Soviet Union, although some States have always favoured spatialism, such as Italy. This change in support was influenced by the Bagotá Declaration, although even in its wake functionalist States were still reluctant to accept the need for any immediate boundary. The spatialist approach provides clarity of application, but there is no consensus among the spatialists as to where the boundary is to be drawn.¹²⁰ As Cheng observes, “there are probably as many criteria as there are speakers or writers on the subject”.¹²¹ Cheng lists these criteria as including: “gravitational effect, effective control, actual lowest perigee of orbiting satellites¹²² (certainly is it doubtful if airspace can be said to extend beyond this¹²³), theoretical lowest perigee of orbiting satellites, the von Kármán line, limit of air drag, limit of air flight, the atmosphere and its various layers, an absolutely arbitrary height... or one-hundredth of the earth’s radius.”¹²⁴ In addition, some jurists favour instead the creation of two demarcations with an intermediate zone. This lack of consensus on the criteria to be used in drawing a boundary and the limitation of sovereignty issue are just two arguments supporting a rejection of this approach. The US has also pointed out the inability of stated to monitor such an altitude boundary

¹²⁰ See Cheng, p.426 and for different approaches: Vencatassin, “Le Champ d’Application du Droit de L’Espace ” in Mc Whinney and Bradley (eds) *New Frontiers in Space Law* (NW Sijthoff, Leyden, 1964), p.9, International Law Association, *Report of the 53rd Conference*, Buenos Aires, 1968, p.110, Kopal, V., “Issues Involved in Defining Outer Space, Space Object and Space Debris,” (1991) 34 *Proc. Coll. L. Out. Sp.*38, Vasilevskaya, Era, “Delimitation of Air and Outer Space,” in Institute of State Law & U.S.S.R. Academy of Sciences, *Studies & Law: Space & Law* (Nauka Publishers, Moscow, 1985), 29 at p.37 *et seq.* Nandakumar, S., “Legal Impasse – Commercialisation of Space through Reusable Sub-Orbital Launchers”, (2004) 47 *Proc. Coll. L.Out. Space* 452, at p.455 and Goedhart R.F.A., *The Never-Ending Dispute: Delimitations of Air Space and Outer Space*, (Editions Frontieres, Singapore, 1996), at p. 151 and UN Doc. A/AC 195/C.2/L.139.

¹²¹ *Studies in International Space Law*, at p. 426.

¹²² Approximately 96 Km UK Skynet-IIA, one other is at 104 Km all others are above 110KM: UN Study on the Altitude of Artificial Earth Satellites, A/AC.105/164 (1967).

¹²³ ILA, *Report of the 52nd Conference*, Helsinki, (1966) and Report of the 53rd Conference, Buenos Aires, (1968).

¹²⁴ The Question of the Definition and/or Delimitation of Outer Space A/AC.105/C.2/7, Addendum, A/AC.105/C.2/7/Add.1 and Górbriel, *The Legal Definition of Outer Space* (University of Lódź, 1980); see also Bookout, Hal H., “Conflicting Sovereignty Interests in Outer Space: Proposed Solutions Remain in Orbit!” 7 *Military Law Review* 23 (Department of the Army Pamphlet No. 27-100-07 January, 1960) from p.37 *et seq.*

as well as the possible inhibiting element such a fixed boundary may have on further efforts to explore outer space.¹²⁵ Before the Legal Subcommittee in 2009, the continuing challenge on reaching international agreement was evident. It was recognized by some delegations both that the need for certainty, to avoid disputes and to establish an effective safety regime in outer space required that space be defined or delimited¹²⁶ and yet others suggested that there should be no amendment to the current corpus iuris, that the current legal framework functions well and that it had not hindered the development of outer space.¹²⁷

The definition based on when the human body can no longer survive in the atmosphere surrounding him or her would set the limit at a rather close 24km.¹²⁸ Acclimatisation to low oxygen levels can occur even at 3km (10,000 feet), as in the case of an inhabitant of La Paz. The F.A.A. requires supplemental oxygen at above this level for crew and passengers although at 16km, supplemental oxygen alone is not sufficient to maintain life and pressurization is also essential. But this will be insufficient at 24km. At this altitude, independent oxygen and nitrogen systems must be maintained. Thus 24km could in one sense be viewed as the delineation between air and space. This appears to have no international support by space powers.

Another theory based on technological limitations rather than humanity's would demarcate at 32Km where turbojet engines can no longer function as there is insufficient air entering into the engine's compressor to mix with the fuel. A ramjet engine may operate above this altitude as it compresses shock waves rather than air but this cannot function above 45Km. Rockets are generally required in order to gain altitudes in excess of this. A central problem with this is however, the development of technology itself. While the physics cannot be altered, it is possible that should

¹²⁵ A/AC.105/C.2/SR.316 (4.4.79).

¹²⁶ U.N.G.A. COPUOS A/AC.105/935, *Report of the Legal Subcommittee on its Forty-Eight Session*, held in Vienna from 23rd March to 3rd April 2009, p. 11, paras 56-60.

¹²⁷ *Ibid*, p.12, paras 62,65 and 69. See also the U.S. Statement, "Definition and Delimitation of Outer Space And The Character And Utilization Of The Geostationary Orbit, Legal Subcommittee of the United Nations Committee on the Peaceful Uses of Outer Space at its 40th Session in Vienna from April" in *Digest of United States Practice in International Law*, 2001 available at <http://www.state.gov/s/l/22718.htm>.

¹²⁸ Graham, p.10 *et seq.*

airships-to-space be developed, which is not dependent on any kind of jet propulsion to reach high altitudes, will force a rethink of an approach so grounded in distinctions between jet and rocket propulsion. Furthermore, there is no international support for such a demarcation at this altitude. The spatialist approach does operate in other areas, for example, under Article 3 of the Law of the Sea Convention 1982.¹²⁹ The change in the clear delineation from 3 to 12 nautical miles change suggests that the fact that an internationally accepted demarcation may change in accordance with practice is not in itself fatal to the philosophy. It also has support at a national level. Under the German Federal Aviation Code, ‘spacecrafts, rockets and other similar objects are regarded as aircraft as long as they remain in airspace.’¹³⁰

There are several arguments in favour of the spatialist approach. Covert notes one of the justifications behind such an approach:

One approach cites the need to delimit the legally-binding obligations regarding the activities and the authority of nations in outer space and air space. Without a clear line, disputes will likely arise, as technology advances, regarding the extent and nature of the obligations nations have assumed in the international agreements related to outer space. Similarly, without consensual definitions among all States, a nation could assert claims of sovereignty that would interfere with space activities desired by many other countries.¹³¹

Cheng observes that international law envisages that the earth, airspace, outer space and celestial bodies will be divided up spatially. This observation is supported by the judgment of Hueber J in *Island of Las Palmas Arbitration* where he stated:

Territorial sovereignty is, in general a situation recognized and delimited in space, either by so-called natural frontiers as recognized

¹²⁹ See Maritime Jurisdiction (Amendment) Act 1988 (Ireland); Act on the Delimitation of the Territorial Waters of Finland (No. 463 of 18 August 1956 as amended).

¹³⁰ §1(2).

¹³¹ “The Post-Human Era: A Time to Reduce Barriers to Intra-Professional Dialogue and Apply More Effective Policy Response”, (2004) 47 *Proc. Coll. L. Out. Sp.* 242, at p.245.

by international law or by outward signs of delimitation that are undisputed, or else by legal engagements entered into between interested neighbours... or by acts of recognition of States with fixed boundaries...[I]t serves to divide between nations the space upon which human activities are employed, in order to ensure them at all points the minimum of protection of which international law is the guardian.¹³²

5.1.3 Current Practice

As such, Cheng submits that the functional division of State activities into lawful and unlawful must be seen to follow rather than to precede from spatial limitation. Therefore, the application of the spatialism to outer space is not to exclude the application of functionalism which will continue to apply as within current international law with regard to lawful and unlawful activities. To do otherwise has been described colourfully as to ‘not only put the cart before the horse but to dispense with the horse.’¹³³ The failure to resolve the matter is due to the lack of urgency that surrounding it and the “fear of surrendering ...valuable sovereign rights”.¹³⁴ But this is changing. State practice suggests that some states at least have accepted a limit at approximately 100km. Italy had suggested such a boundary as early as 1958¹³⁵ as did Belgium in 1976.¹³⁶ At this altitude, there is neither enough nor drag for an aircraft to fly due to the lack of atmosphere. Stars appear as hard points of light and the blackness of space is apparent. Sound waves cannot travel at this altitude. The Australian Space Activities Amendment Act 2002 delineates air and space at a distance of 100 kilometres above sea level.¹³⁷ This is the first time domestic law has intervened to resolve the problem. While the Australian

¹³² 2 R.I.A.A. 829, at p.839.

¹³³ Cheng, *Studies in International Space Law*, p.437.

¹³⁴ Shaw, *supra*, p.480. See Machowski, Jacek, “Selected Problems on National Sovereignty with Reference to the Law of Outer Space” (1961) 55 *ASILP* 169.

¹³⁵ A/C.1/PV.982 (12.11.1958).

¹³⁶ A/AC.105/C.2/L.76 (9.3.1964) reprinted in [1965] *Yearbook of Air and Space Law* 544.

¹³⁷ Space Activities Act 1998 s.8 (as amended).

government sought to downplay the significance of this, Freeland submits this “may represent evidence tending towards the eventual creation of a new customary rule in the future”.¹³⁸ The Soviet Union accepted a boundary at 100km from sea level from 1979 onwards and that States retained the right of space object overflight at altitudes below this.¹³⁹ In relation to national space agencies, both NASA and Rosaviakosmos consider a person to be an astronaut/cosmonaut once reaching this altitude. The Ansari X-Prize Foundation, a U.S.-based organisation that established the X-prize competition, modelled on the Orteig prize won by Charles Lindberg, provided in its rules that to be considered as having reached outer space the space vehicle had to reach 100km or 62miles. Although, as Von der Dunk has noted, ‘a mere advertisement by a private company cannot achieve a feat of constituting or establishing (international) customary law.’¹⁴⁰ This would appear to support an acceptance of the 100km limit by the U.S. However the approach of NASA and the X-Prize foundation is inconsistent with the U.S. Airforce’s understanding of aerospace. This was defined as in 1959 as “an operationally indivisible medium consisting of the total expanse beyond the Earth’s surface.”¹⁴¹ It has altered little¹⁴² with the current definition providing that aerospace is “of, or relating to, the total expanse beyond the earth’s surface.”¹⁴³ The U.S. Department of Defense defines ‘aerospace’ as “of, or pertaining to, Earth’s envelope of atmosphere and the space above it; two separate entities considered as a single realm for launching, guidance,

¹³⁸ Freeland, S., “The Australian Regulatory Regime for Space Launch Activities: Out to Launch?” (2004) 47 *Proc. Coll. L. Out. Sp.* 56, p. 60.

¹³⁹ Working Paper: Approach to the Solution of the Problems of the Delimitation of Airspace and Outer Space, 1979. A/AC.105/C.2/L.76 (XIII).

¹⁴⁰ Von der Dunk, Frans, “The Sky is the Limit – But where does it End? New Developments on the Issue of Delimitation of Outer Space, (2005) 48 *Proc Coll L Outer Sp.* 84.

¹⁴¹ Quoted by Major Rife, Shawn, P., “Five Myths about the Term ‘Aerospace’ ”, [2001] *Air & Space Power Chronicles Online Journal* No.28 available online at <http://www.airpower.maxwell.af.mil/airchronicles/cc/rife.html> (last modified 10th January 2001; last visited 18th January 2006) [hereafter Rife].

¹⁴² See *Air Force Manual (AFM) 1-1*, 1984 and the 1992 editions.

¹⁴³ US Air Force Doctrine Document (AFDD 2) “Organization and Employment of Aerospace Power” dated 17 February 2000.

and control of vehicles that will travel in both entities.”¹⁴⁴ Rife interprets this definition to include intercontinental ballistic missiles, expendable launch vehicles as well as to all exclusively air space or outer space systems. Nonetheless, the Air Force has necessarily recognized that the air and space environments have different characteristics¹⁴⁵ and that there is a general operational limit at 100km:

Although there is no international agreement regarding the specific boundary between air and space, terrestrial-based forces generally operate below an altitude of roughly 100 kilometers; whereas, space-based forces operate above this altitude where the effects of lift and drag are negligible. Space-based forces operate in a harsh environment characterized by high-energy particles and fluctuating magnetic fields and temperatures. Air forces operate in the Earth’s atmosphere, with its temperature, moisture, wind, precipitation, and pressure differences. Airmen must understand both environments as they create an integrated aerospace operation.¹⁴⁶

5.2 Definition of Activities

Space activities are clearly not limited to activities that occur in outer space but are interpreted widely to include earth-based space activities such as launching and testing and to include space research and development. Space activities are widely defined in the South African Space Affairs Act 1993 as “the activities directly contributing to the launching of spacecraft and the operation of such craft in outer space.” In the Netherlands, ‘space activity’ means “the launch, the flight operation or the guidance of space objects in outer space.”¹⁴⁷ The French Law of 2008 uses the term ‘space operation’ which it defines as “any activity consisting in launching or

¹⁴⁴ US Department of Defense, *Dictionary of Military and Associated Terms*, Joint Publication 1-02, quoted by Rife.

¹⁴⁵ US Air Force Basic Doctrine 1 (AFDD1), September, 1997 quoted by Rife.

¹⁴⁶ US Air Force Basic Doctrine, AFDD2-2, August 1998 quoted by Rife.

¹⁴⁷ Rules Concerning Space Activities and the Establishment of a Registry of Space Objects 1969.

attempting to launch an object into outer space, or of ensuring the commanding of a space object during its journey in outer space, including the Moon and other celestial bodies, and, if necessary, during its return to Earth.”¹⁴⁸ The Russian Federation’s Law on Space Activities defines space activities as comprising the creation (including development, manufacture and test), as well as use and transfer of space techniques, space technologies, other products and services necessary for carrying out space activity.¹⁴⁹ These activities may include space research; space communications, including television and radio broadcasting with the help of satellite systems; remote sensing of the Earth from outer space, including environmental monitoring and meteorology; the use of navigation, topographical and geodesic satellite systems; manned space flights; manufacturing of materials and other products in outer space and other kinds or activity performed with the aid of space technologies.¹⁵⁰ The Ukrainian ordinance on space activities defined the term as meaning “scientific space research, the design and application of space technology and the use of outer space.”¹⁵¹ Commercial space activities require sale or purchase on the open market.¹⁵² Under the Russian act, commercial space activity is “independent space activity performed in line with the existing legislation by legal entities and natural persons at their risk and aimed at gaining systematic profits and other benefits from sales of goods, performing work or rendering services in the field of exploration and use of space”.¹⁵³ The current space industry focuses on three elements: satellite telecommunications, satellite remote sensing and space transportation. Space activities also encompass space tourism which includes the existing earth-based space tourism as well as parabolic flights, trips to low earth orbit and orbital flights, although it is the satellite telecommunications industry that is the most mature.

¹⁴⁸ Loi 2008-518, Art.1(3).

¹⁴⁹ Article 2(2) Decree No. 5663-1 of the Russian House of Soviets.

¹⁵⁰ Article 2(1).

¹⁵¹ Ordinance Of The Supreme Soviet Of Ukraine: On Space Activity Law of Ukraine of 15th November 1996 (VVRU, 1997, p. 2), Art.1.

¹⁵² Meredith, Pamela L. and Robinson, George S., *Space Law: A Case Study for the Practitioner* (Kluwer Law International, London, 1992), pp.18-30.

¹⁵³ Article 1.

6. Future Trends

6.1 The OECD's View

The OECD Report, *Space 2030*,¹⁵⁴ sets out three possible future scenarios¹⁵⁵ and the impact on the development of the space industry. In the first scenario, the world is peaceful and there is a greater emphasis on civilian rather than military space programmes. Major progress is achieved technologically and commercial space expands significantly. Although military budgets are reduced, some nations continue to develop a military space infrastructure, emphasising such aspects as telecommunications, earth observation and navigation. All major space powers are seen to cooperate in major space ventures and an international space agency is founded. There is a high degree of technology transfer and a large number of international scientific and exploration programmes develops. Other international organisations become involved in specific aspects of space activities such as WHO and UNESCO as the benefits of distance learning become appreciated. The regulation of space assets is subject to mutually agreed rules. A global space telecommunication space infrastructure is established. Space tourism develops into a successful industry in the favourable economic conditions and the unified markets.

In the second scenario, tensions between China/Russia and the West lead to division into three co-operative blocs, North-America-Europe-Japan, China-Russia and India and other space actors. In this scenario, growing international tensions lead to increasing military budgets and the weaponisation of space, with EU and US space based capabilities increasingly integrated. Civil space programmes are motivated by reasons of national prestige with ambitious manned missions. Civil space applications increase and dual-use technologies develop. Commercial space activities develop somewhat slower than in the first scenario with regional blocs pursuing separate programmes in an environment rife with protectionism. Technology transfer is limited by regulatory procedures. New space-related products are developed

¹⁵⁴ *Space 2030: Tackling Society's Challenges* (OECD, Paris, 2005).

¹⁵⁵ See ch.1, p.21 *et seq.*

regionally but export and investment restrictions negatively impact on this development. Space tourism is able to develop in this environment but is limited to the West.

In the third scenario, multilateralism fails and States go it alone, in a world of unsettled alliances. In this climate, military space budgets increase worldwide and space becomes a militarised zone. The Europeans create their own independent autonomous military space system to keep abreast of other powers. No major international scientific exploration missions are conducted. As in the second scenario, national space programmes are for prestige and to demonstrate national prowess but the value of such efforts is reduced by the level of duplication of programmes and the prioritisation of technology over science. Civil space infrastructures are developed but primarily on a dual-use technology basis. Depressed economic conditions do not favour the development of private space commerce nor do the fragmentation of the markets and the high levels of protectionism. There is a high level of internal competition. Private investment is reduced although military space budgets increase the possibility of civilian spin-offs.

7. Conclusion

It is clear that the earliest phase of development of space activities is inextricably linked with the early phases of rocketry. Since the invention of the multi-stage rocket, the idea of travelling into space and beyond became more plausible reality. This reality came to pass in the 1960s with the launch of both manned and unmanned objects, including satellites and vessels driven by the Space Race. Space technology has also developed and continues to do; spaceplanes challenge the historic conception of space activities as grounded entirely in rocketry. The space industry itself at national, regional and international levels also reflects growth, evident in financial terms, and change. In recent years, there has been an increased commercialisation of space transportation, not simply in terms of cargo, but of persons, which was formerly the coveted preserve of States alone. Against this evolving backdrop is the matching evolution of space law. The Outer Space Treaty,

the *magna carta* of space law, which is forty four years old, the Registration Convention, the Rescue and Return Agreement, the Liability Convention and the Moon Agreement represent in their entirety the sole hard law in the area. Indeed, the dearth of hard law for the last thirty years and the proliferation of soft law instruments suggest a move from internationally binding obligations in the field of space activities towards non-binding resolutions. It is against this practical and legal background that the term 'space activities' is to be defined. The competing theories of functionalism and spatialism provide alternate legal means of understanding the term 'outer space'. It is accepted that functionalism is the method used under the *corpus iuris* and while the issue is still the subject of debate before the Legal Subcommittee of COPUOS, no hard law has been forthcoming. At national level, practice and Australia's 1998 Act recognise 100km as the lower limit and while this has the potential to crystallise into custom at a later date, this has not yet occurred. As a legal solution, the spatialist approach holds a great deal of appeal in providing a bright-line rule with the potential to change – as seen in maritime law boundaries for territorial waters. The absence of a right of innocent passage in airspace is not a significant obstacle in legal terms due to the freedom of use and exploration envisaged in the *corpus iuris* which may be seen to compass freedom of access. However, in limiting state sovereignty, spatialism is not as politically attractive as functionalism.

On the issue of activities, it is clear that the determination of what may constitute a 'space activity' is not tied to those activities that occur only in outer space but may include space-related activities both on the surface of the Earth and in airspace. Furthermore, it is not subject to historical limitation of being grounded in rocketry based technology but may also embrace technology which straddles the divide.

There are a number of trends in the space industry and accordingly in space law from the OECD Report. The militarisation of space remains an important issue though beyond the scope of this discussion. As the OECD point out in all three scenarios, military space activities play a role as do civilian, although in the case of the latter, the reasons for its development vary with the scenario. Commercial space does not fair well in the final scenario although the OECD suggest that space firms in Europe and the US would thrive best in the second scenario. In all three scenarios indicate a

demand for earth observation, positioning and navigation, telecommunications and mobile services remain high. The OECD makes three central recommendations, namely that States implement a sustainable space infrastructure, encourage public use and encourage private sector participation. The last of these may be brought about through the effective regulation of liability and insurance.

CHAPTER II: SOVEREIGNTY, OWNERSHIP AND JURISDICTION

CHAPTER II: SOVEREIGNTY, OWNERSHIP AND JURISDICTION..... 34

1. SOVEREIGNTY	35
1.1 Sovereignty and Freedom of Exploration and Use of Outer Space	35
1.2 Sovereignty and Lunar Resources.....	40
1.3 Private Appropriation of Space and its Resources	42
2. OWNERSHIP.....	47
2.1 Space Objects	47
2.1.1 <i>Ownership of Objects in Space</i>	50
2.2 Ownership of Intellectual Property and the International Space Station	50
3. JURISDICTION	53
3.1 Introduction	53
3.2 Jurisdiction over Space Objects, their Component Parts and Personnel.....	54
3.3 Nationality of Space Objects.....	57
3.4 Criminal Jurisdiction.....	59
3.5 Civil Jurisdiction	68
3.5.1 <i>U.S. Practice</i>	70
3.5.2 <i>Irish Practice on the Exercise of Jurisdiction</i>	71
3.5.2.1 <i>The Traditional Rules</i>	71
3.5.3 <i>European Choice of Law</i>	73
3.5.3.1 <i>Brussels Convention, Brussels I Regulation and the Lugano Convention</i> . 73	
3.5.3.2 <i>Regulation 44/2001</i>	74
3.5.3.2.1 <i>Contracts of Insurance</i>	80
3.5.3.2.2 <i>Consumer Contracts</i>	81
3.5.3.2.3 <i>Inter-Related Claims</i>	82
3.5.3.2.4 <i>Exclusive Jurisdiction</i>	83
3.5.4 <i>Forum Non Conveniens</i>	84
3.5.4.1 <i>Forum non Conveniens and Regulation 44/2001</i>	87
3.5.5 <i>Forum Shopping</i>	88
3.5.6 <i>Other Civil Matters</i>	90
3.5.7 <i>Conflicts of Law in the Law of Air</i>	92
3.6 Choice of Law	92
3.6.1 <i>Choice of Law and Non-European States</i>	96
3.6.1.1 <i>Contract</i>	96
3.6.1.2 <i>Tort</i>	97
3.7 Recognition and Enforcement.....	98
3.7.1 <i>Recognition</i>	98
3.7.2 <i>Enforcement</i>	98
4. CONCLUSION	99

1. Sovereignty

1.1 Sovereignty and Freedom of Exploration and Use of Outer Space

Unlike airspace which is subject to ‘complete and exclusive’ state sovereignty,¹ outer space, as defined as the “void between celestial bodies,”² is the “common province of mankind”, a *res extra commercium* under the existing *corpus iuris spatialis*.³ As such the realm of outer space fits within the existing international law as stated by Hueber J. in the *Isle of Las Palmas Arbitration*:

The fact that the functions of State can be performed by any State within a given zone is ... precisely the characteristic feature of the legal situation pertaining in those parts of the globe which, like the high seas or lands without a master, cannot or do not yet form the territory of a State.⁴

Indeed there is a strong practical basis for the existence of sovereignty in aerospace but not in outer space. Outer space cannot be seen as super adjacent to a State as

¹ Article I of the Convention on the Regulation of Aerial Navigation, signed in Paris on 13 October 1919 (1922) 11 Legal of Nations Treaty Series 173, and Art. I the Convention on International Civil Aviation signed in Chicago 7th December 1944. See Abdurrsyid, Priyatna, “State’s Sovereignty in Airspace,” in Baccelli, Guido (ed), *Liber Americorum Honouring Mateesco Matte* (Editions Pedone, Paris, 1989) and Barrett, R., “Outer Space and Air Space” (1973) XXIV(4) *Air University Review* available at <http://www.airpower.maxwell.af.mil/airchronicles/aureview/1973/May-Jun/barrett.html> and Haley, Space Law – Basic Concepts (1956) 24 *Tennessee L. Rev.* 643.

² Adopting the approach of Cheng, Bin, *Studies in International Space Law* (OUP, 1997), at p.81. See also Cheng. “From Air Law to Space Law” (1960) 13 *Current Legal Problems* 228 at p. 234.

³ Article I, Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space Including the Moon and Other Celestial Bodies, done Jan. 27, 1967, 18 U.S.T. 2410, T.I.A.S. No. 6347, 610 U.N.T.S. 205 (entered into force Oct. 10, 1967) which provides: “Outer space, including the Moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means.” [hereafter the OST] See Cheng, *Studies in International Space Law* (OUP, 1997) at p. 81; Note, “National Sovereignty of Outer Space,” (1961) 74 *Harv. L. Rev.* 1154, and Diederiks-Verschoor, *An Introduction to Space Law* 3rd ed. (Kluwer Law International, Alphen aan den Rijn, 2008) p. 26. On theories of sovereignty in outer space before the OST, see Bookout, Hal H. “Conflicting Sovereignty Interests in Outer Space: Proposed Solutions Remain in Orbit!” 7 *Military Law Review* 23 (Department of the Army Pamphlet No. 27-100-07 January, 1960).

⁴ 2 RIAA 829 at 839.

airspace may as the latter forms 'part and parcel of our planet and rotating with it, constitutes a fixed adjunct to a nation's territory and can be considered integral to it.'⁵ The earth's own rotation and orbit as well as the general movement of the solar system illustrate how difficult it is to claim sovereignty over a particular region of space on the basis as sovereignty is claimed over airspace. A claim based to sovereignty based on *cuius est solum, eius est usque ad coelum* could never practically succeed as owing to the curvature of the earth any space claimed by one state must extend outward from the territory, creating an inverted cone the edges of which must inevitably overlap with the assumed territory of other States.⁶ The UN has consistently accepted the principle of freedom of exploration and use and it is recognised in the Outer Space Treaty.⁷ The Treaty provides specifically for the freedom of exploration, use and scientific investigation of space, the moon and other celestial bodies and for free access to all areas of celestial bodies.⁸ Read in conjunction with Art. I, this freedom is applicable to all states. Gorove argues that the reference however to 'all states' should not be read as excluding the extension of that freedom to international governmental organisations, nongovernmental organisations and individuals. As he observes:

Had it been the intentions of the drafters to exclude entities other than states they could have inserted 'only' to make the phrase read 'only by states'.⁹

This argument, insofar as it applies to international intergovernmental organisations, is supported by Art.VI of the Treaty itself which anticipates acceptance of its terms by such entities. A separate question arises as to the extent to which parties, organisations and individuals may rely on this freedom. What exactly does this freedom import in its scope and content? Gorove posits the question: whether there

⁵ Cheng, *supra*, p.10

⁶ Bookout, Hal H., 7 *Military Law Review* 1 (Department of the Army pamphlet No.27-100-7, January 1960) at p.32

⁷U.N.G.A. Res1962, 18 U.N.G.A.O.R. 15, U.N. Doc A/C.1/L.331 and U.N.G.A. 1721, 16 U.N.G.A.O.R. 6, U.N. Doc. A/15 (1961). See Gorove, Stephen, *Studies in Space Law: It's Challenges and Prospects* (A.W. Sitijhoff, Leiden, 1977), ch. 4, p.49 *et seq.*

⁸Article I OST.

⁹ Gorove, *supra*, p.50.

could 'be such a thing as discovery of some fact which would not constitute some form of exploration or use'. This possibility in turn depends on the definitions for both 'exploration' and 'use', neither of which is expressly defined in the Treaty. Gorove adopts a broad definition for exploration to include 'any purposeful inquiry or observation whether by seeing or hearing, or by any other senses whether done directly by a person or indirectly by a person or through the use of his instruments, or by a combination of both'.¹⁰ Such a definition, untied to the geographical location of the instruments is desirable, including as it would earth-based observational activities. However, given the title of the Treaty itself which refers to activities 'in' outer space, it may be too wide a definition for space law. In addition, it would impose an obligation on States conducting such earth-based observation to ensure that their activities are carried out in the interests of all countries, an unlikely interpretation of the Treaty's obligations.¹¹ As to the word 'use', Mc Dougal and Lipsom observe that it would have been impossible at the time of drafting to foresee and list all possible space activities".¹² With the continuing growth and development of space technology, the difficulties of foreseeing all possible uses in order to provide a comprehensive definition still remains. Nor has the absence of a definition proved a hindrance to the development of the space industry. It is probable that the term, as with 'exploration' will continue to have its parameters set by States through custom. It may be preferable to adopt both a positive and negative view on the scope of the freedom of exploration and use. In the negative sense, it may be seen to be imposing a duty of non-interference on other States and those over whom they exercise jurisdiction and international intergovernmental organizations where that freedom is properly exercised with due regard for the rights of other States and relevant entities. This is supported by the terms of Art. I which provides that '[o]uter space, including the moon and other celestial bodies, shall be free for exploration and use by all States without discrimination of any kind, on a basis of equality and in accordance with international law'.

An additional question raised by Gorove is whether the freedom must involve 'activities'. This is due to the employment of the phrase 'exploration and use' in

¹⁰ Gorove, *supra*, p.54.

¹¹ Gorove, *supra*, p.55.

¹² "Perspectives for a Law of Outer Space," (1958) 52 *Am J. Int'l L* 407.

Art.I and ‘activities in the exploration and use of outer space’ in Art. IV. For Gorove, this is more than a simple question of semantics:

The question is of some importance since, for instance, ‘exploration and use’ must be ‘for the benefit and in the interests of all countries’ ‘without discrimination of any kind’ and ‘on a basis of equality’ whereas ‘activities in the exploration and use’ must be carried on ‘in the interests of maintaining international peace and security and promoting international cooperation and understanding’.¹³

The difference would appear to be more apparent than real however, as Gorove himself notes, if all exploration and use ‘by the very meaning of these terms carries with it the implication of some activity or activities’.¹⁴

The full scope of the positive view on the freedom is undecided. There is no explicit provision on freedom of access to outer space *per se* although the Treaty does provide for ‘free access to all areas of celestial bodies’. Nonetheless, state practice accepts that freedom of exploration includes such. This was so even in the hey-day of the American and Russian space programmes of the 1960s and 1970s with the Mercury, Gemini and Apollo 1-17 and Soyuz 1-11 missions.¹⁵ As Barrett observed in 1973:

[I]n recent years no nation has protested such passage over its territory as violating its sovereignty. In fact, no nation has explicitly reserved its position concerning the passage over its territory of a space object of another country.¹⁶

¹³ Gorove, *supra*, p.52.

¹⁴ Gorove, *supra*, p.52-53.

¹⁵ See Cortright E.M.(ed.), *Apollo Expeditions to the Moon*, (NASA, Washington D.C., 1975); Brooks, C.G. et al., *Chariots for Apollo: A History of Manned Lunar Spacecraft*, (NASA, Washington D.C., 1979) and Crompton, W.D., *Where No Man Has Gone Before: A History of Apollo Lunar Exploration Missions*, (NASA, Washington D.C., 1989).

¹⁶ Barrett, Raymond J., “Outer Space and Air Space: The Difficulties in Definition,” (1973) XXIV (4) *Air University Review* available at

Wadegaonkar suggests that the acceptance by States with full knowledge and consciousness of launching and orbiting of objects supports the conclusion that the distinction between aeronautics and astronautics has been accepted.¹⁷ The precise limits, if any, to this freedom of use Nandakumar submits that the frequent flight of sub-orbital crafts through airspace “may be something in excess of the freedom contained in [the] OST 1967”.¹⁸ The former Soviet Union in its 1979 Report spoke of ‘retaining’ the right of overflight for space objects under the proposed 100m limit, although this has been described as ‘questionable’.¹⁹ Cheng has also queried the scope of freedom of access. He states:

De lege ferenda, it might be too restrictive to secure a right of passage merely for the purpose of reaching to orbit or returning to earth ‘in the territory of the launching State’; for space objects might for instance, be launched and return to *territorium extra commercium*.²⁰

Cheng notes that such a right is less like the right of innocent passage but more like a right of transit passage as envisaged in UNCLOS III. Currently landlocked States have no right to access the High Seas under customary international law.²¹ Nonetheless, state practice has remained unaltered, although for Cheng this is not enough to amount to a general practice giving rise to customary international law. However, there have been some arguments from the U.S. suggesting that this freedom of access should be guaranteed by the military where necessary:

Preserving the freedom to operate on the high seas of space is essential to the future well-being of all nations. Securing space for free travel and commerce to the benefit of all, ideally, should be the aim of all the nations of the world. But where unscrupulous nations or groups seek a

<http://www.airpower.maxwell.af.mil/airchronicles/aureview/1973/may-jun/barrett.html> (last visited 22nd October 2009).

¹⁷ *The Orbit of Space Law*, (Stevens and Sons London, 1984), p.40.

¹⁸ Nandakumar, S., “Legal Impasse – Commercialisation of Space Through Reusable Sub-Orbital Launchers”, in (2004) 47 *Proc. Coll. L. Out. Sp.* 452, at p.454.

¹⁹ Cheng, *Studies in International Space Law*, *supra*, p.452.

²⁰ Cheng, *Studies in International Space Law*, p. 452.

²¹ *Faber Case* [1903] Ven. Arb 600, p. 629; (1903) X R.I.A.A.438.

special advantage that would threaten the space lanes, then responsible people and nations must act together to restore the freedom of space passage through strength and collective will or, in the last resort, by force of arms.²²

In light of such attitudes, it would not seem likely that the status quo will undergo any radical change within this decade save with the exception of increased space traffic systems management and regulation. The freedom is limited by the terms of the Treaty itself as mentioned above, in that it must “be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development” and exercised “without discrimination of any kind, on a basis of equality and in accordance with international law.”

1.2 Sovereignty and Lunar Resources

The Moon and its natural resources *in situ* and the geostationary orbit fall under the common heritage of mankind principle²³ according to Art. 11(3) of the Moon Agreement.²⁴ In this respect, Cheng notes that the Moon Agreement may be seen to have added an additional classification of territory to the original tripartite

²² Hansen, Richard, E., “Dominance on the High Seas of Space: Can the U.S. Afford to Surrender in the Next Conflict to Another Nation’s Dominance in Space?” [1999] *Air & Space Power Chronicles Online Journal No.4* available online at <http://www.airpower.maxwell.af.mil/airchronicles/cc/highseas.html> (last modified at March 1999; last visited 18th January 2005). See also by the same author “*Freedom of Passage on the High Seas of Space*,” (1977) *Strategic Review* 91.

²³ Christol, C.Q., “Legal status of the Geostationary Orbit in the Light of the 1985-1988 Activities of the ITU,” (1989) 32 *Proc. Coll. L. Out. Sp.* 215. See generally, Cocca, A.A., “Common Heritage of Mankind: A Basic Principle of the International Legal System,” (1988) 31 *Proc. Coll. L. Out. Sp.* 89 and Kerrest, A., “Outer Space: *Res Communis*, Common Heritage or Common Province of Mankind,” 2001 ECSL Lecture, Nice, available at <http://fraise.univ-brest.fr/~kerrest/IDEI/Nice-appropriation.pdf>

²⁴ Article 11 and 5 of the Agreement governing the Activities of States on the Moon and Other Celestial bodies, 1979 (hereafter the Moon Agreement). See Ní Chearbhaill, *The Moon Agreement*, (2004) 47 *Proc. Coll. L.Out. Sp.*284.

formulation of Hueber J in the *Isle of Law Palmas Arbitration*, namely, *territorium commune humanitatis*.²⁵

Other celestial bodies are also covered under the principle by virtue of Art.1 of the Moon Agreement. However, this Treaty is not widely accepted with only eleven ratifications (none of which are major space powers) and five signatories and cannot be seen to amount to general international law.²⁶ Cheng submits that as other celestial bodies are *terrae firmae* “there is no reason why they cannot in law be brought under national sovereignty through effective occupation and foreign recognition unless by international agreement foreign states bind themselves not to do so”.²⁷ This is complicated by the OST which provides that “the moon and other celestial bodies” are “not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means” and by Resolution 1721A (XVI) which states that both outer space and celestial bodies are not subject to national appropriation, a principle replicated in Resolution 1962 (XVIII). As the latter declares also that international law applies to outer space, the principle of non-appropriation insofar as it affects celestial bodies appears to contradict this. Cheng notes that “the question that then arises, therefore, is whether the second principle is a valid and effective exception to the first, to the extent to which it contradicts it.” He concludes that as both resolutions are in themselves without binding force, they would not “estop members of the United Nations from denying that the principles that they incorporate are binding” save those that have declared that they view the resolutions as declaratory of customary law. This is supported by the assumption by States that these instruments are mere recommendations. However, he observes that the agreements by the superpowers prior to the resolutions which represent their *modi vivandi* “may lead others not to recognize any claims to sovereignty put forward either by individually by States or collectively through intergovernmental agencies”.

²⁵ Cheng, *Studies in International Space Law*, p.436.

²⁶ The eleven ratifying states are: Australia, Austria, Belgium, Chile, Kazakhstan, Mexico, Morocco, the Netherlands, Pakistan, the Philippines and Uruguay. The signatory states include Peru, Romania, India, France and Guatemala (as at January 1st 2005).

²⁷ Cheng, *Studies in International Space Law*, p. 84.

Thus the policy of the superpowers “may effectively prevent the establishment of territorial sovereignty on celestial bodies” though this would simply be the development of new international customary law. The limit of sovereignty to air space is a key factor in the inability of State to agree internationally on a legal boundary between air and space.

1.3 Private Appropriation of Space and its Resources

Although there can be no national appropriation of outer space, some doubt remains as to whether legitimate private appropriation is possible.²⁸ It is noted that Art.II of the OST does not draw the distinction made by the IISL draft resolution of 1965 which specifically states that outer space “shall not be subject to national *or private appropriation*, by claim of sovereignty, by means of use or occupation or by any other means”.²⁹ Indeed, the Chinese text, which is equally authentic, appears to clearly limit the application of the non-appropriation doctrine to acts of the State.³⁰ Gorove and, more recently, White, submit that it is possible to do so under the existing legal order within a civil legal system where the concepts of property and sovereignty exist independently.³¹ White accepts that this is not possible for common law jurisdictions.³²

This distinction between ‘national appropriation’ and ‘property rights’ requires a narrow reading of Art.II and is supported by a complimentary reading of the Moon

²⁸ It is argued that private appropriation is not excluded: Gorove, Stephen, “Interpreting Article II of the Outer Space Treaty,” (1969) 37 *Fordham L. Rev.* 349, 351; White, Wayne, “Implications of a Proposal for Real Property Rights in Outer Space,” [2000] 42 *Proc. Coll. L. Out. Sp.* 366.

²⁹ Emphasis added.

³⁰ Lee, Ricky J. and Eylward, “Article II of the OST and Human Presence on Celestial Bodies: Prohibition of State Sovereignty, Private Property Rights or Both?” [2005] 48 *Proc. Coll. L. Outer Sp.* 95.

³¹ Gorove, “Interpreting Art. II of the OST,” *supra*; White, Real Property Rights in Outer Space, (1997) 40 *Proc. Coll L. Outer Sp.* 370.

³² White, Wayne, “Real Property Rights in Outer Space,” [1997] 40 *Proc. Coll L. Out. Sp.* 370.

Agreement's Arts 11(2) and 11(3).³³ The delegations from Brazil, Chile, the Philippines, the Netherlands and Japan considered 'appropriation' to prohibit sovereignty claims rather than claims to property rights during the First Committee stage of drafting the OST.³⁴ But such a narrow interpretation is not favoured widely; France considered non-appropriation to prohibit both. Aoki rejects that the absence of "or private appropriation" in Art.II owing to the incompatibility between the alternate interpretation of White and the freedom of access to space in Art.I.³⁵ Christol submits that the inclusion of 'by any other means' extends the scope of Art.II to include the acts of individuals and that this is supported by the *travaux preparatoires*³⁶ although Gorove considers there is no provision precluding private appropriation.³⁷ Dasch *et al* distinguishes between national appropriation and property rights and believes that national appropriation is prohibited but not private property rights.³⁸ Gabrynowicz agrees³⁹ as do Wasser and Jobes.⁴⁰ Tennen submits that the extension of the non-appropriation doctrine to private entities is 'firmly established in space law'.⁴¹ Prevost also supports a wide interpretation of Article II.⁴²

³³ Lee, Ricky J. and Eylward, "Article II of the OST and Human Presence on Celestial Bodies: Prohibition of State Sovereignty, Private Property Rights or Both?" (2005) 48 *Proc. Coll. L. Out. Sp.* 95 and Aoki, Setsuko, "Commentary on Emerging System of Property Rights in Outer Space," *Proceedings of the UN/Republic of Korea Workshop on Space Law – United Nations Treaties on Outer Space: Actions at the National Level* (UN, New York, 2004) ST/SPACE/22 (I am grateful to Prof. Aoki for giving me a copy of her paper for this research).

³⁴ U.N. Doc. A/AC.1/SR4393 (1966).

³⁵ Aoki, Setsuko, *Commentary, supra*.

³⁶ Christol, Carl, Q., "Article II of the 1967 Treaty Revisited," (1984) 9 *Ann. Air & Space L.* 217 at p.241.

³⁷ Gorove, Stephen, "Interpreting Article II of the Outer Space Treaty," (1969) 37 *Fordham L.Rev.* 349 at 351.

³⁸ Dasch, Pat, Martin-Smith, Michael and Pierce, Ann, "National Space Society," (1999) *IAC*:50.

³⁹ "The International Space Treaty Regime in the Globalization Era," (2005) *Ad Astra* 30.

⁴⁰ Wasser, Alan and Jobes, Douglas, "Space Settlements, Property Rights and International Law: Could a Lunar Settlement Claim the Lunar Real Estate it Needs to Survive?" [2008] 73 *Journal of Air L. & Comm.* 38, p.46.

⁴¹ See Tennen, Leslie, *Second Commentary on the Emerging System of Property Rights in Outer Space*, Proceedings of the UN/Republic of Korea Workshop on Space Law 2003, 342 at 343. See also Tennen, "Outer Space: A Preserve for All Humankind," (1979) 2 *Hous. J. Int'l L.* 145, 149.

⁴² Prevost, "Law of Outer Space Summarized," (1970) 19 *Clev. St. L. Rev.* 595, 606.

This view is supported by Lee and Eylward otherwise States could simply privatise the offending entity in order to escape the non-appropriation doctrine⁴³ The US State Department's Official Determination has stated that, “[i]n the view of the Department, private ownership of an asteroid is precluded by Article II of the [Outer Space Treaty of 1967].” The statement from the Board of Directors of the International Institute of Space Law submits that private entities may not attempt to do what States are not permitted to do – an interpretation justified by a conjunctive and harmonious reading of Article I of the OST and the obligation of States to supervise all its non-governmental activities under Article VI.⁴⁴ For the State to permit private individuals to claim real property rights in respect of the Moon, its natural resources in situ, outer space or the geostationary orbit would be a breach by that State of its international treaty obligations. So the US would have been in breach of its obligations when the Geneva Town council in Ohio passed and ratified its own declaration of ownership had this occurred post-OST ratification.⁴⁵ This would also appear to be supported by the case law. In *Nemitz v US*,⁴⁶ the applicant’s claim for parking fees against NASA

⁴³ Lee, Ricky J. and Eylward, “Article II of the OST and Human Presence on Celestial Bodies: Prohibition of State Sovereignty, Private Property Rights or Both?” [2005] 48 *Proc. Coll. L. Out. Sp.* 9; Sterns and Tennen, “Privateering and Profiteering on the Moon and other Celestial Bodies: Debunking the Myth of Property Rights in Space,” (2003) 31 *Adv. Sp. Res* 2433; Pop, Virgiliu, “The Men who Sold the Moon: Science Fiction or Legal Nonsense?” (2001) 17 *Sp. Policy* 195, Pop, Virgiliu, “Appropriation in Outer Space: The Relationship between Land Ownership and Sovereignty on Celestial Bodies,” (2000) 16 *Sp. Policy* 275, Von Der Dunk Frans, Back-Impallomeni, Hobe, Stephen and de Arellano, R.M., Ramirez, “Surreal Estate: Addressing the Issue of ‘Immovble Property Rights on the Moon,” (2004) 20 *Space Policy* 149 and White, Wayne, “Interpreting Article II of the Outer Space Treaty,” [2003] 46 *Proc. Coll. L. Out. Sp.* 171.

⁴⁴ IISL, *Statement by the Board of Directors of the International Institute of Space Law on Claims to Property Rights Regarding the Moon and Other Celestial Bodies*, (IISL, 2004) available at http://www.iislweb.org/docs/IISL_Outer_Space_Treaty_Statement.pdf (last visited 21st October, 2009) and IISL, *Further Statement by the Board of Directors of the International Institute of Space Law on Claims to Lunar Property Rights* (IISL, 2009) <http://www.iislweb.org/docs/Statement%20BoD.pdf> (last visited 23rd October 2009). See generally Pop, Virgiliu, “Extraterrestrial Real Estate: Debunking the Myth,” [2004] 47 *Proc. Coll. L. Out. Sp.* 334.

⁴⁵ The declaration was passed in 1966. See http://www.geocities.com/moonsayles/geneva_moon_owner.jpg

⁴⁶ The applicant’s brief is available at <http://www.erosproject.com/appeal/apindex.html>. See White, Wayne, “Nemitz vs U.S., The First Real Property Case in the United States Courts,” [2004] 47 *Proc.*

for its NEAR Shoemaker craft owing to his alleged ownership of Asteroid 433 Eros was unsuccessful. The applicant relied on a class D designation from the Archimedes Institute, his natural property rights and his Californian Commercial Code filing. The district court dismissed the claim holding that the plaintiff had failed to state a valid claim as he had no valid legal basis for asserting ownership. It also held that neither the tenth nor the eleventh amendments provided a cognisable cause of action for the denial of a property right in space. The appellate court affirmed this finding and upheld the district court orders. The claim of three Yemeni men to the entire planet of Mars against the US was withdrawn under pressure from the Yemeni prosecutor general,⁴⁷ suggesting that this has been accepted by other States, notwithstanding the Bogotá Declaration 1976.⁴⁸ Aoki also lists some examples of the attempted sales of celestial objects.⁴⁹

White also submits that although resources, while *in situ*, may not be subject to proprietary claims, this is not the case once removed.⁵⁰ Aoki submits on the basis of analogy with Art. 137 of the Law of the Sea Convention 1982, dealing with the resources of the deep sea bed, that lunar and other celestial resources *in situ* are *res communis* but on recovery title passes to the entity which mined the resources.⁵¹ This

Coll. L. Out. Sp. 339 and Kelly, Robert, “*Nemitz vs. United States, A Case of First Impression: Appropriation, Private Property Rights and Space Law Before the Federal Courts of the United States*,” (2004) 30 *Journal of Sp. L.* 297 and Diederiks-Verschoor, *supra*, pp.155-156.

⁴⁷ CNN, “Three Yemeni Men Sue NASA for Trespassing on Mars” *Sci-Tech*, July 24th 1997, available at <http://www-cgi.cnn.com/TECH/9707/24/yemen.mars/>

⁴⁸ This stated: “the segments of geostationary synchronous orbit are part of the territory over which Equatorial states exercise their national sovereignty” (1978) 6 *Journal of Space Law* 194.

⁴⁹ 1955 Hayden Planetarium; 1979 Celestial Gardens; 1980 Lunar Embassy (more than 1,125,000 people hold real estate certificates; see <http://www.buylandonthemoon.com/>) 1992 Space Pioneers (Mars); 1990’s Universal Lunarian Society and Martian Consulate. See also The Lunar Registry website (“Earth’s Leading Lunar Real estate Agency”) <http://www.lunarregistry.com/info/faq.shtml>

⁵⁰ White, “Implications of a Proposal for Real Property Rights in Outer Space,” [2000] 42 *Proc. Coll. L. Out. Sp.* 366.

⁵¹ Article II Annex III of UNCLOS. On the feasibility of such exploitation, see Jahku, Ram and Buzdugan, Maria, “The Role of Private Actors: Commercial Development of Outer Space Resources, Including Those of the Moon and Other Celestial Bodies: Economic and Legal Implications,” *Proceedings of the Policy and Law Relating to Outer Space Resources: Examples of the Moon, Mars, and Other Celestial Bodies Workshop*, Montreal, June 28-30, 2006, p.58.

is in contrast to the practice of NASA which refuses to recognise private proprietary claims to lunar resources which were removed from the surface.⁵² U.S. regulations forbid the private ownership of Apollo lunar samples. The value of lunar rocks once removed has been valued at \$1m per 10 ounces.⁵³ The Courts had an opportunity to examine the matter in the *Honduran Lunar Rock Case*.⁵⁴ Here an American national sought to sell a 1.1 gram piece of lunar rock that had been retrieved by an Apollo-17 mission in 1972. The piece was part of a larger sample named the Goodwill rock that had been broken into more almost two hundred pieces and distributed to one hundred and thirty five nations. It was mounted on a plaque and presented to the President of Honduras by the United States. The plaque was stolen by Colonel Ugarte from the Presidential Palace in the 1990s. It was then purchased by a Mr. Rosen from Ugarte. Rosen then sought to sell the rock online when it was confiscated by Customs Service agents as Rosen had smuggled the rocks in without paying the appropriate customs duties. Rosen sought to argue that as the rock had been the property of the Honduran government it was outside the scope of the regulations. The Court found that the rock was still the property of the Honduran government and Mr. Rosen did not have good title. Jordan J. ordered the return of the rocks.

Lee and Eylward submit that notwithstanding the disputes regarding the correct interpretation of Art. II, there is evidence to suggest that “there may be sufficient state practice and/or *opinio juris* to support the notion that the prohibition of private property rights may be a principle of international law.”

⁵² Judicially noted in *United States v. One Lucite Ball Containing Lunar Material*, 252 F. Supp. 2d 1367 (S.D.Fla. 2003); 2003 U.S. Dist. LEXIS 4672; 16 Fla. L. Weekly Fed. D 342 (2003) (the Honduran Lunar Rock Case).

⁵³ Reed, Christina, “Moon Rocks for Sale,” *Geotimes*, September 2002, American Geological Institute, available at http://www.agiweb.org/geotimes/sept02/NN_moon.html

⁵⁴ *United States v. One Lucite Ball Containing Lunar Material (One Moon Rock) and One Ten Inch by Fourteen Inch Wooden Plaque* 252 F. Supp. 2d 1367; 2003 U.S. Dist. LEXIS 4672; 16 Fla. L. Weekly Fed. D 342 (2003) (the Honduran Lunar Rock Case). See Siehr, Kier, “Chronicles,” (2005) 12 *International Journal of Cultural Property* 118.

2. Ownership

2.1 Space Objects

A space object is distinguishable in international law from aircraft, even when in airspace, with liability to an aircraft in flight caused by another State's space object being absolute under the Liability Convention but strict where it is caused to by a space object. The term 'space object' is not defined definitively in the *corpus iuris spatialis* notwithstanding the efforts made to do so during the negotiations regarding the Liability and Registration Convention.⁵⁵ It is stated in those Conventions to include "component parts... as well as its launch vehicle and parts thereof"⁵⁶ and in the Outer Space Treaty to include "objects landed or constructed on a celestial body". However, as observed by Kerrest, this is merely a precision, not a definition.⁵⁷ Under Art.31.1 of the Vienna Convention, treaties must be interpreted 'in accordance with the ordinary meaning to be given to the terms of the treaty in their context and in light of its object and purpose'.⁵⁸ Here, the starting point of the Treaties themselves is of limited assistance in clearing up the textual ambiguity surrounding the definition of the term. Recourse may be had to supplementary sources under Art.32 where the interpretation under Art.31 is obscure, such as the *travaux préparatoires*, subsequent practice, commentaries or case law. Some writers also suggest that it is

⁵⁵ Hurwitz describes this as 'regrettable': *State Liability*, p.25 *et seq.* See Andem, Maurice, "Recent Developments in Space Transportation Systems and the Problems Relating to the Definition of Space Objects in Space Law: A Brief Reflection on the Legal Status of Space Planes," in Tupamäki, Matti, *Liber Amicorum Bent Broms* (Finnish Branch of the International Law Association, Suomen Osasto, Helsinki, 1999), p.1.

⁵⁶ Art. I(d) Liability Convention; Art. I(b) Registration Convention.

⁵⁷ Kerrest, Armel, "Liability for Damage Caused by Space Activities", in Benkö, Marietta and Schrogl, Kai-Uwe (eds), *Space Law: Current Problems and Perspectives for Future Regulation* (Eleven International Publishing, Utrecht, 2005), 91 at p. 97.

⁵⁸ Vienna Convention on the Law of Treaties 1969. See generally, Sinclair, *The Vienna Convention on the Law of Treaties*, 2nd ed. (Manchester University Press, 1984) and specifically Hurwitz, Bruce, *State Liability for Outer Space Activities in Accordance with the 1972 Convention in International Liability for Damage Caused by Space Objects* (Kluwer, Dordrecht, 1992), p.12.

permissible to have regard to comparative conventions.⁵⁹ International law generally is not wholly consistent in its usage of the term.

While Resolution 1721(XVI) uses the term objects, Resolution 1962 (XVIII) uses both 'objects' and 'space vehicle', thus marking the beginning of dual terminology usage. The Outer Space Treaty uses the term 'space vehicle' in Articles V and XII, although 'object' is used later in Articles VII and VIII. 'Space vehicle' is defined in neither but a definition may be found in the 1964 ELDO Convention: "a vehicle designed to be placed in orbit as a satellite of the Earth or other heavenly body, or to be caused to travel traverse some other path in space".⁶⁰ The Moon Agreement similarly uses both terms although it refers to spacecraft and man-made objects separately.⁶¹ The Rescue Agreement uses the term 'spacecraft'⁶² in Articles 1- 4 but then returns to the vocabulary of 'space object' in Art.5. Cheng observes that the terms 'spacecraft and space object' "appear to have been treated as synonymous terms".⁶³ He suggests from their usage in the Space Treaties however that 'space vehicle' and 'spacecraft' "have been used primarily to designate any device designed to move, or to be stationed, in space or on celestial bodies, whether manned or unmanned."⁶⁴ National law provides limited assistance.⁶⁵

⁵⁹ Theunis, J., (ed.) *International Carriage of Goods by Road* (Lloyd's of London Press, 1987), p.226; Clarke, Malcom A., *Contracts of Carriage by Air* (LLP, London, 2002), p.28.

⁶⁰ 507 UNTS 177 (1964); [1964] U.K.T.S. 30 Cmnd 2391.

⁶¹ See Art. VIII of the Moon Agreement.

⁶² Fawcett, James, in *International Law and the Uses of Outer Space* (Manchester U.P., 1968) defines a "spacecraft" at p.2 as "a general terms to describe any object whether it is a vehicle or not, which goes into Earth orbit or beyond." He applies a test of whether its 'real work' is to go into outer space citing *Polpen Shipping Co. v Commercial Union Insurance* [1943] 1 K.B. 161; [1942] 74 Lloyd's List Rep. 157.

⁶³ *Studies in International Space Law*, p. 463.

⁶⁴ *Ibid.*

⁶⁵ But not always – Art.4 of the Spanish Royal Decree, dated 24th February 1995, establishing in the Kingdom of Spain of the Registry foreseen in the Convention adopted by the United Nations General Assembly on 2nd November 1974 defines 'space object' in no greater detail than the Liability Convention as including "both component parts thereof and the launch vehicle and parts thereof."

In Belgium, a space object means any object launched or intended to be launched into outer space, including the material elements composing that object”⁶⁶ while in Korea it means an object “designed and manufactured for use in outer space including space launch vehicles, artificial satellites, and spaceships and their components”.⁶⁷ The South African Space Affairs Act defines a spacecraft as “any object launched with the purpose of being put and operated in outer space” with launch defined as “the placing or attempted placing of any spacecraft into a suborbital trajectory or into outer space, or the testing of a launch vehicle or spacecraft in which it is foreseen that the launch vehicle will lift from the earth's surface”.

The Australian Space Activities Act 1998 includes defines a space object as a thing consisting of a launch vehicle and a payload (if any) that the launch vehicle is to carry into or back from outer space or any part of such a thing, even if the part is to go only some of the way towards or back from outer space or the part results from the separation of a payload or payloads from a launch vehicle after launch. A payload is also defined, as including “a load to be carried for testing purposes or otherwise on a non-profit basis.” The US in its Commercial Space Act of 1998 favours the term 'space transportation vehicle' which it defines as “any vehicle constructed for the purpose of operating in, or transporting a payload to, from, or within, outer space, or in suborbital trajectory, and includes any component of such vehicle not specifically designed or adapted for a payload”. Galloway has noted the need for definition of ‘component parts’ as there are two possible interpretations – the component parts of a single spacecraft or the component parts of a cluster of space objects, for example, the ISS.⁶⁸ Cheng concludes:

In sum, therefore, the term space object designates any object which humans launch, attempt to launch or have launched into outer space. It

⁶⁶ Art. 3(1), Law on the Activities of Launching, Flight Operations or Guidance of Space Objects 2005.

⁶⁷ Art.2(3) Space Development and Promotion Act 2007 (No.7538).

⁶⁸ Galloway, Eileen, “ The Relevance of General Multilateral Space Conventions to Space Stations,” in Böcksteigel, Karl-Heinz (ed), *Space Stations, Legal Aspects of Scientific and Commercial Use in a Framework of Transatlantic Co-Operation*, (Carl Heymans Verlag, Cologne, 1985), p.33 *et seq.*

embraces satellites, spacecraft, space vehicle equipment, facilities, stations, installations and other constructions, including their components, as well as the launch vehicles and parts thereof.⁶⁹

2.1.1 Ownership of Objects in Space

Ownership generally is unaffected by presence in space or on a celestial body as Art. VIII of the OST provides:

Ownership of objects launched into outer space, including objects landed or constructed on a celestial body, and of their component parts, is not affected by their presence in outer space or on a celestial body or by their return to the Earth.

The Moon Agreement also states this albeit in a slightly different formulation⁷⁰ which applies to “space vehicles, equipment, facilities, stations and installations”. Property rights in space may derive from products manufactured in space.

2.2 Ownership of Intellectual Property and the International Space Station⁷¹

In relation to intellectual property rights in space,⁷² the US has taken steps in its Patent Act⁷³ to ensure that any invention made, used or sold in outer space on board a

⁶⁹ *Ibid* at p. 464.

⁷⁰ Art. 12(1).

⁷¹ See Balsano and Wheeler, “The IGA and ESA: Protecting Intellectual Property Rights in the Context of ISS Activities,” in Von Der Dunk, Frans and Brus, M.M.T.A. (eds) *The International Space Station – Commercial Utilisation from a European Legal Perspective* (Martinus Nijhoff Publishers, Leiden, 2006), 63.

⁷² See generally, see Vorobieva, O., “Intellectual Property Rights with respect to Inventions Created in Space”, in Sa’id Mosteshar, ed., *Research and Inventions in Outer Space* (Kluwer Law International, London, 1997), pp.179-83 and Malagar L. and Magdoza-Malgar, M., “International Law of Outer Space and the Protection of Intellectual Property Rights” (1999) 17 *Boston University International Law Journal* 311.

spacecraft that is under the jurisdiction or control of the USA is considered to be made, used or sold on US territory, except where an international agreement has been concluded that states otherwise. This also applies to its module on the International Space Station (ISS).⁷⁴

Within Europe, Germany modified (*de facto*) its patent law prior to the signing of an Intergovernmental Agreement of 1998 (IGA) on the ISS, to ensure that its patent law can be applied to inventions created on board an ESA registered module.⁷⁵ France and Italy too allow for the registration of patents arising from discoveries on the ISS.⁷⁶ ESA have pointed out that “[a]part from these two examples the national patent laws of other countries do not contain provisions that would make national patent law applicable on board a spacecraft.”⁷⁷ However, in accordance with Art.21

⁷³ 35 U.S.C. 10 §105 (2003) Public Law 101- 580 which states: “(a) Any invention made, used or sold in outer space on a space object or component thereof under the jurisdiction or control of the United States shall be considered to be made, used or sold within the United States for the purposes of this title, except with respect to any space object or component thereof that is specifically identified and otherwise provided for by an international agreement to which the United States is a party, or with respect to any space object or component thereof that is carried on the registry of a foreign state in accordance with the Convention on Registration of Objects Launched into Outer Space. (b) Any invention made, used or sold in outer space on a space object or component thereof that is carried on the registry of a foreign state in accordance with the Convention on Registration of Objects Launched into Outer Space, shall be considered to be made, used or sold within the United States for the purposes of this title if specifically so agreed in an international agreement between the United States and the state of registry.” See generally Tatsuzawa, Kunihiko, “The Regulation of Commercial Space Activities of Non-Governmental Organisations” (1988) 29 *Proc. Coll. L. Out. Sp.* 83.

⁷⁴ See Art. 21 of the Intergovernmental Agreement January 1998.

⁷⁵ On the current law in Germany, see Smith, Lesley Jane, “Legal Aspects of Commercial Utilisation of the International Space Station – A German Perspective,” in Von Der Dunk, Frans and Brus, M.M.T.A. (eds) *The International Space Station – Commercial Utilisation from a European Legal Perspective* (Martinus Nijhoff Publishers, Leiden, 2006), 153 at p.167

⁷⁶ See Article L. 611-1 and Article L 613-5 of the French Intellectual Property Code/ Code de la Propriété Intellectuelle.

⁷⁷ ESA, *Patents and Space-Related Inventions* (ESA, 2004)

http://www.esa.int/SPECIALS/Intellectual_Property_Rights/SEMG3Z0A90E_0.html#subhead1

of the IGA⁷⁸ any activity that gives rise to intellectual property⁷⁹ rights will be subject to the jurisdiction of the State of registry of the space station flight element in which the activity occurs and therefore subject to that State's intellectual property law although Sreejith has pointed out that this clause is inconsistent with Art.27 of the TRIPs regime⁸⁰ in using the place of the invention as a determining factor.⁸¹ In the case of an invention made in or on any space station flight element by a person who is not its national or resident, Art.21(3) of the IGA provides that "a partner state shall not apply its laws concerning secrecy of inventions so as to prevent the filing of a patent application (for example, by imposing a delay or requiring prior authorization) in any other Partner State that provides for the protection of the secrecy of the patent applications containing information that is classified or otherwise protected for national security purposes." Although this is without prejudice to the right of any Partner State in which a patent application is first filed to control the secrecy of such patent application or restrict its further filing or the right of any other Partner State in which an application is subsequently filed to restrict, pursuant to any international obligation, the dissemination of an application. The same article also makes specific provision for IP that is registered in more than one European partner state whereby a "person or entity may not recover in more than one such state for the same act of infringement of the same rights in such intellectual property which occurs in or an ESA-registered element." A temporary stay of proceedings may be granted in a later-filed action pending the outcome of an earlier filed action where the same act of infringement occurs on an ESA-registered module

⁷⁸ This provides that "for the purposes of intellectual property law, an activity occurring in or on board a space station flight element shall be deemed to have occurred only in the territory of the partner state of that element's registry".

⁷⁹ According to Art.21(1) this is "understood to have the meaning of Article 2 of the Convention Establishing the World Intellectual Property Organization, done at Stockholm on July 1967, namely "'intellectual property' shall include the rights relating to: literary, artistic and scientific works, performances of performing artists, phonograms, and broadcasts, inventions in all fields of human endeavors, scientific discoveries, industrial designs, trademarks, service marks, and commercial names and designations, protection against unfair competition, and all other rights resulting from intellectual activity in the industrial, scientific, literary or artistic fields."

⁸⁰ Agreement on Trade-Related Aspects of Intellectual Property Rights.

⁸¹ Sreejith, "Intellectual Property Clause of the International Space Station Agreement: Damp Squib?" *Patentmatics*, May 2004 available at <http://www.patentmatics.org/pub2004/pub5g.doc>

gives rise to actions by different intellectual property owners by virtue of an act of more than one European Partner State's deeming the activity to have occurred in its territory. Art.21(5) provides that no European State "shall refuse to recognize a license for the exercise of any intellectual property rights if that license is enforceable under the laws of any European Partner State, and compliance with the provisions of such license shall also bar recovery for infringement in any European Partner State" with respect to an activity occurring in or on an ESA-registered element." In addition the temporary presence in the territory of a partner state of any articles, including the components of a flight element, in transit between any place on earth and any flight element of the space station registered by another Partner State or ESA will not in per se form the basis for any proceedings in the first Partner State for patent infringement.

3. Jurisdiction ⁸²

3.1 Introduction

Story has summarised the basic rule relating to jurisdiction

Every nation possesses an exclusive sovereignty and jurisdiction within its own territory.... No State or nation can, by its laws, directly affect, or bind property out of its own territory, or persons not resident therein, whether they are natural born subjects or not...it would be wholly incompatible with the equality and exclusiveness of the sovereignty of any nation,⁸³ that other nations should be at liberty to regulate either persons or things within its territories.⁸⁴

⁸² See generally Rothblatt, "State Jurisdiction and Control in Outer Space," [1984] 26 *Proc. Coll. L. Out. Sp.* 135 at p.136.

⁸³ See Art. 2(1) of the UN Charter.

⁸⁴ Story, *Commentaries* quoted in Biehler, Gernot, *International Law in Practice: An Irish Perspective*, (Dublin 2005), at para 3-06.

3.2 Jurisdiction over Space Objects, their Component Parts and Personnel⁸⁵

As Brownlie observes, the starting point of jurisdiction is territory.⁸⁶ However, this cannot be the starting point for space law. The Declaration of Legal Principles governing the Activities of States in the Exploration and Use of Outer Space states establishes the quasi-territoriality in Art.7:

The State on whose registry an object launched into outer space is carried shall retain jurisdiction and control over such object, and any personnel thereon, while in outer space.

Quasi-territoriality permits jurisdiction of a State over space objects because of that State's special relationship with the object through registry. The OST adopts the same tone in Art.VIII which provides:

A State Party to the Treaty on whose registry an object launched into outer space is carried shall retain jurisdiction and control over such object, and over any personnel thereof, while in outer space or on a celestial body.⁸⁷

Jurisdiction in this sense must refer both to civil and criminal jurisdiction, it would 'be extremely difficult, if not impossible'⁸⁸ to sustain otherwise. But it is doubtful if an international intergovernmental organisation could exercise criminal jurisdiction. It is important to note that the Treaty does not provide that the State of registry has exclusive jurisdiction, leaving the possibility of multiple states exercising concurrent jurisdiction, although Gorove suggests that the state of registry would retain primary jurisdiction.⁸⁹ The use of the word 'retain' in the Treaty also implies some prior

⁸⁵ See Seare, Modeste, Trans, Vasquez and Malley, Elaine, *Cosmic International Law* (Wayne State University Press, Detroit, 1965), p.27 *et seq.*

⁸⁶ *Principles of Public International Law*, 6th ed. (OUP 2003), ch.15.

⁸⁷ White submits that this shows that not all aspects relating to sovereignty are excluded in outer space: "Real Property Rights in Outer Space," (1997) 40 *Proc. Coll. L.Out. Sp.* 370.

⁸⁸ Gorove, *supra*, p.144.

⁸⁹ Gorove, *supra*, p.145.

jurisdiction and control being exercised by the State of registry, which would appear to exclude the possibility of states of registry acting akin to states providing flags of convenience. This is the position in relation to the U.S. where the vehicle is under its jurisdiction “while that vehicle is in flight, which is from the moment when all external doors are closed on Earth following embarkation until the moment when one such door is opened on Earth for disembarkation or in the case of a forced landing, until the competent authorities take over the responsibility for the vehicle and for persons and property aboard.”⁹⁰ The Russian Federation retains jurisdiction and control over space objects registered to it “during the ground time of such objects, at any stage of a space flight or stay in outer space, on celestial bodies and also on return to the Earth outside the jurisdiction of any state.”⁹¹ This jurisdiction is explicitly stated not to affect the legal status of the area of outer space or the surface or subsoil of a celestial body occupied by it. It also retains jurisdiction and control over any crew of a manned space object registered to it, during the ground time of such object, at any stage of a space flight or stay in outer space, on celestial bodies, including extra-vehicular stay, and on return to the Earth, until the completion of the flight program, unless otherwise specified in international treaties.⁹² White adds:

[Jurisdiction] applies to the space facility, to a reasonable area around the facility (for safety purposes), and to all personnel in or near the facility, irrespective of nationality. Space objects occupy locations on a first-come, first-served basis, and personnel have the right to conduct their activities without the harmful interference of other states.⁹³

This appears to be endorsed in Russia, which may set down binding rules for Russian and foreign organizations and citizens within the zone minimally necessary for safeguarding the safety of space activity in direct proximity with its registered space object.⁹⁴ As Tatsuzawa observes, jurisdiction and control of a State of registry are “the rights regarding the operational activities in outer space because they are locally

⁹⁰ Crimes and Criminal Procedure Act 1948 18 U.S.C. ch.1 §7.

⁹¹ Space Activities Act 1993 of the Russian Federation Art.17(2).

⁹² Art 19(4) of the Space Activities Act of the Russian Federation.

⁹³ Footnotes omitted. “Implications of a Proposal for Real Property Rights in Outer Space,” (2000) 42 *Proc. Coll. L. Out. Sp.* 366.

⁹⁴ Space Activities Act of the Russian Federation Art.17(5).

limited to outer space, including the celestial bodies, and exercised only over a space object and over the personnel thereof.”⁹⁵ The Moon Agreement in Art.12(1) provides however:

State parties shall retain jurisdiction and control over their personnel, vehicles, equipment, facilities, stations and installations on the moon.⁹⁶

Cheng denies that latter provision extends the scope of Art.III of the OST, suggesting it is a mere amplification rather than a modification. Menthe submits that these provisions function like the ‘temporary presence’ doctrine⁹⁷ as seen in *The Schooner Exchange*⁹⁸ and *Brown v. Duchesne*.⁹⁹ The return to earth does not affect this ‘special national status’. So in *Hughes Aircraft v US*,¹⁰⁰ an invention registered under US patent law in the US for launch onboard another state’s space object was found not subject to US law owing to the application of the temporary presence doctrine.

There is also a second element to the control of space objects within the *corpus iuris spatialis* which attributes international responsibility to the State for all national activities in space, regardless of whether such activities are conducted by governmental or non-governmental entities, and requires that State to ensure that such activities are conducted in conformity with the OST.¹⁰¹ This may be viewed as an exception to the general rule in the *Lotus* that the exercise of a State’s control over its nationals is restricted to its territory. Under Art.VI of the OST, the appropriate State party must require authorization and must continue to supervise the activities of non-governmental organisations. The ‘appropriate State’ is not defined by the Treaty however Vereshchetin submits that this may be both “the State whose nationality the

⁹⁵ Tatsuzawa, *supra*.

⁹⁶ See von der Dunk, Frans, “Back in Business? The Moon Agreement, Private Actors and Possible Commercial Exploitation of the Moon and Its Natural Resources,” *Proceedings of the Policy and Law Relating to Outer Space Resources: Examples of the Moon, Mars, and Other Celestial Bodies Workshop*, Montreal, June 28-30, 2006, p.244 at pp.258-259.

⁹⁷ See Menthe, D., “Jurisdiction in Cyberspace: A Theory of International Spaces,” (1998) 4 *Mich. Telecomm. Tech. Rev.* 69.

⁹⁸ *The Schooner Exchange v. McFaddon*, 11 U.S. (7 Cranch) 116 (1812)

⁹⁹ *Brown v. Duchesne*, 60 U.S. (19 How.) 183, 15 L.Ed. 595 (1857).

¹⁰⁰ 29 Fed. Cl. 197 (1993).

¹⁰¹ Article 6 of the OST.

entity has and the State or States on whose territory its activities are done.”¹⁰² Furthermore, as all activities in the exploration and use of outer space must be conducted in accordance with international law under Art.III of the OST, soft law obligations must also be respected by States. Tatsuzawa submits that this requires a State to ensure that its non-governmental organisations also respect such obligations. Certainly, if this was not the case, States could simply privatise their agencies in order to avoid complying with their soft law duties.

In addition, there is the issue of jurisdiction where there is no state of registry. This is not probable, given that most states agree in advance on which state’s registry a space object will appear and this is indeed expected under Art.II(2) of the Registration Convention. It is also possible that an object may be placed on a national registry without being placed on the UN registry. This may occur where a state has neglected its soft law obligations under Resolution 1721 and its hard law obligations under the Registration Convention or where it has simply not ratified the latter. Such an arrangement would not however affect the provisions of the Outer Space Treaty from taking effect as it speaks of a “State Party to the Treaty on whose registry an object launched into outer space is carried” as being the state to retain jurisdiction. This indicates that it is sufficient to be placed on a national registry in order to claim jurisdiction.¹⁰³ However, in the case of States which have ratified the Registration Convention, the state of registry must be a launching state as noted below.

3.3 Nationality of Space Objects

As Marcoff has pointed out there is no explicit incorporation of the concept of nationality pertaining to space craft or space objects. This contrasts with the international regime of air law in the Chicago Convention¹⁰⁴ and with the Law of the

¹⁰² Vereshchetin, V.S., “Space Activities of ‘Non-Governmental Entities’: Issues of International and Domestic Law,” 26 *Proc. Coll. L. Out. Sp.* 263.

¹⁰³ Supported by Gorove, p.145.

¹⁰⁴ Article 17 Chicago Convention 1944. See also the Paris Convention 1919 and the Havana Convention of 1928.

Sea Convention which provide for the nationality of aircraft and ships respectively.¹⁰⁵ In relation to space objects that seem to straddle the divide between air and space law regimes, such as the spaceplane, it is submitted that the space law regime would apply rather than the air law approach. It is worth mentioning in this regard that White Knight which has a different engine system to *SpaceShipOne*, in that it is without rocket boosters, was regulated as a space craft rather than as an aircraft. *SpaceShipOne* was of course licensed as a space craft. The notion of nationality is replaced by the notion of the State of registry. However, it is possible for there to be a number of states that may register a space object as launching¹⁰⁶ states owing to the wide definition of the latter term within the existing *corpus iuris spatialis*. The Registration Convention defines a launching state to include a state which launches a space object, a state which procures the launch of a space object and the State from whose territory or facility the space object is launched. This is the same definition that is found in the Liability Convention. So a number of States that may each validly have jurisdiction over the same space object, though the Conventions use of the singular in reference to the term “state of registry” indicates that the space vehicle may be registered only on one State’s registry. This interpretation is also supported by Art.II(2) of the Registration Convention which provides inter alia “where there are two or more launching States in respect of any such space object, they shall jointly determine which one of them shall register the object.”

The confusion that this may cause is one argument in favour of introducing the concept of nationality to space objects or space craft. Cheng argues that the concept of nationality for space objects should be introduced as this would clarify matters

¹⁰⁵ See *Oteri and Oteri v. Regina* (1976) ALR 11 and Art. 5 Geneva Convention on the High Seas. See Jennings R. and Watts A., *Oppenheim’s International Law*, 9th ed. (Longman Essex, 1992), vol. 2, §287 and McDougal, Burke and Vlastic, “Public Order at Sea and the Nationality of Ships” (1960) 54 *Am. J. Int’l L* 25.

¹⁰⁶ This is defined in the South African Space Affairs Act as “the placing or attempted placing of any spacecraft into a suborbital trajectory or into outer space, or the testing of a launch vehicle or spacecraft in which it is foreseen that the launch vehicle will lift from the earth’s surface.”

significantly.¹⁰⁷ Such a suggestion was also made in the Belgian Working Paper on the Unification of Certain Rules Governing Liability for Damage Caused by Space Vehicles in 1963,¹⁰⁸ however, it was not adopted. The absence of nationality as pertaining to space objects may mean that in a collision on outer space, the territory of the state of registry cannot be seen to be affected. The combination of the State's duties to supervise national activities in Art.VI of the OST and its liability for any damage caused thereby in both the OST and the Liability Convention leads to a situation where it is conceivable that where a company that is registered in Ireland procures the launch of a space object Ireland will be considered internationally as a launching state and will therefore be absolutely liable for any damage caused on the surface of the earth or to aircraft in flight or liable in negligence for damage elsewhere such as to another space object in outer space or on the Moon. Although Ireland has not acceded to the Registration Convention, the Outer Space Treaty also presumes some form of registry is in existence in at least one of the launching states, though there is no such registry in Ireland nor are there any proposals to establish such at present, with the result that though Ireland may be internationally liable for the damage caused by the object (and the absence of a registry also denotes a lack of supervision of national space activities contrary to its obligations under the OST), it is not currently able to claim any jurisdiction over the object itself.

3.4 Criminal Jurisdiction

There are a number of principles that may be applied to determine the application of a State's criminal jurisdiction.¹⁰⁹ These are considered here for comparative purposes when contrasting with the position on determining civil jurisdiction. As Gorove notes:

There is no reason to believe that the various principles of criminal jurisdiction will not be invoked in connection with man's antisocial activities in outer space.¹¹⁰

¹⁰⁷ See Cheng, *Studies in International Space Law*, p.474 and Cheng, "The Commercial Development of Space: The Need for New Treaties", (1991) 19 *Journal of Space Law* 17.

¹⁰⁸ U.N. Doc. A/AC/105/C.2/L/7, 30 April 1963, see Christol C.Q., *International Space Law*, 468.

¹⁰⁹ See Gorove, *Studies in Space Law: Its Challenges and Prospects* (Sijhoff, Leiden, 1977), ch.12.

The principle ‘of primary importance and of fundamental character’¹¹¹ in this regard is the territorial principle where courts of the locus of the crime may exercise jurisdiction. Given the terms of the Outer Space Treaty, the State of registry may exercise criminal jurisdiction over crimes occurring in that object. As to installations on the Moon and other celestial bodies, the principle that the State of registry may exercise jurisdiction over crimes committed on the installation still incurs these benefits regardless of whether international law comes to reject the non-appropriation on these resources. However, as the Court in the *Lotus* stated it “is not an absolute principle of international law and by no means coincides with territorial sovereignty”.¹¹² The acceptance of the non-necessity of a correspondence between the exercise of territorial sovereignty and the exercise of criminal jurisdiction is valuable from a space law perspective in that it allows the territoriality principle to apply even where the event occurs in a locus not subject to sovereign claims.¹¹³ Jurisdiction may be seen to be coextensive with the effective control of States.¹¹⁴ Where a crime is committed on a space object or installation registered to one State and completed in another, registered to a different State, a possibility as demonstrated by the International Space Station, the quasi-territoriality principles can be extended to apply subjectively as the territoriality principle would do.¹¹⁵ Similarly the principle may apply objectively where the crime is committed in one space object but has an effect on another. This flexible interpretation is also supported by the Permanent Court of International Justice in the *Lotus* case.¹¹⁶

¹¹⁰ Gorove, *Studies, supra*, p.143.

¹¹¹ Dickinson, “Introductory Comment to the Harvard Research Draft Convention on Jurisdiction with Respect to Crime 1935” (1935) 29 *Am. J. Int’l L. Supp.* 443. See also the ECtHR in *Bankovic v Belgium* where the Court stated that ‘the jurisdictional competence of a State is primarily territorial.’ (2001) 11 B.H.R.C. 435 at para 59.

¹¹² (1927) P.C.I.J. Ser A no. 10, p. 19

¹¹³ See Art. II of the Convention on the High Seas 1958 450 UNTS 11; Art. 89 of the UN Convention on the Law of the High Sea 1982; 516 UNTS 205; (1982) 21 ILM 1261.

¹¹⁴ See Biehler, *International Law in Practice* (Sweet and Maxwell, Dublin 2005), para 3-02.

¹¹⁵ *The Tennyson* 45 JDI (1918) 739; *Public Prosecutor v DS* ILR 26 (1958 II) 209.

¹¹⁶ (1927) P.C.I.J. Ser A no. 10, p. 10. Followed in *DPP v Doot* [1973] AC 807. See Commentary to the Harvard Research Draft Convention on Jurisdiction with Respect to Crime, at p 519

On the point of extra-territorial crime, the Court found that no State had protested against the exercise by a State of its criminal jurisdiction where the “constituent elements of the offence and more, importantly its effects have taken place there” although the authors of a crime are elsewhere.¹¹⁷ The Court applied the territoriality principle objectively in that case. In contrast to the objective/subjective approach is the ‘effects doctrine’ which emerged from US antitrust law.¹¹⁸ The doctrine was examined in *Rio Tante Zinc Corp v Westinghouse Zinc Corporation*¹¹⁹ where the only connection was the effect by a uranium cartel on the US, as Lowe observes, there was no intra-territorial conduct at all and the assertion of jurisdiction by the US raised strong protests from a number of States. Thus the flexibility of the principle in relation to space activities would only be truly demonstrated where there is some form of intra-quasi-territorial element. The acts of a juristic person of another State aboard a space object would also be subject to punishment where criminal by the law of the State of the national.¹²⁰

A space object that collides with the space object registered to another State would allow that latter State criminal jurisdiction over the personnel responsible, if such responsibility exists, if the position of a ship on the high seas is found to equate to that of a space object in outer space. The principle on jurisdiction as expressed in the *Lotus* has been reversed in Art.97 of UNCLOS 1982 which now provides that in the event of a collision on the High Seas, no penal or disciplinary proceedings may be instituted against the master or any other person in the service of the ship except before the flag State or the State of which he is a national. Therefore, insofar as the *Lotus* suggests by analogy that the State of registry is not the sole State that may exercise criminal jurisdiction over the personnel onboard, such that in a collision between two or more manned space objects, criminal jurisdiction may be rightfully exercised over the personnel under the jurisdiction of other States by the State of registry which has sustained the loss, that analogy is not without its flaws. But

¹¹⁷ See also the opinion of Moore J dissenting in (1927) P.C.I.J. Rep., Series A, no. 10 at p.73.

¹¹⁸ *US v Aluminium Co of America* 148 F 2d 416 (1945).

¹¹⁹ [1978] 1 All ER 434. See Lowe in Evans (ed), *International Law* (OUP, 2003).

¹²⁰ See the correspondence of Great Britain and the US on John Anderson, a British national who committed homicide aboard an American vessel, (1879) 1 Moore 932. This appears to be supported by the *Lotus*. See also *G.B. v The Netherlands* (1897) Moore, 5 Int. Arb. 4948.

although the *Lotus* case has been criticised and not followed in other decisions,¹²¹ this has been due to the Court's views on the scope of an individual State's discretion to adopt laws outside of "a general prohibition to the effect that States may not extend the application of their laws and the jurisdiction of their courts to persons, property or acts outside their territory".¹²² Therefore, its potential to apply analogically to space activities is not entirely excluded. Applying the current law in the UNCLOS by analogy, where there was a collision between two manned space objects registered to separate States, no proceedings may be brought against the captain or crew except the state of registry or the state of which he/she is a national.

However, it is possible to envisage other circumstances where other principles governing jurisdiction may be applicable, for instance, the nationality principle. From *Nottebohm*,¹²³ it is clear that a 'genuine and close link' must exist between State and individual before the principle is effective. However, although the potential to create parallel jurisdictions and double jeopardy has resulted in its restriction by States, where there is no question of territoriality, such as in Antarctica or in outer space, the nationality principle can apply without these restrictions. Many national space laws criminalize certain acts occurring within their territory. In most cases a failure to obtain the requisite licence to engage in launching activities may give rise to criminal liability or other penal measure. Norwegian law forbids the launch of any object into outer space from Norwegian territory including Svalbard, Jan Mayen and the Norwegian external territories, Norwegian vessels, aircrafts etc. as well as areas that are not subject to the sovereignty of any state, when the launching is undertaken by a Norwegian citizen or person with habitual residence in Norway without permission.¹²⁴ The South African Space Affairs Act 1993 includes a similar provision

¹²¹ Most notably in the *Anglo-Norwegian Fisheries* case [1951] ICJ Rep. 116 and *Nottebohm* [1955] ICJ Rep. 4.

¹²² (1927) P.C.I.J. Ser A no.10 p.18cf *In the Matter of Article 26 of the Constitution and in the Matter of the Criminal Law (Jurisdiction) Bill 1975* (1977) I.R. 129.

¹²³ *Nottebohm* [1955] ICJ Rep. 4.

¹²⁴ Act on Launching Objects from Norwegian Territory etc. into Outer Space No. 38 of 13 June. 1969, §1.

according to which the Minister may expand through regulation those space activities that require a licence.¹²⁵

The UK Outer Space Act¹²⁶ provides for certain criminal offences under s.12¹²⁷ where activities are carried out in contravention of the licensing requirement in section 3, for the purpose of obtaining a licence (for himself or for another) knowingly or recklessly makes a statement which is false in a material particular; being the holder of a licence, fails to comply with the conditions of the licence; fails to comply with a direction under section 8; intentionally obstructs a person in the exercise of powers conferred by a warrant under section 9; or fails to comply with such of the regulations under this Act as may be prescribed. The defence of due diligence is available however where the person can show that they “took all reasonable precautions to avoid the commission of the offence.”¹²⁸ As the act applies to the activities of launching or procuring the launch of a space object, operating a space object and any activity in outer space regardless of where they occur there is the potential for extra-territorial effect. Extra-territorial effect is recognized by s.12 (4) which provides that offences may be committed outside of the UK but treated as occurring within the territory.¹²⁹

Similarly where a launch occurs from an Australian launch facility for which no s.26 launch permit or s.46 exemption certificate has been granted and which is not conducted in accordance with an agreement as set out in s.109, the natural or legal

¹²⁵ Space Affairs Acts 1993, s.23.

¹²⁶ The Act applies to UK nationals, Scottish firms and bodies incorporated under the law of the UK.

¹²⁷ Offences also include knowingly or recklessly makes a statement which is false in a material particular for the purpose of obtaining a licence (for himself or for another); being the holder of a licence and failing to comply with the conditions of the licence; failing to comply with a direction under section 8 and intentionally obstructing a person in the exercise of powers conferred by a warrant under section 9.

¹²⁸ Criminal offences for company members are also created in s.12 (3) Where an offence committed by a body corporate is proved to have been committed with the consent or connivance of, or to be attributable to neglect on the part of, a director, secretary or other similar officer of the body corporate, or a person purporting to act in any such capacity, he as well as the body corporate is guilty of the offence and liable to be proceeded against and punished accordingly.

¹²⁹ But this is limited by s.12 (6).

person is guilty of an offence.¹³⁰ These offences too explicitly have extraterritorial effect where a space object is launched from a launch facility located outside Australia, the launch is not authorised by an overseas launch certificate held by any person and an Australian national is a responsible party for the launch. In addition the return of a space object not launched in its entirety or in part from an Australian launch facility to any place in Australia also requires a launch permit or an exemption certificate or must be in accordance with an agreement under s.109 and a failure to obtain the relevant permit or exemption by a natural or legal person is an offence. In addition, if a person returns a space object purportedly in accordance with a s.43 authorisation (a return permit) and the return is conducted in a way that is likely to cause substantial harm to public health or public safety or to cause substantial damage to property or the space object is or contains a nuclear weapon or a weapon of mass destruction of any other kind or the space object contains any fissionable material and the Minister's written approval for this has not first been obtained or the insurance/financial requirements, they will have committed a criminal offence subject on conviction to a fine, a spell of imprisonment or both.¹³¹ In Sweden, section 5 of the Act on Space Activities provides for an offence where any person, wilfully or negligently, carries on space activities without the necessary licence, subject to a fine or to imprisonment for a maximum of a year. The same applies to any person, wilfully or negligently, disregards the conditions laid down as a prerequisite for obtaining a licence.

Under Art.9(4) of the Space Activities Act of the Russian Federation, it is an offence to carry out space activities without a licence or in willful violation of a licence.¹³² Other acts involving space activities may also have a criminal aspect, for instance, removal of space shuttle debris may give rise to a criminal conviction, as occurred following the theft of debris from the Space Shuttle Columbia¹³³ although this did

¹³⁰ The former is liable to a term of imprisonment not exceeding 10 years or a fine not exceeding 600 penalty units or both. The latter is liable for a fine not exceeding 100.000 penalty units. Section 4AA of the Crimes Act 1914 for the current value of a penalty unit.

¹³¹ Space Activities Act, s.44(1).

¹³² Licences are required for commercial space activity in Russia under Art.10 of the Commercialisation of Space and Commercial Space Activity Act.

¹³³ See Guntheinz, Joseph Richard, "Stealing the Dream: The Consequences of Stealing Space Shuttle Columbia Debris" *Collect Space*, 2007 available at

not have an inter-state element. Under art.11(I) of the Loi 2008-518 of France,¹³⁴ extraterritorial jurisdiction is exercised over French operators¹³⁵ who launch or return space objects from a foreign State's territory or facility or natural and legal persons who procure a launch or command a space object during its passage through outer space without authorization. The penalty is a substantial fine. A higher penalty may be imposed where command of a space is transferred to a French operator whose launch has not been authorized under the legislation.¹³⁶ Of the legislation examined above, the French Act appears to be the preferred model as it identifies the possibility of French natural or legal persons taking command of space objects outside of France, without having launched the object, thereby exposing the State to liability as a launching State.

The Irish Nuclear Test Ban Act¹³⁷ criminalises the carrying out of a nuclear explosion outside the State or attempt and/or conspiracy to so do, thus exercising passive personality,¹³⁸ but also criminalises such an action by an Irish citizen where it occurs outside the State.¹³⁹ Therefore where a nuclear powered satellite is deliberately destroyed causing a nuclear explosion and that action may be attributed to an Irish citizen, such a citizen is exposed to criminal liability under the Act of a fine and or imprisonment. This is so even if the action was undertaken in order to meet the environmental protection obligations binding on the launching state under

http://www.collectspace.com/resources/flown_stealingdream.html. See also United States Department of Justice, Press Release on the Indictment of Jeffrey D. Arriola. United States Attorney's Office, Eastern District of Texas, March 5, 2003 and Murname, Andrew W., *Theft of Debris from the Space Shuttle Columbia: Criminal Penalties*, Congressional Research Service, Report for Congress, June 12, 2003.

¹³⁴ An unofficial translation is published in [2008] 34 *Journal of Sp Law* 453.

¹³⁵ Loi 2008-518 defines an 'operator' as a "toute personne physique ou morale qui conduit, sous sa responsabilité et de façon indépendante, une opération spatiale" and a 'space operation' as "toute activité consistant à lancer ou tenter de lancer un objet dans l'espace extra-atmosphérique ou à assurer la maîtrise d'un objet spatial pendant son séjour dans l'espace extra-atmosphérique, y compris la Lune et les autres corps célestes, ainsi que, le cas échéant, lors de son retour sur Terre." (arts I(2) and (3)).

¹³⁶ Section 11(II).

¹³⁷ No 16 of 2008.

¹³⁸ See Watson, "The Passive Personality Principle," (1993) 28 *Tex. I.L.J.* 2.

¹³⁹ Section 2(2) and 2(3) of the Nuclear Test Ban Act 2008.

the Outer Space Treaty, an obligation which is binding equally on Ireland as a party to the Treaty.

The passive personality principle is also not without application to the space environment. It was ‘vigorously opposed in Anglo-American countries’¹⁴⁰ and was excluded from the Harvard Draft Convention 1935 but can be seen to operate in later hard law, such as the Tokyo Convention,¹⁴¹ as well as in national law.¹⁴² The principle was recognised by the International Court of Justice in the *Arrest Warrant* case.¹⁴³ It has been applied to outer space objects, most notably to the ISS. In the case of the ISS jurisdiction of the state of registry of the space flight element extends to personnel. While each State has personal jurisdiction over its own nationals in space, under Art.22 of the IGA, a partner state may exercise jurisdiction over another partner state’s nationals whose conduct in orbit “(a) affects the life or safety of a national of a Partner State or (b) occurs in or on the flight element of another partner state. As Zhao points out:

It is thus obvious that the criminal jurisdiction is based on customary international principles of nationality and the protective principle. That means the criminal law of the victim’s will normally apply.¹⁴⁴

However, there is no mention however of the position of non-personnel or to use the terminology of the CLSAA 2004, of the “space-flight participant” nor of the position of stowaways. Gorove submits that neither are personnel¹⁴⁵ although this fact in itself would not exclude the possibility of the state of registry exercising jurisdiction over such persons.¹⁴⁶ Zhao observes the insufficiency of the IGA to deal with a scenario

¹⁴⁰ (1935) 29 *Am. J. Int’l L. Supp.* 579.

¹⁴¹ (1969) U.K.T.S. 126, Cmnd. 4230; 704 U.N.T.S. 219.

¹⁴² See *US v Yunis (No.2)* (1988) 82 ILR 344.

¹⁴³ *Democratic Republic of the Congo v. Belgium* [2002] ICJ Rep. 121.

¹⁴⁴ Zhao, “Developing a Legal Regime for Space Tourism: Pioneering a Framework for Space Commercialisation,” (2006) 48 *Proc. Coll. L.Out Sp.* 5.

¹⁴⁵ Gorove, Stephen, “Legal Problems of the Rescue and Return of Astronauts,” (1969) 3 *Int’l Law* 899.

¹⁴⁶ Gorove, *Studies*, p.147.

involving a criminal act upon a Non-Partner State national aboard the ISS. Although, the other ISS partner State's would have had to give their consent for such a national to be aboard the ISS in the first place. Zhao submits that the better approach to the problem is to adopt the semi-universal jurisdiction principle" from aircraft hijacking law.

Piracy in relation to space objects may result in the application of the universality principle.¹⁴⁷ In the *Pinochet* case,¹⁴⁸ Millett L.J. (dissenting) required two criteria to be satisfied. First, the acts must "be contrary to a peremptory norm of international so as to infringe *ius cogens*."¹⁴⁹ Secondly, they must be so serious and on such a scale that they can justly be regarded as an attack on the international legal order."

Where treasonable offences occur onboard a space object or in an installation, jurisdiction may be claimed by a State other than that of the state of registry in reliance on the protective or security principle.¹⁵⁰ The Harvard Draft Convention commentary notes that the overwhelming majority of States had enacted legislation based on the principle such that it was 'hardly possible to conclude that such legislation was in excess of competence as recognised by international law.'¹⁵¹ It applies to foreign offences that affect the vital interests of the State and may extend, in the absence of a rule to the contrary, where there is a legal connection or linking point ('Anknuepfungspunkte') between the State holding itself out with jurisdiction and the individual alleged to have committed the act.¹⁵² This linking point must be 'so close, so substantial, so direct, so weighty, that legislation in respect of [a given set of facts] is in harmony with international law and its various aspects' for a State

¹⁴⁷ Graeforth, Bernhard, "Universal Criminal Jurisdiction and an International Criminal Court," (1990) 1 *E.J.I.L.* 67. See Hyde, *International Law*, 2nd ed., (1947), Vol. I, p.804 and Cowles, W.B., "Universal Jurisdiction over War Crimes," (1945) 33 *Calif. L.R.* 177 who support the principle.

¹⁴⁸ [1999] 2 WLR 827; (2000) 1 A.C. 147 at p.275.

¹⁴⁹ See for example, *AG for the Government of Israel v Eichmann* (1961) 36 ILR 5 D.Ct. of Jerusalem, *aff'd* (1962) 36 ILR 277.

¹⁵⁰ *Joyce v DPP* [1946] AC 347; (1948) AD 12.

¹⁵¹ (1935) 29 *Am. J. Int'l L. Supp.* 552.

¹⁵² Dahm, „Zur Problematik des Voelkerstrafrechts“ (Göttingen, 1956), p.8 quoted by the Court in *AG for the Government of Israel v Eichmann* (1961) 36 ILR 5.

to have jurisdiction.¹⁵³ “A merely political, economic, commercial or social interest does not in itself constitute a sufficient connection.” The principle was applied by Israel in *AG for the Government of Israel v Eichmann*¹⁵⁴ and in England in *Joyce v DPP*.¹⁵⁵

Each of the principles above may be interwoven with each other and may interact with more than one applicable and to different extents in any case. Brownlie observes that “the ‘principles’ are in substance generalizations of a mass of national provisions which by and large do not directly reflect categories of jurisdiction.”

3.5 Civil Jurisdiction

Although some international bilateral and multilateral agreements have allotted jurisdiction, there are no uniform jurisdiction rules applicable to civil actions arising from space activities specifically, despite the academic calls for such.¹⁵⁶ The Liability Convention provides for no specific choice-of-law rules.¹⁵⁷ The only guidance is to be found in the provisions for compensation to be paid on the basis of ‘justice and equity’. The primary benefit of this formula was enunciated by Foster:

The primary advantage of the use of international law, justice and equity is that it should ensure uniformity in the assessment of compensation; all who suffer damage in space object accidents will be subjected to the same rules

¹⁵³ Mann, F.A., “The Doctrine of Jurisdiction in International Law,” (1964-1) 111 *Hague Recueil* 1.

¹⁵⁴ (1961) 36 ILR 5.

¹⁵⁵ Where Lord Jowett stated: “No principle of comity demands a State should ignore the crime of treason committed against it outside its territory. On the contrary a proper regard for its own security requires that all those who commit that crime, whether they commit it within or without the realm should be amenable to its laws.” See also *Molvan v AG for Palestine* [1948] A.C. 351 PC.

¹⁵⁶ See Bosco, Joseph A., “The United States Government as a Defendant – One Example of the Need for a Uniform Liability Regime to Govern Outer Space and Space-Related Activities,” (1987-1988) 15 *Pepperdine L Rev.* 581.

¹⁵⁷ Bosco, Joseph A., “Practical Analysis of International Third Party Liability for Outer Space Activity – A U.S. Perspective,” (1985) 29 *Trial Law Guide* 278 at 334 and Reis, “U.S. Discusses ‘Applicable Law’ for Outer Space Claims,” (1970) 62 *Dept. State Bull* 18 (U.S. perspective only).

governing compensation irrespective of their nationality, the place where the accident occurs, and the identity of the launching state. In the event that international law should prove deficient or uncertain, recourse may be had to the ‘principles of justice and equity’ which will normally consist of rules of general application in the municipal legal systems of the world, to fill the gaps and cure the ambiguities.¹⁵⁸

Jurisdiction therefore falls to be determined by the rules at national or regional level. Under the FTCA, exclusive jurisdiction is conferred on the federal district courts “of civil actions on claims against the United States for money damages,... for injury, loss of property, or personal injury or death caused by the negligent or wrongful act or omission of any employee of the Government acting within the scope of his office or employment, under circumstances where the United States, if a private person, would be liable to the claimant in accordance with the law of the place where the act or omission occurred”.¹⁵⁹ States must apply the whole of the state of the locus of damage (with the exceptions, such as its strict or absolute liability provisions and those on prejudgment interest) including its rules on choice-of-law.¹⁶⁰ From an Irish perspective, as Ireland has not acceded to the Registration Convention and has no national registry, it cannot currently exercise jurisdiction over a space object which is the prerogative of the State of Registry, rather than of the launching state *simpliciter*.¹⁶¹ Therefore any tort committed against an Irish space tourist aboard a space object must logically be a foreign tort. In the case of space vehicles launching from New Mexico and licensed by the F.A.A., it is probable that the U.S. would be the state of registry.

In relation to the exercise of civil jurisdiction where conflicts arise in outer space, in order to comply with their international obligation vis-à-vis aliens, States are obliged to maintain and empower a courts system to apply private international law where a

¹⁵⁸ See Foster, “The Convention on International Liability for Damage Caused by Space Objects,” (1972) 10 *Can. Y.B. Intn’l L.* 137 at 172.

¹⁵⁹ 28 U.S.C. §1346(b) (1982).

¹⁶⁰ *Richards v U.S.* 369 U.S. 1 (1961).

¹⁶¹ See Art. VIII of the Declaration of Legal Principles governing the Activities of States in the Exploration and Use of Outer Space art. 7 and the Outer Space Treaty 1967.

case contains a foreign law element. The purpose of private international law is threefold – it establishes the conditions for determining the correct jurisdiction, the applicable law within that jurisdiction and rules regarding the enforcement of judgments.

3.5.1 U.S. Practice

States within the Federation may exercise personal jurisdiction over non-resident defendants where this is not contrary to State or Federal constitutions.¹⁶² General jurisdiction may be exercised over a non-resident defendant where its activities “are so substantial that the defendant can be considered physically present in the state for all purposes”.¹⁶³ Limited or specific jurisdiction will be established by a plaintiff against an insurer where it can show a substantial link among the defendant, the forum state and its own injuries.¹⁶⁴

The U.S. requires that foreign launches obtain a licence where the other country agrees that the US has jurisdiction or where the US entity involved has a controlling interest. For all launches outside US territory involving US entities and citizens, a licence is required save where there is an agreement between the US and the foreign state that it has jurisdiction. The US registers a number of different categories of space object including spacecraft engaged in practical applications and uses of space technology, spent boosters, spent manoeuvring stages and other non-functional objects, shuttle-launches and shuttle-launched objects. All payloads launched within the US are also registered. Payload that is launched in a foreign state must be registered where it is owned or controlled by private or governmental entities unless the States have agreed otherwise. All owners or operators of payloads launched in the US are required to provide payload information and where the launch takes place

¹⁶² *Roth v Garcia Marquez*, 942 F 2d 617 (9th Cir 1991); *Asahi Metal Industries Co v Superior Court* 480 US 102 (1987).

¹⁶³ Margo, p. 485, para 26.61.

¹⁶⁴ *Sammons Enterprises Inc v Superior Court* 205 Cal App 3d 1435.

in another state, the owner or operator must ensure that the information is provided to the State of registry.¹⁶⁵

3.5.2 Irish Practice on the Exercise of Jurisdiction

There is no practice on space launches as Ireland possesses no launch facilities of its own. The Irish Courts have jurisdiction over cases involving a foreign element “if the defendant has been duly served with an originating summons in accordance with the rules governing the issue and service of summons”.¹⁶⁶ It may decline even if the service of the summons is procedurally sound on the grounds furnished by the Brussels Convention, because it concerns foreign immovables or revenue laws or the person on whom the summons has been served has immunity from jurisdiction. Furthermore, the Court retains a discretion to refuse discretion because there is a *lis albi pendens*, the proceedings are vexatious or on the ground of forum non conveniens.

3.5.2.1 The Traditional Rules

Under the traditional rules of jurisdiction, a person may be subject to the jurisdiction of the Irish courts where an originating summons has been validly served on a defendant within the jurisdiction¹⁶⁷ regardless of the duration of the stay.¹⁶⁸ Where the defendant is outside the jurisdiction, they may elect to submit to Irish jurisdiction and enter either an unconditional appearance or a conditional appearance contesting the Court’s jurisdiction. Where the defendant is outside the jurisdiction and refuses to submit, the intended may seek the leave of the Court to permit service out of the jurisdiction or in the case of a non-national, leave to serve notice of the summons. The Court has a discretionary power to make such an order under Order 11 Rule 1 of

¹⁶⁵See Gabrynowicz, J.I., “Practice of National states: The United States of America,” *Proceedings of the 2003 IISL/ECISL Symposium at the UNCOPUOS*, available at http://www.spacelaw.olemiss.edu/downloads/lectures/Practice_of_Natl_States.pdf

¹⁶⁶ Binchy, *Conflicts of Laws* (Roundhall, Dublin 1989), p. 124.

¹⁶⁷ *Rainford v Newell-Roberts* [1962] I.R. 95; *Laurie v Carroll* 98 C.L.R. 310 (1958).

¹⁶⁸ *Maharanees of Baroda v Wildenstein* [1972] 2 QB 283.

the Rules of the Superior Courts (Order 13 of the Circuit Court Rules) i.e. where the subject-matter of the case is sufficiently connected to the jurisdiction that it would be appropriate for it to be dealt with in Ireland. Order 11 provides an exhaustive list of seventeen categories. The intended plaintiff must show a good arguable case, rather than simply a good cause of action.¹⁶⁹ What is required in establishing such a case is set out in Order 11 Rule 2 which specifies two factors: the amount or value of the claim or property affected and the comparative cost and convenience of proceedings in Ireland, or in the place of the defendant's residence.¹⁷⁰ Costs may be reduced by centralising litigation in a single forum.¹⁷¹ The case must have more than a tenuous connection with the jurisdiction.¹⁷² But even where the application falls within one of the categories set out in Order 11 and the jurisdiction is shown to be the *forum conveniens*, the Court may refuse service if to do so would impose unwarranted expense and inconvenience. An inherent discretion to dismiss or stay proceedings vests in the High Court under the Judicature (Ireland) Act 1877 where *forum non conveniens* is made out and in the 'interests of justice'. Concerns that arise under 'the interests of justice' include the availability of witnesses¹⁷³ and evidence.¹⁷⁴ Weight will of course be placed on the domicile of the Defendant or its seat of business in the case of a legal person.¹⁷⁵ Of the seventeen categories, the most significant are: where an action is brought to enforce, rescind, dissolve, annul or otherwise affect a contract, or to recover damages or other relief for or in respect of a breach of contract made within the jurisdiction or made by or through an agent trading or residing within the jurisdiction on behalf of a principal trading or residing outside the jurisdiction or by its terms or implication is to be governed by Irish law; where the action is founded on a tort committed within the jurisdiction; where an injunction is sought as to anything to be done within the jurisdiction or where any person out of

¹⁶⁹ *Analogue Devices DV v Zurich Insurance Corporation* [2002] 1 I.R. 272 per Fennelly J. and *Shortt v Ireland* [1996] 2 I.R. 188 at 215.

¹⁷⁰ *McCarthy v Pillay* [2003] IESC 31; [2003] 2 I.L.R.M. 284, [2003] 1 I.R. 592, para.22

¹⁷¹ *Ibid*, para.31. See also *Tromso Sparebank v. Burren*, Unreported, Supreme Court, 15th December, 1989; *Analogue Devices DV v Zurich Insurance Corporation* [2002] 1 I.R. 272 and *Shortt v Ireland* [1996] 2 I.R. 188.

¹⁷² *Grehan v. Medical Incorporated* [1986] I.R. 528.

¹⁷³ *McCarthy v Pillay* [2003] IESC 31; [2003] 2 I.L.R.M. 284, [2003] 1 I.R. 592, para.43.

¹⁷⁴ *Doe v Armour Pharmaceuticals Inc and ors* [1997] IEHC 139.

¹⁷⁵ *Intermetal Group Limited v. Worlslade Trading Limited*, [1998] 2 I.R. 1.

the jurisdiction is a necessary and proper party to an action brought against some other person duly served within the jurisdiction.¹⁷⁶ Therefore where a contract for space carriage is subject to Irish law, or is formed within Ireland or through an agent trading/residing in Ireland, Ireland may be the *forum conveniens*. Similarly, this is so, where a tort is committed on an Irish registered space object. Ireland however as a member of the EC is bound by European choice of law rules insofar as they apply between EC and EFTA member states.

3.5.3 European Choice of Law

3.5.3.1 Brussels Convention, Brussels I Regulation and the Lugano Convention

Special rules were formulated under the Brussels Convention for application to European Countries. This Convention has been superseded by Council Regulation 44/2001 on jurisdiction and the recognition and enforcement of judgments in civil and commercial matters as amended (Brussels I Regulation)¹⁷⁷ which now applies between EC Member States. The Lugano Convention of 1988 is applicable between EC states and EFTA Member States (Norway, Liechtenstein, Switzerland and Iceland),¹⁷⁸ and its provisions are almost identical to the Brussels Convention. Therefore, it is not necessary to seek the leave of the Court to issue summons under Order 11A (which applies Regulation 44/2001),¹⁷⁹ Order 11B (which applies the

¹⁷⁶ See *Waddell v Nortland and Anor.* [1966] N.I. 85 at p.91 *per* Lord Mc Dermott; *Witted v Galbraith* [1893] 1 QB 577 at 579; *Mac Laine, Watson & Co. v Bing Chen* [1983] 1 NSWLR 163; *Patunvanu v Government of Vanuatu* [2005] VUCA 18; *McCarthy v Pillay* [2003] IESC 31, [2003] 2 I.L.R.M. 284, [2003] 1 I.R. 592.

¹⁷⁷ OJ L 12/1 16.1.2001 amended by Commission Regulation (EC) No 1496/2002, of 21 August 2002 OJ L 225/13 of 22.8.2002 and Commission Regulation (EC) No 1937/2004 OJ L 334/3 of 10.11.2004. In force on the 1st March 2002

¹⁷⁸ Member States of the EC may not accede to the Lugano Convention: ECJ Opinion 1/03, Competence of the Community to conclude the new Lugano Convention on jurisdiction and the recognition and enforcement of judgments in civil and commercial matters, February 7, 2006. See Baumé, Tristan, "Competence of the Community to Conclude the New Lugano Convention on Jurisdiction and the Recognition and Enforcement of Judgments in Civil and Commercial Matters: Opinion 1/03 of 7 February 2006" (2006) 8 *German Law Journal* 7.

¹⁷⁹ S.I. 506 of 2005.

Lugano Convention), Order 11D¹⁸⁰(applying Regulation 1393/2007) and Order 11E (which applies the Hague Convention).¹⁸¹ For States that are outside the EC and the EFTA, the traditional rules still apply.

3.5.3.2 Regulation 44/2001

Regulation 44/2001 applies without prejudice to other Community measures governing jurisdiction and enforcement in specific matters, such as the measures implementing the Montreal Convention.¹⁸² It applies to civil and commercial matters.¹⁸³ The general rule remains the same as under the Brussels Convention, namely, that persons are to be sued in the courts of the Member State in which they are domiciled.¹⁸⁴ There are two methods of defeating the general rule:¹⁸⁵ to agree a

¹⁸⁰ OJ L 324/79 10th December 2007. Brought into force in Ireland in the Rules of the Superior Courts (Service of Proceedings (Regulation (EC) No. 1393/2007)) 2009 S.I. 280 of 290. Repealing Regulation repealing Council Regulation (EC) No 1348/2000 OJ L160/37 of 30 June 2000 (See the District Court (EU Regulations) Rules 2005 SI 635 of 2005).

¹⁸¹ Order 14 of the Circuit Court Rules.

¹⁸² Council Decision 2001/539/EC O.J.L 194/ 38, 18.07.1998; Regulation 889/2002 OJL 140/2 30.05.2002.

¹⁸³ The Brussels I Regulation does not apply to revenue, customs or administrative matters, the status or capacity of natural persons, rights in property arising out of a matrimonial relationship, apart from maintenance payments; wills and succession; bankruptcy; proceedings relating to the winding up of insolvent companies or other legal persons; judicial arrangements, compositions and analogous proceedings; social security or arbitration.

¹⁸⁴ Article 2(1) of the Brussels I Regulation. See *General Monitors Ireland v Ses-Asa* [2005] IEHC 223 and *Leo Laboratories v Crompton BV* [2005] IESC 31. Under Art. 59(1) of the Regulation, internal law is applied to determine if a party is domiciled in the Member state whose courts are seised of the matter. If the party is not domiciled in the Member state seised of the matter, then in order to determine if the party is domiciled in another Member State the court must apply the law of that state. For legal persons, their domicile is determined in accordance with the rules in Art. 60, i.e. where it has its statutory seat (its registered office or where there is no such office, the place of incorporation or where there is no such place anywhere, the place under the law of which the formation took place), central administration or principal place of business.

¹⁸⁵ Regulation 44/2001 provides for a number of derogations. Under Art. 63 a person domiciled in the Grand Duchy of Luxembourg sued in the court of another Member State under Art. 5(2) may refuse to submit to the latter's jurisdiction if the final place of delivery of goods or the provision of services

jurisdiction to hear the dispute within the contract under Article 23¹⁸⁶ or to plead one of the exceptions set down in Regulation 44/2001 itself. Under Art.23(3), where such an agreement is concluded by parties, none of whom is domiciled in a Member State, the courts of other Member States have no jurisdiction over their disputes unless the court or courts chosen have declined jurisdiction. This parallels Art.17 of the Brussels Convention. On Art.17, the ECJ stated:

The way in which that provision is to be applied must be interpreted in the light of the effect of the conferment of jurisdiction by consent, which is to exclude both the jurisdiction determined by the general principle laid down in Article 2 and the special jurisdictions provided for in Articles 5 and 6 of the Convention. In view of the consequences that such an option may have on the position of the parties to the action, the requirements set out in Article 17 governing the validity of clauses conferring jurisdiction must be strictly construed. By making such validity subject to the existence of an 'agreement' between the parties, Article 17 imposes on the court before which the matter is brought the duty of examining, first, whether the clause conferring jurisdiction upon it was in fact the subject of a consensus between the parties, which must be clearly and precisely demonstrated. The purpose of the formal

was in Luxembourg till 1st March 2008. Under Art. 65, the jurisdiction specified in Arts 6(2) and 11 in actions on a warranty of guarantee or in any other third party proceedings may not be resorted to in Germany or Austria although a person domiciled in another Member State may be sued before the Courts in Germany and Austria under Arts 68, 73, 73 and 74 of the Zivilprozessordnung or Art. 21 of the Zivilprozessordnung respectively.

¹⁸⁶ Article 23(1) of the Brussels I Regulation provides that “[i]f the parties, one or more of whom is domiciled in a Member State, have agreed that a court or the courts of a Member State are to have jurisdiction to settle any disputes which have arisen or which may arise in connection with a particular legal relationship, that court or those courts shall have jurisdiction. Such jurisdiction shall be exclusive unless the parties have agreed otherwise. Such an agreement conferring jurisdiction shall be either:(a) in writing or evidenced in writing; or in a form which accords with practices which the parties have established between themselves; or in international trade or commerce, in a form which accords with a usage of which the parties are or ought to have been aware and which in such trade or commerce is widely known to, and regularly observed by, parties to contracts of the type involved in the particular trade or commerce concerned.”

requirements imposed by Article 17 is to ensure that the consensus between the parties is in fact established.

The Irish Courts have approved this.¹⁸⁷ Article 23 was also examined in *Antec International Ltd v Biosafety USA Inc*¹⁸⁸ in the context of non-exclusive jurisdiction clauses. Here the parties had freely negotiated a contract containing a non-exclusive English jurisdiction clause. The claimant was an English company while the defendant was an American Corporation based in Florida. The claimant was subsequently taken over by a Delaware company but the contractual obligations continued to be discharged from England. Gloster J. in the High Court held that England was the correct forum and set down a number of factors to be considered in coming to the view as to what was the appropriate forum in light of the facts. First, the parties had freely negotiated the contract containing the clause and this was itself sufficient to create a *prima facie* case that the English jurisdiction was the correct one. This was so even though the clause was non-exclusive.¹⁸⁹ Secondly, although the Court is free to have regard to all the circumstances of the case, “the general rule is that the parties will be held to their contractual choice of English jurisdiction unless there are overwhelming, or at least very strong, reasons for departing from this rule.”¹⁹⁰ Factors of convenience that were foreseeable at the time that the contract was entered into do not constitute reasons for this purpose and therefore it is inappropriate to enter into the *Spiliada* balancing test. Even where the defendant can point to an unforeseeable factor, this does not automatically mean that the party

¹⁸⁷ *Bio-Medical Research Ltd. v Delatex S.A* [2000] 4 I.R. 307, at p. 317; [2000] IESC 32 and *O’Connor & Anor v Masterwood (UK) Ltd. & Ors* [2009] IESC 49.

¹⁸⁸ [2006] EWHC 47 (Comm), [2006] All ER (D) 208 (Jan).

¹⁸⁹ Here Gloster J. relied on Hobhouse J. in *S & W Berisford Plc v New Hampshire Insurance Co.* [1990] 1 Lloyd’s Rep. 454, at p.463, Waller J. in *British Aerospace Plc v Dee Howard Co* [1993] 1 Lloyd’s Rep. 368 and Moore-Bick J. in *Mercury Communications Ltd v Communication Telesystems International* [1999] 2 All ER 33 at p.41.

¹⁹⁰ [2006] EWHC 47 (Comm), [2006] All ER (D) 208 (Jan), at para.7(ii). Relying on *British Aerospace Plc supra* and *Mercury Communications supra* at page 41; *per* Aikens J in *Marubeni Hong Kong & South China Ltd v Mongolian Government* [2002] 2 All ER (Comm) 873, at p.891(b) - (f); *per* Lawrence Collins J. in *Bas Capital Funding Corporation and others v Medfinco Ltd and Others* [2004] 1 Lloyd’s Rep. 652, at paragraphs 192-195; *per* Gross J. in *Import Export Metro Ltd v Compania Sud Americana de Vapores SA* [2003] 1 Lloyd’s Rep. 405.

should be released from the contract. This is so even where the institution of proceedings in another forum has occurred or is imminent otherwise parties could escape their bargains simply by the institution of proceedings.¹⁹¹ Applying these principles to the case, Gloster J found that the only factor was the change on ownership of the claimant but as the performance of the contract still occurred in England, this had no effect on the jurisdictional position.

Article 5 provides for a number of exceptions to this general rules. So in matters relating to a contract, in the courts for the place of performance of the obligation¹⁹² in question may exercise special jurisdiction.¹⁹³ ‘Place of performance’ under the default position set out by the Regulation has an autonomous meaning.¹⁹⁴ Where the default position does not apply, the place of performance of the obligation is determined in accordance with the law governing the contract according to the national rules of private international law of the court seised.¹⁹⁵ The ‘place of performance’ poses difficulties in its application as it envisages that the place will be within the territory of a Member State; this will clearly not be the case where a satellite is to be delivered into orbit. In matters relating to tort, delict or quasi-delict, the courts for the place where the harmful event occurred or may occur. If a civil claim for damages or restitution

¹⁹¹ See *The El Amria* [1981] 2 Lloyd's Rep. 119; *Breams Trustees Ltd v Upstream Downstream Simulation Services* [2004] EWHC 211 (Ch) *per* Patten J at paragraphs 27 and 28.

¹⁹² In the case of the sale of goods, this is the place in a Member State where, under the contract, the goods were delivered, or should have been delivered and in the case of the provision of services, the place in a Member State where, under the contract, the services were provided or should have been provided. The characterization of the contract by the parties regarding the contract is not determinative: *Leo Laboratories v Crompton BV* [2005] IESC 31 *per* Finlay-Geoghegan J.

¹⁹³ Article 5(1) (a) of the Brussels I Regulation.

¹⁹⁴ *General Monitors Ireland v Ses-Asa* [2005] IEHC 223. See the Explanatory Memorandum of the proposal for a Council Regulation (EC) on jurisdiction and the recognition and enforcement of judgments in civil and commercial matters COM/99/0348 final, O.J. C 376 E, 28th December 1999 where the Commission stated: “This pragmatic determination of the place of enforcement applies regardless of the obligation in question, even where this obligation is the payment of the financial consideration for the contract. It also applies where the claim relates to several obligations. The rule may, however, be “displaced” by an explicit agreement on the place of performance.”

¹⁹⁵ *Leo Laboratories v Crompton BV* [2005] IESC 31 *per* Finlay-Geoghegan J.

which is based on an act giving rise to criminal proceedings,¹⁹⁶ then the Court seized of the criminal proceedings may exercise special jurisdiction. The onus of proof is on the plaintiff to show that the exception applies.¹⁹⁷ In light of the difficulties facing a plaintiff in showing quasi-territoriality, it is strongly recommended that contracts contain an exclusive jurisdiction clause. In *Leo Laboratories v Crompton BV*,¹⁹⁸ the Supreme Court held:

[I]f the contract contains a term conferring exclusive jurisdiction on the Dutch Courts, that will prevail over any claimed special jurisdiction pursuant to Article 5.

Finlay-Geoghegan J. concluded that the ‘obligation in question’ within Art.5(1) was the “the contractual obligation forming the basis of the legal proceedings”¹⁹⁹ or “that which corresponds to the contractual right on which the claimant’s action is based”.²⁰⁰

Applying the case law from the Brussels Convention to the current Regulation, it is clear that the exceptions as set out in Art.5 must be interpreted narrowly and the rules as set out therein “cannot give rise to an interpretation going beyond the cases expressly envisaged by the Convention”²⁰¹ This approach is supported in the Irish courts.²⁰²

¹⁹⁶ See the preceding section on criminal acts with regard to space activities.

¹⁹⁷ *General Monitors Ireland v Ses-Asa* [2005] IEHC 223.

¹⁹⁸ [2005] IESC 31. Here, the plaintiff, an Irish company, made a contract with a Dutch company for certain pharmaceutical goods. The plaintiffs were unhappy with the goods and commenced proceedings in contract before the Dutch courts and for tort before the Irish courts.

¹⁹⁹ *De Bloos, S.P.R.L. v. Bouyer* (Case 14/76) [1976] E.C.R. 1497.

²⁰⁰ *Hassan Shenavai v. Klaus Kreischer* (Case 266/85) [1987] E.C.R. 239.

²⁰¹ *Kalfelis v Bankhaus Schroder, Muenchmeyer, Hengst and Co. and others. (Convention On Jurisdiction And The Enforcement Of Judgments)* (Case 189/87) [1988] EUECJ R-189/87 (27 September 1988); [1988] E.C.R. 5565, paragraph 19 and *Blijdenstein* (Case C-433/01) [2004] E.C.R. I-1417, para.25.

²⁰² *Handbridge Limited v. British Aerospace Communications Ltd.* [1993] 3 I.R. 342.

It is only by way of derogation from that fundamental principle attributing jurisdiction to the courts of the defendant's domicile that Section 2 of Title II of the Convention makes provision for certain special jurisdictional rules, such as that laid down in Article 5(3) of the Convention.²⁰³

However, there does appear to be some inconsistent case law from the ECJ on this.²⁰⁴ Also in applying the case law from the Brussels Convention in respect of tortious actions, it is clear that where the place of origin of the damage is different from the place in which the damage occurred, the plaintiff has a choice of jurisdiction where either place could “constitute a significant connection factor from the point of view of jurisdiction.”²⁰⁵ But this is not without its limits, as the ECJ stated:

Whilst it has been recognized that the term ‘place where the harmful event occurred’ within the meaning of Article 5(3) of the Convention may cover both the place where the damage occurred and the place of the event giving rise to it, that term cannot be construed so extensively as to encompass any place where the adverse consequences can be felt of an even which has already cause damage actually arising elsewhere.²⁰⁶

Thus in *Kronhofer*, a case concerning purely financial loss, the ECJ did not find that there was enough of a connecting factor to the victim’s domicile in Austria where the greater part of his assets were concentrated and therefore the greatest part of his losses occurred in Germany, as well as the alleged acts of negligence on the part of the defendants.²⁰⁷ The conferring of jurisdiction must meet the objective, rather than subjective need, “as regards evidence or the conduct of the proceedings”.²⁰⁸

²⁰³ *Kronhofer v Maier and others* (Case 168/02) [2004] E.C.R. I-6009.

²⁰⁴ See *Verein für Konsumenteninformation v Henkel* (Case 167/00) [2002] E.C.R. I-8111.

²⁰⁵ *Bier ('Mines de Potasse d'Alsace')* (Case 21/76) [1976] E.C.R. 1735, para.15.

²⁰⁶ *Marinari v Lloyds Bank plc* (Case C-364/1993) [1995] E.C.R. I-3719, at para.14.

²⁰⁷ *Kronhofer v Maier and others*, (Case 168/02) [2004] E.C.R. I-6009.

²⁰⁸ See also *Doe v Armour Pharmaceuticals Inc and ors* [1997] IEHC 139.

Other exceptions are provided in Art.6 of the Regulation. Where a person is domiciled in one Member States is one of a number of defendants he can be sued in the courts of the domicile of any one of them “provided that the claims are so closely connected that it is expedient to hear and determine them together to avoid the risk of irreconcilable judgments resulting from separate proceedings.” Special rules are also set down with respect to certain categories of contract, including insurance, consumer and employment contracts. The rules relating to insurance and consumer contracts are set out below.

3.5.3.2.1 Contracts of Insurance

Contracts of insurance²⁰⁹ are dealt with in section 3 of the Regulation which provides that jurisdiction is to be determined without prejudice to the rules in Arts 4 and 5(4). An insurer domiciled in a Member State may be sued before the courts of the Member State where he is domiciled or in another Member State (in the case of actions brought by the policyholder, the insured or a beneficiary), in the courts for the place where the plaintiff is domiciled.²¹⁰ If the insurer is a co-insurer, he/she may be sued in the courts of a Member State in which proceedings are brought against the leading insurer.²¹¹ In the case of an insurer who is not domiciled in a Member State but has a branch, agency or other establishment in one of the Member States, such an insurer is to be deemed to be domiciled in that Member State in disputes arising out of the operations of the branch, agency or establishment.²¹² Significantly, Art.10 provides that in respect of liability insurance, the insurer may in addition be sued in the courts for the place where the harmful event occurred. The same applies if movable property is covered by the same insurance policy and both are adversely affected by the same contingency.²¹³ This means that the State of Registry may be a forum for a plaintiff in a dispute relating to an insurance contract where the harmful

²⁰⁹ See Clarke, Malcom A., *The Law of Insurance Contracts*, 4th ed. (Lloyd’s London Press, London, 2002), pp.25-110.

²¹⁰ Article 9(1)(a) and (b).

²¹¹ Article 9(1)(c).

²¹² Article 9(2).

²¹³ Article 10 of Regulation 44/2001.

event occurs aboard the space object, in the absence of a clause to the contrary. Any such clause must come within the exceptions provided for in Art. 13. However, the insurer may only take proceedings in the courts of the Member State in which the defendant is domiciled, irrespective of whether he is the policyholder, the insured or a beneficiary, although this does not apply to counter-claims.²¹⁴

3.5.3.2.2 Consumer Contracts

Consumer contracts are covered in section 4 of the Regulation. A 'consumer contract' in this regard is the standard EU definition, viz, a contract concluded by a person for a purpose which can be regarded as being outside his trade or profession.²¹⁵ The contract must be for one of the following however: a contract for the sale of goods on instalment credit terms, for a loan repayable by instalments, or for any other form of credit, made to finance the sale of goods; or in all other cases and be concluded with a person who pursues commercial or professional activities in the Member State of the consumer's domicile or, by any means, directs such activities to that Member State or to several States including that Member State, and the contract falls within the scope of such activities.²¹⁶ Under Art.15, where a consumer enters into a contract with a party who is not domiciled in the Member State but has a branch, agency or other establishment in one of the Member States, that party shall, in disputes arising out of the operations of the branch, agency or establishment, be deemed to be domiciled in that State. Unfortunately, the availability of the special rules relating to consumer contracts may not be available for space tourists as section 4 is stated specifically "not [to] apply to a contract of transport other than a contract which, for an inclusive price, provides for a combination of travel and accommodation." So contracts for space carriage *simpliciter* may not come within the special rules. Package deals including accommodation on board a space object will still benefit the space carriage consumer as will contract for space carriage that include the provision of accommodation on earth. Where the section 4 rules are found to apply, a consumer may institute

²¹⁴ Article 11 of Regulation 44/2001.

²¹⁵ Article 15 (1) of Regulation 44/2001.

²¹⁶ Article 15(1)(a)-(c) of Regulation 44/2001.

proceedings against the other party to a contract either in the courts of the Member State in which that party is domiciled *or in the courts for the place where the consumer is domiciled*. Proceedings against a consumer may only be brought by the other party to the contract in the courts of the Member State in which the consumer is domiciled, although, as with insurance contracts, this is without prejudice to the ability to counter claim.²¹⁷ These rules may be departed from only by an agreement which is entered into after the dispute has arisen or which allows the consumer to bring proceedings in courts other than those indicated in section 4 or which is entered into by the consumer and the other party to the contract, both of whom are at the time of conclusion of the contract domiciled or habitually resident in the same Member State, and which confers jurisdiction on the courts of that Member State, provided that such an agreement is not contrary to the law of that Member State.²¹⁸

3.5.3.2.3 *Inter-Related Claims*

The Regulation provides in Art. 27 that where proceedings involving the same cause of action and between the same parties are brought in the courts of different Member States, any court other than the court first seised must of its own motion stay its proceedings until such time as the jurisdiction of the court first seised is established. Where it is established, any other court must decline jurisdiction in favour of that court. In the case of related actions, any court other than the first court may stay its proceedings or decline jurisdiction. For this purpose “actions are deemed to be related where they are so closely connected that it is expedient to hear and determine them together to avoid the risk of irreconcilable judgments resulting from separate proceedings.”²¹⁹ The Irish Courts have adopted the approach set down by Lord Steyn in *Continental Bank N.A. v. Aeokos Cia Naviera S.A.*²²⁰ in relation to claims that are closely knitted to the contractual claim:

²¹⁷ Article 16(2) and (3) of Regulation 44/2001.

²¹⁸ Article 17 of Regulation 44/2001.

²¹⁹ Article 28(3) of Regulation 44/2001.

²²⁰ [1994] 1 W.L.R. 588.

It seems to me that this is the correct approach and is, indeed, in accordance with business common sense. The defendant's claims of negligence, of misrepresentation, and indemnity are 'closely knitted' to the contractual claim, and indeed it appears that very much the same evidence would be used in support of all the claims.

The ECJ has held that the concept of related actions should be given an independent interpretation as it had different meanings in different member states. Such an interpretation must be broad and cover all cases where there is a risk of conflicting decisions, even if the judgments can be separately enforced and their legal consequences are not mutually exclusive²²¹ This was considered by the House of Lords in *Sarrío SA v Kuwait Investment Authority*²²² where Saville L.J, stated:

I am of the view that there should be a broad common sense approach to the question of whether the actions in question are related, bearing in mind the objective of the Article, applying the simple wide test set out in Article 22 and refraining from an over-sophisticated analysis of the matter.

3.5.3.2.4 Exclusive Jurisdiction

Exclusive jurisdiction²²³ is provided for generally in Article 6 and more specifically in Arts 22(3) and (4) which confers exclusive jurisdiction in proceedings which have as their object the validity of entries in public registers on the courts of the Member State in which the register is kept and in those concerned with the registration or validity of patents, trade marks, designs, or other similar rights required to be deposited or registered, the courts of the Member State in which the deposit or registration has been applied for, has taken place or is under the terms of a Community instrument or an international convention deemed to have taken place. Therefore any challenges or disputes relating to the registration of a space object

²²¹ *Tatry* (Case 406/92)[1994] E.C.R. I-5439.

²²² [1999] 1 A.C. 32.

²²³ See Article 6.

must take place within the State of registry. Similarly, disputes relating to intellectual property that came from activity on board space objects are resolved according to the State of registration of the right. Where the courts of another Member State are seised of the matter, by virtue of Art.22, any other court in a Member State seised with principally the same claim must declare of its own motion to have no jurisdiction.²²⁴ Under Art.29, where actions come within the exclusive jurisdiction of several courts, any court other than the court first seised must decline jurisdiction in favour of that court.

3.5.4 *Forum Non Conveniens*

The doctrine of *forum non conveniens*²²⁵ was developed first in Scotland and was later accepted in England in a limited way²²⁶ until the case of *The Atlantic Star*.²²⁷ In its expanded version it provides that a national court may decline to exercise jurisdiction on the ground that a court in another State, which also has jurisdiction, would objectively be a more appropriate forum for the trial of the action, that is to say, a forum in which the case may be tried more suitably for the interests of all the parties and the ends of justice. The result is that such proceedings are stayed and may resume if the court in the other State finds that it has no jurisdiction so the plaintiff is not left without a forum. A two-pronged test was established in *Spiliada Maritime Corporation v Cansulex Ltd.*²²⁸ to determine the question of *forum non conveniens* objections. Firstly, the defendant is required to show that there is another alternative forum, available and more appropriate than the current jurisdiction where the case will be more suitably tried in the interest of all of the parties and of the ends of justice. Secondly, once the defendant discharges the above burden, the court will grant a stay, unless the plaintiff can show that, even though factors connect the case with the alternative forum, special circumstances exist to show that substantial

²²⁴ Article 25.

²²⁵ See generally Hayes, Ellen L. "Forum Non Conveniens in England, Australia and Japan: The Allocation of Jurisdiction in Transnational Litigation," (1992), 26 *U.B.C. Law Rev.* 41.

²²⁶ *Logan v. Bank of Scotland* [1906] 1 K.B. 141 (C.A.).

²²⁷ [1974] A.C. 436.

²²⁸ [1987] 1 A.C. 460, at p. 470

justice cannot be obtained there. These special circumstances may include contingency fee arrangements and the adequacy of legal aid.²²⁹ This test was endorsed in Ireland.²³⁰ It does not consider matters relating to convenience that were foreseeable at the time when the contract was entered into; the factors must be unseen at that time.²³¹

The standard of proof is that normally applicable to civil matters and “the existence of a more appropriate forum must be clearly established to displace the forum selected by the plaintiff”.²³² The forum which is more suitable for the ends of justice is the jurisdiction which has “the most real and substantial connection with the lawsuit.”²³³ The doctrine was examined in the light of allegations of forum shopping in *Barclay's Bank PLC v Inc. Incorporated*²³⁴ where the plaintiff erroneously deposited money into the accounts of the defendant. The accounts were held in the Cayman Islands where both the plaintiff and the defendant had their registered offices, where the error took place and where most of the witnesses resided. The proceedings were instituted in Alberta where two of the shareholders of Inc. Incorporated resided. The plaintiff successfully pleaded *forum non conveniens* and pointed to the juridical disadvantage if the proceedings took place before the Alberta courts. The Court rejected the argument by the defendants that the plaintiff was forum shopping and found that there was a “minimal connection” with Alberta.

In the USA, federal due process requires that the plaintiff have certain minimal connections with the state so that due process is not violated.²³⁵ Although the Alien

²²⁹ See *Connelly v RTZ* [1998] A.C. 854; *Lubbe and Others v Cape PLC* [2000] 1 W.L.R. 1545, [2000] 4 All E.R. 268, [2000] UKHL 41.

²³⁰ *Intermetal Group Limited v. Worlslade Trading Limited* [1998] 2 I.R. 1 per Murphy J. at pp. 33 and 34 and *McCarthy v Pillay* [2003] IESC 31, [2003] 2 I.L.R.M. 284, [2003] 1 I.R. 592, para. 39.

Compare the test of Stephens J.A. in *United Oilseed Products v Royal Bank* (1988), 29 C.P.C. (2d) 28 at p. 39; 60 Alta. L.R. (2d) 73.

²³¹ *Antec International Ltd v Biosafety USA Inc* [2006] EWHC 47 (Comm), [2006] All ER (D) 208 (Jan).

²³² *Amchem Products Inc. v. British Columbia (Workers' Compensation Board)* (1993) 3 W.W.R. 441, per Sopinka J. (for the majority) at p.28.

²³³ *Ibid.*

²³⁴ (1999) A.B.Q.B. 110 (Coutu J.).

²³⁵ *International Shoe Co. v. Washington*, 326 U.S. 310 (1945).

Tort Claims Act²³⁶ confers jurisdiction on the federal courts to hear any civil action by a non-national for a tort only, committed in violation of the law of nations or a treaty of the United States, the defendant may rely on *forum non conveniens*. The US test for *forum non conveniens* was set down in *Gulf Oil Corporation v. Gilbert*²³⁷ an approach it later confirmed in *Piper Aircraft Co. v. Reyno*.²³⁸ It too adopted a two-step test like England, first, to inquire whether another adequate forum exists and secondly to weigh both public and private factors. Adequacy in this sense “implies an alternative forum that provides an impartial arbiter and permits some measure of compensatory damage to be recovered.”²³⁹ So where the other forum is considered too corrupt it will not satisfy the first limb of the test.²⁴⁰ The Court then examines whether the defendant is amenable to process in the other forum.²⁴¹

Australia has a stricter test that works in a negative rather than a positive fashion. The burden is to show that Australia is “a clearly inappropriate forum”²⁴² and that the continuation of proceedings “would be oppressive in the sense of seriously and unfairly burdensome, prejudicial or damaging, or vexatious, in the sense of productive of serious and unjustified trouble and harassment”.²⁴³

²³⁶ 28 U.S.C. 1350.

²³⁷ 330 U.S. 501 (1947).

²³⁸ 454 US 250 (1981).

²³⁹ Belgore, Y., “*Forum Non Conveniens* in England and the USA for litigation against Oil Multinationals” (2003) 1 *Oil, Gas & Energy Law Intelligence* 5.

²⁴⁰ *Eastman Kodak Co v. Kavlin* 978 F. Supp. 1078, 1084 (SD Fla. 1997) re: the Bolivian Judicial System.

²⁴¹ *Re: Union Carbide Corp. Gas Plant Disaster at Bhopal, India*, 634 F.Supp. 842, at 867 (S.D.N.Y. 1986).

²⁴² *Voth v Manildra Flour Mills Pty Limited* (1990) 171 CLR 538; [1990] HCA 55 *cf* the Supreme Court Rules actually provide only for showing that the court is “an inappropriate forum”.

²⁴³ *Regie National des Usines Renault SA v Zhang* [2002] HCA 10 (14 March 2002). See Hunt, F., “*Forum Non Conveniens*,” (2002) 19 *The Maritime Advocate* 15 available at http://www.maritimeadvocate.com/i19_foru.php

3.5.4.1 *Forum non Conveniens* and Regulation 44/2001

The application of the doctrine in England and Ireland has been severely curtailed following the implementation of the Brussels and Lugano Conventions and Regulation 44/2001 as the doctrine is no longer applicable between the signatory states to these instruments. Following the ruling in *UGIC v Group Josi*²⁴⁴ it is clear that the Brussels Convention applies to disputes arising between a defendant domiciled in a Contracting State and a claimant domiciled in a non-Contracting State. This was confirmed in *Owusu v Jackson*.²⁴⁵ Although both *UGIC* and *Owusu* relate to the Brussels Convention, the law still holds good for Regulation 44/2001 as the Courts have shown their willingness to interpret it in light of the case law on the former.

In *Owusu v Jackson*²⁴⁶ the applicant was injured during his holiday in Jamaica when he struck his head off a concealed sandbank after diving into the sea from a beach, leaving him a tetraplegic. He sued the defendant, a UK domiciliary, from whom he had rented the house. Under the rental contract, there was to be access to a private beach, and the plaintiff sought to argue that this included an implied condition that the beach would be safe and free from hidden dangers. He also sued several Jamaican companies who managed the beach and its facilities in tort. The defendants sought to have the proceedings stayed and the Court of Appeal requested a preliminary ruling from the ECJ to determine whether the Court had discretion to apply *forum non conveniens* doctrine when the plaintiff relied on Art.2 of the Brussels Convention.²⁴⁷ The ECJ held that although the Brussels Convention did require an ‘international element’²⁴⁸ in order to apply but:

the international nature of the legal relationship at issue need not necessarily derive, for the purposes of the application of Article 2 of

²⁴⁴ (Case C-412/98) [2000] E.C.R. I-5925.

²⁴⁵ [2005] ILPr 25, [2005] 2 All ER (Comm) 577, [2005] EUECJ C-302/02, [2005] QB 801, [2005] EUECJ C-281/02, [2005] 1 CMLR 43, [2005] 1 Lloyd's Rep 452, Case C-281/02, [2005] 1 CLC 246, Case C-302/02, [2005] 2 WLR 942, [2005] E.C.R. I-1383.

²⁴⁶ (Case No. C-281/02) [2005] EUECJ C-281/02.

²⁴⁷ [2002] EWCA Civ 877, [2003] PIQR 186; [2002] IL Pr 45 (CA) (UK).

²⁴⁸ Borrowing the language of the Jenard report on the Convention (OJ 1979 C 59, pp. 1, 8).

the Brussels Convention, from the involvement, either because of the subject-matter of the proceedings or the respective domiciles of the parties, of a number of Contracting States. The involvement of a Contracting State and a non-Contracting State, for example because the claimant and one defendant are domiciled in the first State and the events at issue occurred in the second, would also make the legal relationship at issue international in nature.²⁴⁹

This is in line with previous rulings of the ECJ which applied the Brussels Convention to cases where the claimant was domiciled or had its seat in a non-Contracting State while the defendant was domiciled in a Contracting State.²⁵⁰

3.5.5 Forum Shopping

Where an argument of juridical advantage or disadvantage is made this may be met by the counterargument that the plaintiff is forum shopping. This has been described as “the transfer assets or judicial proceedings from one ... State to another with the view to obtaining a more favourable legal position.”²⁵¹ The Supreme Court of Canada examined the problems posed by forum shopping in *Amchem Products Inc. v. British Columbia (Workers' Compensation Board)*.²⁵² Here one hundred and ninety four plaintiffs brought proceedings claiming injury as a result of exposure to asbestos or as dependants of those so affected. The original action in damages was brought before the courts in Texas in 1988 and the Compensation Board of British Columbia paid out compensation in all but forty of the actions. Most of the claimants were residents of British Columbia though none of the respondents had any connection with British Columbia, the majority of which were incorporated within the USA and

²⁴⁹ (Case No. C-281/02) [2005] EUECJ C-281/02 at para. 26.

²⁵⁰ *Ibid*, at para 27 citing *Rich* (Case C-190/89) [1991] E.C.R. I-3855, *Tatry* (Case C-406/92) [1994] E.C.R. I-5439 and *Group Josi*, para. 60. Contrast *Re Harrods (Buenos Aires) Ltd.* [1992] Ch 72; *Intermetal Group Ltd v Worlslade Trading Ltd* [1998] 2 I.R. 1 and *Gonzalez v Mayer and Others* [2003] IEHC 43 (25th July 2003). Compare *DC v W O' C* [2001] 2 I.R. 1.

²⁵¹ See the second recital of Council Regulation 1346/2000/EC

²⁵² (1993) 3 W.W.R. 441, [1993] 1 SCR 897.

carried on some form of business in Texas (none were actually incorporated in Texas). The Texas court ruled that it had jurisdiction however under Texan law, this finding could not be appealed until after the action was tried. Motions were unsuccessfully raised challenging the jurisdiction, venue and seeking a stay on the ground of *forum non conveniens*.²⁵³ However, the companies were successful in obtaining anti-suit injunctions before the British Columbia courts.²⁵⁴ The Texan court then issued an anti- anti-suit injunction. The appeal against the anti-suit injunction was allowed. The Court acknowledged the current difficulties associated with the selection of a forum,²⁵⁵ however as Sopinka J. stated:

This does not mean, however, that "forum shopping" is now to be encouraged. The choice of the appropriate forum is still to be made on the basis of factors designed to ensure, if possible, that the action is tried in the jurisdiction that has the closest connection with the action and the parties and not to secure a juridical advantage to one of the litigants at

²⁵³ Forum non conveniens was statutorily abolished in Texas: *Dow Chemical Co. v. Alfaro*, 786 S.W.2d 674 (Tex. 1990), *certiorari* denied, 59 U.S.L.W. 3460 (1991).

²⁵⁴ *Amchem Products Inc. v. British Columbia (Workers' Compensation Board)* (1989), 42 B.C.L.R. (2d) 77 (first instance) (1990), 50 B.C.L.R. (2d) 218 (CA). See generally Black, Vaughan, "The Standard for Issuing Anti-suit Injunctions in Canada," (1991) 44 C.P.C. (2d) 30, Raushenbush, Richard W., "Anti-suit Injunctions and International Comity," (1985) 71 *Va. Law Rev.* 1039, *Castanho v. Brown & Root (U.K.) Ltd.*, [1981] A.C. 557 (H.L.) and *SNI Aérospatiale v. Lee Kui Jak* [1987] 3 All E.R. 510 (P.C.) and Art.22 of the Brussels Convention.

²⁵⁵ Sopinka J.A. for the majority observed: "With the increase of free trade and the rapid growth of multi-national corporations it has become more difficult to identify one clearly appropriate forum for this type of litigation. The defendant may not be identified with only one jurisdiction. Moreover, there are frequently multiple defendants carrying on business in a number of jurisdictions and distributing their products or services world wide. As well, the plaintiffs may be a large class residing in different jurisdictions. It is often difficult to pinpoint the place where the transaction giving rise to the action took place. Frequently, there is no single forum that is clearly the most convenient or appropriate for the trial of the action but rather several which are equally suitable alternatives. In some jurisdictions, novel principles requiring joinder of all who have participated in a field of commercial activity have been developed for determining how liability should be apportioned among defendants. In this climate, courts have had to become more tolerant of the systems of other countries. The parochial attitude exemplified by *Bushby v. Munday* (1821), 5 Madd. 297, 56 E.R. 908, at p. 308 and p. 913, that '[t]he substantial ends of justice would require that this Court should pursue its own better means of determining both the law and the fact of the case' is no longer appropriate."

the expense of others in a jurisdiction that is otherwise inappropriate. I recognize that there will be cases in which the best that can be achieved is to select an appropriate forum. Often there is no one forum that is clearly more appropriate than others.²⁵⁶

Juridical advantage has not therefore been given any particular status²⁵⁷ and is simply another factor to be weighed in the balance in identifying the appropriate forum rather than “a separate and distinct” condition.²⁵⁸

3.5.6 Other Civil Matters

Some civil matters are regulated under separate, specific Conventions. Accidents arising from air transport are governed by either the Warsaw²⁵⁹ or Montreal Conventions,²⁶⁰ the latter of which now applies *inter alia* to European Community and U.S.A. airspace.²⁶¹ Article 28 of the Warsaw Convention prescribes four *fora* where an action for damages must be brought, at the option of the plaintiff, *viz*, in the territory of one of the contracting parties, either before a court having jurisdiction where the carrier is ordinarily resident, or has his principal place of business, or has an establishment by which the contract has been made or before the Court having jurisdiction at the place of destination. The Montreal Convention is somewhat more plaintiff-friendly with the addition of a fifth forum namely the territory of a state party in which at the time of the accident the passenger has his or her principal and permanent residence and to or from which the carrier operates services for the carriage of passengers by air, either on its own aircraft or on another carrier's aircraft

²⁵⁶ *Ibid* at p.451.

²⁵⁷ *United Oilseed Products Ltd. v. Royal Bank* (1988), 29 C.P.C. (2d) 28; 60 Alta. L.R. (2d) 73

²⁵⁸ *Amchem Products Inc. v. British Columbia (Workers' Compensation Board)* (1993) 3 W.W.R. 441 *per Sopinka J* at p. 456.

²⁵⁹ Convention for the Unification for Certain Rules Relating to International Carriage by Air 1929.

²⁶⁰ Convention for the Unification for Certain Rules for International Carriage by Air 1999, in force 4th November 2003.

²⁶¹ Council Decision 2001/539/EC O.J.L 194/ 38, 18.07.1998; Regulation 889/2002 OJL 140/2 30.05.2002. In force in Ireland from the 28.07.04

pursuant to a commercial agreement, and in which that carrier conducts its business of carriage of passengers by air from premises leased or owned by the carrier itself or by another carrier with which it has a commercial agreement.

Actions arising from contracts of carriage by rail as governed by the Convention concerning International Carriage by Rail (COTIF) as amended by the Vilnius Protocol of 1999²⁶² may be brought before the courts or tribunals of Member States designated by agreement between the parties or before the courts or tribunals of the Member State on whose territory the defendant has his domicile or habitual residence, his principal place of business or the branch or agency which concluded the contract of carriage.²⁶³ The Athens Convention relating to the Carriage of Passengers and their Luggage by Sea 1974 (PAL)²⁶⁴ provides that an action arising under it must, at the option of the claimant, be brought before the court of the place of permanent residence or principal place of business of the defendant or the court of the place of departure or that of the destination according to the contract of carriage or a court of the State of the domicile or permanent residence of the claimant, if the defendant has a place of business and is subject to jurisdiction in that State or a court of the State where the contract of carriage was made, if the defendant has a place of business and is subject to jurisdiction in that State (provided that the court is located in a State Party to this Convention).

There is no equivalent international or regional convention governing private commercial space carriage yet, though there have been some calls for this. Any convention should take account of the State of registry of the space object in some form.

²⁶² There is currently a proposal for a council decision for a regulation on international rail passengers' rights COD 2004/0049 and for the Community to accede to COTIF 1999: COM(2003) 696 final, 17.11.2003

²⁶³ Article 57.

²⁶⁴ The 2002 Protocol is not yet in force (requires 6 further ratifications).

3.5.7 Conflicts of Law in the Law of Air

The *Institut de Droit International* examined the issue of conflicts of law in private air law in the 27th Commission in 1963 observed that ‘considérant que, tant que l’idéal de l’adoption d’un droit aérien uniforme n’est pas atteint, il est opportun d’adopter des règles uniformes de conflits en la matière.’ The rules set forth apply the law of the nationality of the aircraft, that is the law of the State where the aircraft is registered, to rights *in rem* and private law claims (‘Les droits réels et les privilèges d’ordre privé’), although creditors entitled to sums from the maintenance or rescue of an aircraft may rely on the priority rules applicable in the State where the rescue or maintenance operations took place. Hiring and affreightment, crew employment contracts, contracts for the carriage of passengers and goods are governed by the law of the state as determined by the parties’ will and, in the absence of such agreement, will be governed by default by the nationality of the aircraft. In the case of aerial collisions which occurs in a place subject to State sovereignty, ‘la loi du lieu où cet abordage est survenu s’applique’. Where no State sovereignty applies, such as where a collision occurs over the High Seas, the law of the State of nationality of the craft applies. The same approach is applied to instances of rescue or assistance and where damage is caused to third parties on the surface of the earth. Where an act takes place on board a craft giving rise to legal liability, other than in relation to goods carried onboard, the law of the place where the event took place will apply but if this cannot be ascertained or if the event did not take place in an area subject to State sovereignty, then the law of the State of nationality of the craft applies.

3.6 Choice of Law

While the procedural aspects of a case will be determined by the law of the forum, the substantive determination may be made applying a different law. The area has been clarified and harmonized under Regulation 864/2007 (the Rome II

Regulation)²⁶⁵ which applies to acts that occur after the 20th of August 2008.²⁶⁶ Article 4 establishes the general rule of applicable law as *lex loci damni*. The Rome II Regulation applies to non-contractual obligations in civil and commercial matters. The Regulation does not apply to the liability of the State for acts and omissions in the exercise of State authority (*acta iure imperii*)²⁶⁷ and so proceedings against states by nationals relating to launch activities undertaken by the State or its space agency will fall outside the scope of the Regulation and under the traditional rules.²⁶⁸ Non-contractual obligations arising out of nuclear damage fall outside the Regulation so any incidents concerning nuclear radiated debris etc. will not be subject to it. The Regulation covers, *inter alia*, damage that arises or is likely to arise from any consequence of a tort/delict, from product liability as well as intellectual property infringement and environmental damage.²⁶⁹ The law applicable to non-contractual obligations governs the basis and extent of liability, including the determination of persons who may be held liable for acts performed by them; the grounds for exemption from liability, any limitation of liability and any division of liability; the

²⁶⁵ Regulation 864/2007 [2007] OJ L 199/40. On the background to the 2007 Regulation see Von Hein, J., "Something Old and Something Borrowed, But Nothing New? Rome II and the European Choice-of-Law Evolution," [2008] *Tulane L. Rev.* 1676.

²⁶⁶ Regulation 864/2007 came into force on the 11th of January, 2009, in all Member States except Denmark. See generally Kramer, Xandra, "The Rome II Regulation on the Law Applicable to Non-Contractual Obligations: The European Private International Law Tradition Continued," (2008) 4 *Nederlands International Privaatrecht* 414.

²⁶⁷ Art.1(1). Revenue, customs or administrative matters are also excluded as are non-contractual maintenance (or equivalent) obligations, matrimonial property obligations, obligations arising out of bills of exchange, cheques and promissory notes, obligations arising out of the law of companies and other bodies corporate or unincorporated regarding matters such as the creation, by registration or otherwise, legal capacity, internal organisation or winding-up of companies and other bodies corporate or unincorporated, the personal liability of officers and members as such for the obligations of the company or body and the personal liability of auditors to a company or to its members in the statutory audits of accounting documents, arising out of the relations between the settlors, trustees and beneficiaries of a trust created voluntarily, obligations arising out of violations of privacy and rights relating to personality, including defamation (Arts 1(1) and 1(2) of the Rome II Regulation).

²⁶⁸ On the application of Regulation 864/2007 to damage from space, see Smith, Lesley Jane and Doldirina, C., "Jurisdiction and Applicable Law in Cases of Damage from Space in Europe," [2008] 51 *Proc. Coll. L. Out. Sp.*44.

²⁶⁹ Article 2(1)-(3) of the Rome II Regulation.

existence, the nature and the assessment of damage or the remedy claimed; within the limits of powers conferred on the court by its procedural law, the measures which a court may take to prevent or terminate injury or damage or to ensure the provision of compensation; the question of whether a right to claim damages or a remedy may be transferred; persons entitled to compensation for damage sustained personally; liability for the third party acts and the manner in which an obligation may be extinguished and rules of prescription and limitation.²⁷⁰ The Regulation supersedes the application of other convention between Member States on the matters it covers but otherwise does not affect their application or continuance.²⁷¹

In relation to torts or delict, the general rule is applies the law of the country in which the damage occurs.²⁷² This is so irrespective of the country in which the event giving rise to the damage occurred and irrespective of the country or countries in which the indirect consequences of that event occur. There are two exceptions to the general rule. First, where the allegedly liable person and the person sustaining damage both have their habitual residence in the same country at the time when the damage occurs, the law of that country applies instead.²⁷³ Secondly, both the general rule and the first exception may be displaced where it is clear from all the circumstances of the case that the tort/delict is “manifestly more closely connected” with another country.²⁷⁴ An example given of that connection is a where pre-existing relationship between the parties subsides that is closely connected with the tort/delict in question. The general rule for torts also applies to environmental damage or damage sustained by persons or property as a result of such damage, but the alleged victim may elect to base his or her claim on the law of the country in which the event giving rise to the damage occurred.

Separate provisions on product liability are provided for ‘without prejudice’ to the first exception above. The law applicable in relation to product liability is the law of

²⁷⁰ Article 15 of the Rome II Regulation.

²⁷¹ Article 29 of the Rome II Regulation.

²⁷² Article 4(1) of the Rome II Regulation.

²⁷³ Article 4(2) of the Rome II Regulation.

²⁷⁴ Article 4(3) of the Rome II Regulation.

the country in which the person sustaining the damage had his or her habitual residence when the damage occurred, if the product was marketed in that country; or, failing that, the law of the country in which the product was acquired, if the product was marketed in that country; or, failing that, the law of the country in which the damage occurred, if the product was marketed in that country. But if the allegedly liable person could not reasonably foresee the marketing of the product, or a product of the same type, in any of these countries, the law applicable is that where that person is habitually resident. Again, all this may be displaced where there is a manifestly closer connection with another country.²⁷⁵

In all of the above cases, derogations are possible under Article 14, which provides for the parties' agreement to apply the law of their choice.²⁷⁶ No derogation is possible, however, in relation to the provisions on intellectual property²⁷⁷ but the applicable law is the law of the country for which protection is claimed.²⁷⁸ In the case of an infringement of a unitary Community intellectual property right, the law applicable is, for any question that is not governed by the relevant Community instrument, the law of the country in which the act of infringement was committed.²⁷⁹ The victim may also bring his or her claim directly against the insurer of the person liable to provide compensation if the law applicable to the non-contractual obligation or the law applicable to the insurance contract so provides.²⁸⁰

In summary, the Regulation will govern the determination of applicable law where the parties have not so determined themselves within EC Member States (excluding Denmark) for cases related to space activities giving rise to actions in tort, including product liability and environmental liability (including consequential property damage) and infringements of intellectual property.

²⁷⁵ Article 5(2) of the Rome II Regulation.

²⁷⁶ Article 14(1) of the Rome II Regulation. The agreement may be entered into after the event giving rise to the damage occurred or before where all parties are pursuing commercial activity.

²⁷⁷ Article 8(3) of the Rome II Regulation.

²⁷⁸ Article 8(1) of the Rome II Regulation.

²⁷⁹ Article 8(2) of the Rome II Regulation.

²⁸⁰ Article 18 of the Rome II Regulation.

3.6.1 Choice of Law and Non-European States

3.6.1.1 Contract

Outside of EC States (excluding Denmark), the Rome Convention on the Law Applicable to Contractual Obligations 1980 will continue to apply.²⁸¹ It applies to “contractual obligations in any situations involving a choice of law between the laws of different countries”.²⁸² Article 3 provides that the rules do not apply to an insurance contract which covers risks within the territories of the Member States of the European Community. Therefore while contracts for launches within the territories of the Member States²⁸³ will be subject to the 2007 Regulation, those in Europe but not within the EC²⁸⁴ may be under the scope of this Convention or under the traditional rules set out below. This has been held not to exclude reinsurance

²⁸¹ Contractual Obligations (Applicable Law) Act 1991, No. 8 of 1991.

²⁸² Article 1 of the Rome Convention. Article 2 provides for a number of specific exclusions from the rules set down by the Convention *viz*, questions involving the status or legal capacity of natural persons, without prejudice to Article 11, contractual obligations relating to wills and succession, rights in property arising out of a matrimonial relationship and rights and duties arising out of a family relationship, parentage, marriage or affinity, including maintenance obligations in respect of children who are not legitimate, obligations arising under bills of exchange, cheques and promissory notes and other negotiable instruments to the extent that the obligations under such other negotiable instruments arise out of their negotiable character, arbitration agreements and agreements on the choice of court, questions governed by the law of companies and other bodies corporate or unincorporate such as the creation, by registration or otherwise, legal capacity, internal organization or winding up of companies and other bodies corporate or unincorporate and the personal liability of officers and members as such for the obligations of the company or body, the question whether an agent is able to bind a principal, or an organ to bind a company or body corporate or unincorporate, to a third party, the constitution of trusts and the relationship between settlors, trustees and beneficiaries, evidence and procedure, without prejudice to Article 14.

²⁸³ Rocket launches have taken place at Aberystwyth (Skylark), the Hebrides Archipelago (Skua, Petrel), Levant Island, Kourou (Ariane, Diamant, Europa) and Biscarosse, Kiruna, (Black Brant, Castor, Centaure, Nike), El Hierro (INTA) Perdasdefogu, (Skylark, Centaure, Belier, Zenit, Alfa), Morón (Shuttle Trans-Atlantic Abort Landing Site: TAL) and Mazagon (INTA).

²⁸⁴ Svalbard, Haugnes (Nike Tomahawk) and Andøya (Nike Cajun, Nike Apache, Arcas, Centaure, Dragon, Cuckoo Zenith, Petrel, Skua, Skylark, Fulmar, Terrier Malemute, Nike Orion, Taurus Orion, Black Brant IV, V, IX, X and XII, Viper 3A (MiniDusty and MiniMidas), Terrier I-Orion, VS30, SS-520) and Plesetsk (FOTON, Molniya, Rus (Soyuz-2)), Baikonur (Proton, Soyuz, Zenit, SL-12), Volgograd (R-1, R-2, R-5, R-11, R-12, R-14) and Svobodny (SL-18).

contracts from the scope of the Convention's application. The provision is of relevance in a space context as risks associated with launch must necessarily occur in another state's territory. The Convention protects the freedom to decide the applicable law of the contract, though not absolutely. The choice "must be expressed or demonstrated with reasonable certainty by the terms of the contract or the circumstances of the case." The law of the chosen state may apply to all or part of the contract and may vary the choice of law post-formation. The Convention sets out special rules for certain consumer contracts. In the absence of a clause stating the applicable law, they will be governed by the law of habitual residence. This applies to contracts for a combination of travel and accommodation at an inclusive price. But contracts of carriage and those for the supply of services where the services are to be supplied to the consumer exclusively in a country other than that in which he has his habitual residence are excluded.

Outside of the Rome Convention and the Rome II Regulation, the common law regulates the issue of choice of law. While the *lex loci contractus* was traditionally favoured, now the proper law of the contract is preferred in the absence of the parties' choice. This is determined by having regard to all the circumstances of the case and as a common law rule is subject to greater judicial interpretation than the rules in the Convention or the Regulation.

3.6.1.2 Tort

In Ireland, conflicts issues with regard to tort were resolved through a combination of the *lex fori* theory and the *lex loci delicti*²⁸⁵ following the approach set down by Wiles J. in *Phillips v Eyre*:

As a general rule, in order to found a suit in England, for a wrong alleged to have been committed abroad, two conditions must be fulfilled. First the wrong must be of such a character that it would have been actionable if committed in England... Secondly, the act must not have been justifiable by the law of the place where it was done.²⁸⁶

²⁸⁵ Binchy, *Irish Conflicts of Law*, (Butterworth, Dublin, 1998), ch. 32.

²⁸⁶ (1979) L.R. 6 Q.B. 1, at p. 28.

Some case law suggests a move to adopt the more flexible 'proper law of the tort'²⁸⁷ but the Courts remain content to apply *lex loci delicti* and leave reform to the legislature.²⁸⁸

3.7 Recognition and Enforcement

3.7.1 Recognition

Judgements given in one Member State are to be recognised without any special procedure under Arts 33 of Regulation 44/2001. Though there are a number of exceptions to this. A judgment will not be recognised if it is contrary to public policy in the State in which recognition is sought, if it was given in default of appearance and the defendant was not duly served with the instituting documents, if the judgment is not reconcilable with a judgment given in a dispute between the same parties in the State in which recognition is sought or in a non-Member State where it fulfils the necessary conditions or if the Court has to determine a preliminary question before proceeding to judgment.²⁸⁹ Significantly, recognition will not be authorised if there is conflict relating to an insurance or consumer contract or an instance of exclusive jurisdiction arises.²⁹⁰

3.7.2 Enforcement

Regulation 44/2001 also provides for the enforcement of judgments. In Ireland, an application in for enforcement pursuant to Ch.III of the Regulation or Chapter III of Regulation 2201/2003 or the Enforcement of Judgments Act 1998 (enforcement under Lugano) may be made *ex parte* grounded on affidavit to the Master of the High

²⁸⁷ *Grehan v Medical Incorporated and Valley Pines Associates* [1986] I.L.R.M. 627 (*per* Walsh J. *obiter*).

²⁸⁸ *An Bord Tráchtála v Waterford Foods Plc.*, Unreported, High Court, 25th November, 1992 *per* Keane J. (as he then was).

²⁸⁹ See Art.34 of Regulation 44/2001.

²⁹⁰ Art. 35 of Regulation 44/2001.

Court.²⁹¹ Where the Master grants the order for enforcement, the order may be appealed to the High Court within one month of service.²⁹² But this time limit may be extended to two months where the application is made under Regulation 44/2001 or the 1968 Convention and the party against whom the order is sought is domiciled in another Member State,²⁹³ where the application is made under Regulation 2201/2003 and the party against whom the order is sought is habitually resident in another Member State²⁹⁴ or where the application is made under Title III of the Lugano Convention and the party against whom the order is sought is domiciled in a Contracting State of the 1968 Convention or Contracting State of the Lugano Convention.²⁹⁵ Where the application for an order is refused, an appeal may be made on notice of motion grounded on affidavit within five weeks.²⁹⁶

4. Conclusion

Claims regarding sovereignty do not extend to outer space. Although there is no right of innocent passage through airspace as there is through territorial waters, the Outer Space Treaty provides for the freedom of exploration and use of outer space. The exact limits of this freedom remain untested and current state practice displays the willingness of states to allow space objects to cross through airspace in order to reach outer space. Space objects are defined to include component parts, even such parts as booster rockets that never reach outer space and are intended to drop off within airspace.

Ownership of space objects remains unaffected by presence in outer space but special steps have been taken with regard to intellectual property rights onboard the International Space Station. It is probable that such provisions would be included in any agreements concerning the construction of space stations involving multiple

²⁹¹ O.42A rs 4 and 5 of the RSC.

²⁹² O.42A r.11 of the RSC.

²⁹³ O.42A r.13 of the RSC.

²⁹⁴ O.42A r.12 of the RSC.

²⁹⁵ O.42A r.14 of the RSC.

²⁹⁶ O.42A r.15 of the RSC.

states and/or intergovernmental organisations. The absence of sovereignty in space has resulted in the application of a quasi-territorial principle that confers jurisdiction of a space object on the state of registry. According to the Registration Convention, the state of registry must be a launching state and therefore must have some connection with the space object in question. Such a view is supported by the Outer Space Treaty's use of 'retain' in relation to jurisdiction. Space objects, unlike aircraft, do not have a nationality and Cheng submits that this may be advisable to introduce, although to do so might incorporate the problems of flags of convenience into space law. As the law stands, the implication of prior exercise of jurisdiction by the state or registry would appear to exclude the possibility of a registration being the equivalent of flying a flag of convenience. Jurisdiction of the state of registry extends to personnel, which leaves the position of space flight participants and stowaways in need of further clarification.

In the exercise of criminal jurisdiction, the existing principles may be seen to apply where relevant. Conflicts of laws may occur in space as the state of registry does not exercise exclusive jurisdiction, raising the familiar difficulties of fora of convenience. There is no reason to suppose that the laws applied to resolve conflicts will not be applicable to resolve conflicts where they occur on a space object, facility or installation. In such circumstances, EC intervention is particularly relevant in determining jurisdiction, choice of law, recognition and enforcement. Regulation 44/2001 will operate between EC Member States. It contains specific rules for consumer contracts and insurance and in the absence of the parties including a clause on jurisdiction, its rules will apply. The Lugano Convention applies between EC and EFTA countries. Outside of Europe, the traditional rules will apply between Member States and non-EC, non-EFTA states. In Ireland, the Courts have jurisdiction where the defendant has been validly served with initiating proceedings or notice of initiating proceedings, as the case may be.

Choice of law issues are also subject to recent EC regulation in the form of Regulation 864/2007 which applies to non-contractual obligations. Outside of the scope of the Rome II Regulation, the default position of the traditional rules will apply. Procedural issues in both tort and contract choice of law cases will be determined by the law of the forum. Substantive issues will be adjudged by the law

chosen by the parties or failing that by the jurisdiction the alleged legal wrong is most closely connected. In relation to tort, in Ireland, generally the *lex loci delicti* is applied.

Recognition and enforcement of judgments as and between EC Member States also falls under Regulation 44/2001 and may be sought under the terms of the Regulation.

CHAPTER III: THEORIES OF LIABILITY

CHAPTER III: THEORIES OF LIABILITY	101
1. INTRODUCTION.....	102
2. NEGLIGENCE V STRICT LIABILITY	103
2.1 Social Utility and Strict Liability Systems.....	105
2.2 Economic Efficiency and Theories of Liability	107
2.3 Fairness Rationale for Strict Liability	114
2.3.1 <i>Space Activities as Ultra-Hazardous</i>	115
2.3.1.1 <i>Space Activities and Non-Natural User</i>	131
2.4 Other Fairness-Based Arguments	132
3. APPLICABLE THEORY IN INTERNATIONAL LAW.....	134
4. APPLICABLE THEORY IN DOMESTIC LAW	137
5. CONCLUSION ON THEORIES OF LIABILITY	140

1. Introduction

This chapter examines the theory of liability appropriate to space activities from an economic point of view. There are three separate theories of liability applicable to accidents or unintentional injuries in relation to space activities, that of absolute liability,¹ that of strict liability² and that of negligence.³ Another approach to such

¹ Also described as 'no fault'. It differs from strict liability, in that no-fault liability abolishes the need for litigation while strict liability 'rehabilitates liability as the centre of the legal system'. While strict liability is not fault-based it may be viewed as a hybrid between no-fault and negligence systems: See Fiore, Karine, "No Fault Compensation Systems," in Faure, Michael (ed), *Tort Law and Economics*, (Edward Elgar, Cheltenham, 2009), p.406, at p.416.

² See Harper, Fowler V., James, Fleming and Gray, Oscar S., *The Law of Torts*, 2nd ed., (Little, Brown and Company, Boston, 1986), Vol. 3, para.12.2 pp. 107-109, Epstein, "A Theory of Strict Liability" (1973) 2 *J. Legal Studies* 151 and Davis, "Strict Liability or Liability Based Upon Fault? Another Look," (1984) 10 *U. Dayton L. Rev.* 5, at pp.5-15.

³ On the history of negligence and strict liability, see Peck, *Negligence and Liability Without Fault in Tort Law* (Department of Transportation Study of Automobile Insurance and Compensation, 1970), pp.51-56 extracted in Henderson and Pearson, *The Torts Process*, 3rd ed. (Little Brown Co., Boston, 1988), at pp.320 *et seq* reprinted in (1971) 46 *Wash L. Rev.* 225 Harper, *et al*, *supra*, para.12.3 p.110 *et seq.*, Rabin, "The Historical Development of the Fault Principle: A Reinterpretation," (1981) 15 *Ga. L. Rev.* 925; Schwartz, "The Vitality of Negligence and the Ethics of Strict Liability," (1981) 15 *Ga. L. Rev.* 963[hereafter Schwartz]; Wigmore, "Responsibility for Tortious Acts: Its History," (1894) 7 *Harv. L. Rev.* (parts I-III) 315, 383 and 441, Malone, "Ruminations on the Role of Fault in the History

accidents as and between parties engaged with a market or contractual relationship is to impose no liability either through waiver requirements or otherwise and remove the issue from the field of tort law altogether to that of insurance, as operates under the Commercial Space Launch Amendments Act 2004 (CSLAA). In relation to accidents between parties that have no such relationship, the alternative to liability is to operate a compensation scheme. While strict liability in Irish tort law is primarily restricted to statutory intervention,⁴ sometimes in itself driven by E.C. measures,⁵ and to particular torts, such as the tort in *Rylands v Fletcher*⁶ or for injury caused by wild animals,⁷ the doctrine in the US has particular relevance owing to its interaction with the doctrine of ultra-hazardous activities which has evolved within the civil code separate from the tort in *Rylands*. The doctrine currently extends to cover some space activities such as rocket launching. In international law, under the Liability Convention both strict liability and fault-based regimes are applied. The foundations application of the doctrine to space related activities will be examined below as will the potential for strict liability to apply to space activities in other jurisdictions.

2. Negligence v Strict Liability

The benefit for a third party injured as a result of space related activities in bringing those activities within the scope of the doctrine of ultra-hazardousness is that liability is strict. Strict liability imposes legal responsibility regardless of whether the tortfeasor met the standard that could be expected of the reasonable person, however, he or she may escape the imposition of liability where they can bring themselves within a defence, such as compliance with a particular statutory authorisation as seen

of the Common Law of Torts,” (1970) 31 *La. L. Rev.* 1, Isaacs, “Fault and Liability,” (1918) 31 *Harv L. Rev.* 954 and Gregory, “Trespass to Negligence to Absolute Liability,” (1951) 37 *Va. L. Rev.* 359.

⁴ For example, the Occupiers Liability Act 1995.

⁵ For example the Products Liability Act 1991.

⁶ L.R.3 H.L. 330 (1868).

⁷ *May v Burdett* (1846) 9 Q.B. 101; 115 E.R. 1213; *Nichols v Marsland* L.R. 10 Ex. 255; *Behrens v Bertram Mills Circus Ltd.* [1957] 2 Q.B. 1; *Whitefield v Stewart* 577 P. 2d 1295 (Okla. 1978); *Collins v Otto* 149 Colo. App. 489, 369 P. 2d 564; cf *Scribner v Kelley* 38 Barb. 14; *Vaughan v Miller Bros.* 101 Ranch Wild West Show (1930) 109 W. Va. 170, 153 S.E. 289; *City and County of Denver v Kennedy* (1970) 29 Col. App. 15; 47 P. 2d 760.

in domestic pollution law⁸ or show that they do not come within the scope of the offence. Absolute liability provides no such means of escape; such an approach effectively operated under the Guatemala Protocol 1971 to the Warsaw Convention.⁹ It is applied in Article II of the Liability Convention which renders a launching state liable to pay compensation for damage caused to the surface of the earth or to aircraft in space. Absolute liability focuses entirely on the nature of the product, service, act or omission in question and the hazard it poses, rather than on the conduct of the tortfeasor. Strict liability also follows this pattern but may make allowances for the tortfeasor's conduct either in the determination of the application of the theory or in the establishment of a defence. A negligence-based standard¹⁰ is founded on the words of Lord Atkinson in *Donoghue v Stevenson* which requires the tortfeasor to meet with the standard of the reasonable person in the execution of his or her duty to their neighbour, i.e. anyone whom they can reasonably foresee will be harmed by their acts. It is "the omission to do something which a reasonable man, guided upon those considerations which ordinarily regulate the conduct of human affairs, would do, or doing something which a prudent and reasonable man would not do."¹¹ Its focus is predominantly on the conduct of the tortfeasor, although the nature of the product, service, act or omission may be taken into account in assessing the social utility of the defendants' conduct.¹² Thus a central difference between strict/absolute liability and negligence theories is the willingness of the former to impose liability for unknown hazards.¹³ The system selected must be that which best serves the objectives of 'a rational system of accident liability';¹⁴ these have been noted as accident prevention and the promotion of safety, the compensation of accident

⁸ Water Pollution Act 1990; Air Pollution Act 1987; Fisheries Act 1977.

⁹ See *S.S. Pharmaceutical v Qantas Airways* [1991] 1 Lloyd's Rep 288, at p.297 per Kirby J. endorsed in *A.H.P. Manufacturing B.V. (trading as Wyeth Medica Ireland) v D.H.L. Worldwide Network N.V., D.H.L. Worldwide Express GmbH and D.H.L. International (Ireland) Ltd.* [2001] 4 IR 531.

¹⁰ Negligence in this section refers to the theory, rather than to the cause of action. See Rabin, p.932 and Schwartz, pp.963-964.

¹¹ *Blyth v Birmingham Waterworks Co.* (1856) 11 Exch. 78; 156 ER 1047 per Alderson B.

¹² Binchy and McMahon, *The Law of Torts*, 3rd ed, (Butterworths, Dublin, 2000), p.160-162.

¹³ See Henderson, James A., "Coping with the Time Dimension in Products Liability" (1981) 69 *Cal. L. Rev.* 919, at p.929. See also Note: "Strict Products Liability: The Irrelevance of Foreseeability and Related Negligence Concepts," (1978) 14 *Tulsa. L. J.* 338.

¹⁴ Harper, et al, *supra*, para.12.4 p.114.

victims and the avoidance of undue collateral disadvantages and the moral objective or fairness rationale.¹⁵ There are a number of arguments that may be used to justify the imposition of a strict liability system, most of which are related to social utility and economic efficiency as well as principles of general fairness and their application to liability for accidents related to space activities will now be examined.

2.1 Social Utility and Strict Liability Systems

The benefits for social utility of a strict liability system are summarised by Henderson, albeit in relation to product liability:

In general strict liability is thought to be preferable to negligence because it better enhances social utility by reducing the costs associated with accidents and because it promotes fairness. Strict liability is believed to increase utility by satisfying four major objectives: encouraging investment in product safety, discouraging consumption of hazardous products, reducing transaction costs, and promoting loss spreading.¹⁶

It promotes investment by encouraging potential tortfeasors to find ways to reduce or avoid the risk of accidents. While negligence also secures this, it is argued that strict liability favours potential tortfeasors by reducing the scope of negligence-based liability claims, as an action in negligence requires greater proofs to be made by the plaintiff in a field which is peculiarly within the alleged tortfeasor's expertise. Henderson reflects:

Knowing that the average plaintiff has difficulty in establishing negligence, manufacturers may be willing to bet on escaping liability, or at least large judgments, and thus may limit their efforts to reduce product risks. A

¹⁵ *Ibid.*

¹⁶ Henderson, James A., "Coping with the Time Dimension in Products Liability" (1981) 69 *Cal. L. Rev.* 919 at pp.931-932. See also McMahon and Binchy, pp.38-39.

regime of strict liability, which does not consider the manufacturer's knowledge, eliminates the practical difficulty involved in litigating a negligence claim.¹⁷

Transaction costs are reduced by the simplification of proofs required by plaintiffs, thus reducing the duration and in turn the expense of trials. While the number of cases under strict liability is higher than under negligence where some losses are borne by the victim, the degree of certainty is equally higher as the quota of cases that go to court where the outcome is clear is elevated.¹⁸ The distribution of risk through insurance also ensures to a limited extent that the party that must bear the financial burden of liability is not destroyed in the process. To borrow the words of Wagner, there is unlimited liability on paper but limited liability in reality.¹⁹ This reduces dislocation costs.²⁰ The effect on the consumption of hazardous products or services is as much an argument going to economic efficiency as it is social utility. It has also been observed:

The need for greater application of strict liability becomes more pressing as technology increases the number and severity of harms which may occur. The individual becomes increasingly more helpless to defend himself against such things as airplane crashes, dam failures, oil spills, and radiation leaks. To compensate innocent persons whose persons or property are harmed, courts must be willing to apply strict liability principles against those who carry on abnormally risky ventures for their own profit or pleasure. On the other hand, courts cannot so commonly impose strict liability so as to strangle corporate and individual enterprise. Courts must have a flexible analysis so they can

¹⁷ *Ibid* at p.933. See *Hanrahan v. Merck Sharp and Dohme (Ireland) Ltd.* [1988] IESC 1; [1988] ILRM 629 (5th July, 1988), para. 20.

¹⁸ Schäfer, Hans-Bernd and Müller-Langer, Frank, "Strict Liability versus Negligence," in Faure, Michael (ed), *Tort Law and Economics*, (Edward Elgar, Cheltenham, 2009), p.1 at p.24.

¹⁹ Wagner, Gerhard, "Tort Law and Liability Insurance," in Faure, Michael (ed), *Tort Law and Economics*, (Edward Elgar, Cheltenham, 2009), p.377, at p.393

²⁰ Henderson, at p. 934 and Harper *et al*, *supra*, para. 13.4, p.137 and para.13.5, pp.148 *et seq.* See generally Calabresi, G., "Some Thoughts on Risk Distribution and the Law of Torts," (1961) 70 *Yale L.J.* 499.

balance these ever present and ever shifting factors in order to decide whether to apply strict liability in a particular case.²¹

2.2 Economic Efficiency and Theories of Liability²²

In economic terms, the difference between strict and negligence-based liability may be examined in terms of its effect in providing incentives for risk control in the avoidance of accidents.²³ However, this is dependant on the type of accident and the nature of the relationship of the parties thereto. Posner distinguishes between two classes of accident: “those that can be avoided at a lower cost than the expected accident cost, and those that cannot be avoided at such a cost. The latter are ‘unavoidable’ (in an economic, not necessarily a literal, sense) accidents.”²⁴ To these distinctions between accidents may be added that between unilateral²⁵ and bilateral accidents as defined by Shavell; in the former, it is “the actions of injurers [or tortfeasors] but not of victims are assumed to affect the probability or severity of losses”²⁶ and in the latter both the actions of injurers and victims are assumed to affect this probability. In addition, it is possible to further distinguish between

²¹ Anderson, Jon G., “The *Rylands v Fletcher* Doctrine in America: Abnormally Dangerous, Ultrahazardous or Absolute Nuisance (1978) *Ariz. St. L. J.* 99, at p. 134.

²² See Polinsky, M., “Strict Liability vs. Negligence in a Market Setting,” (1980) 70 *American Economic Review* 363. But Rabin, *supra*, is highly skeptical of the economic rationale as a justification for tort law, rather than the moral justification: 931.

²³ See Calabresi, Guido, *The Costs of Accidents*, (Yale U.P., New Haven, 1970), Calabresi, Guido, “Does the Fault System Optimally Control Primary Accident Costs?” (1968) *Law & Contemp. Problems* 429; Calabresi, Guido, “Some Thoughts on Risk Distribution and the Law of Torts,” (1961) 70 *Yale L.J.* 499; Ehrenzweig, A., “Negligence Without Fault,” (1966) 54 *Cal. L. Rev.* 1422; Shavell, Steven, “Strict Liability Versus Negligence,” (1980) 2 *J. Legal Studies* 1 [hereafter Shavell] and Brown, John P., “Toward an Economic Theory of Liability” (1973) 2 *J. Legal Stud.* 323.

²⁴ Posner, Richard A., *Tort Law: Cases and Economic Analysis*, (Little, Brown and Co., Boston, 1982), p.5. See also *B. & Q.R. Co. v Krayenbuhl* (1902) 65 Neb.889, at pp. 903-4; 91 N.W. 880, at pp.882-3.

²⁵ See also Schäfer, Hans-Bernd and Müller-Langer, Frank, “Strict Liability versus Negligence,” in Faure, Michael (ed), *Tort Law and Economics*, (Edward Elgar, Cheltenham, 2009), p.1 at p.5 *et seq* which also borrow from these definitions from Shavell.

²⁶ Shavell, p.1

bilateral and unilateral accidents where there is no market place relationship between the parties (accidents between strangers²⁷) and those where a market place or other contractual relationship is in place, as in the case of employees and consumers.

One consequence of the negligence theory is that a tortfeasor “will not be motivated to consider the effect on accident losses of his choice of whether to engage in his activity or, more generally, of the level at which to engage his activity.”²⁸ Negligence by itself simply dictates the appropriate level of care; it does not affect the appropriate level of activity. In the case of an ultra-hazardous activity this problem is particularly pronounced as any increase in that activity typically will increase expected accident losses where the standard of care is constant.²⁹

This contrasts with the position of a strict liability theory. Posner has expressed the difference as follows:

[N]egligence usually (though not always) connotes a failure to use the right amount of care rather than failure to reduce the amount of activity to the correct level or change the activity...If so, negligence and strict liability may result in a different number of accidents after all. Strict liability will deter certain accidents where the cost of avoiding the accident by reducing

²⁷ I diverge from the definitions of Shavell here who distinguishes between accidents between strangers and accidents between sellers/suppliers and strangers, given the nature of subject at issue, as unlike Shavell's first category, it is presumed here that at least one party must have been engaged in commercial space activity (which includes the testing of space objects for these purposes).

²⁸ Shavell, p.2.

²⁹ In this regard, ultra-hazardousness when applied to activity “does not imply that the activity is ultra-hazardous in the sense that there is a high degree of probability that the hazard will materialise, but rather that the consequences in the exceptional and perhaps quite improbable event of the hazard materializing may be so far-reaching that special rules concerning the liability of such consequences are necessary if serious injustice and hardship are to be avoided.” Jenks, “Liability for Ultra-Hazardous Activities in International Law,” (1966) 117 *R.A.D.I.* 99, at p.122.

the amount of the activity is less than the expected accident cost; negligence will not deter such accidents.³⁰

Posner's account above later takes into account the efficiency in the allocation of resources for the purpose of risk avoidance, an allocation that may favour the victim or which may not. Where liability insurance is prevalent, as in the space industry where it is mandatory,³¹ Calabresi has observed that "the particular characteristics of the fault system, i.e., the ex post allocation of responsibility on a case-by-case basis despite the knowledge that the costs will be spread to actuarial groups," provides insufficient deterrence to justify the costs, both societal and administrative of dual liability and insurance systems.³² For Shavell, in the case of unilateral accidents between strangers,³³ strict liability, but not negligence, is the efficient system but for reasons related to market forces. As the participant in space activity chooses to avoid liability, the price paid will not reflect the accident losses associated with production and consumers will buy at a price that does not reflect the risk-avoidance measures. They will be likely to overconsume and this will increase the activity of the participant. Under strict liability, the supplier will have to cover the costs of those accidents that could not be avoided by due care. This, combined with the incremental cost of liability insurance as passed on to the consumer ensures that they are less likely to overconsume the product or service attendant with high risk. Consumers pay 'the socially correct' price³⁴ for such a service under a strict liability regime even in a competitive market and are therefore less likely to disregard the perception of risk attaching to the activity.³⁵ Malone has also observed the propriety of imposing the cost of accidents on the ultimate consumers of hazardous services:

³⁰ Posner, Richard A., *Tort Law: Cases and Economic Analysis*, Little, Brown and Co., Boston, 1982, p.5. See also Calabresi, Guido, "Optimal Deterrence and Accidents" (1975) 84 *Yale L.J.* 656; *B. & Q.R. Co. v Krayenbuhl* (1902) 65 Neb.889 at 903-4; 91 N.W. 880 at 882-3.

³¹ For example, the Law of the Russian Federation on Space Activities, article 25.

³² Calabresi, G., *The Costs of Accidents*, at p.240.

³³ Noted in Shavell in relation to accidents between sellers and strangers".

³⁴ Shavell, p.3.

³⁵ See generally Spence, Michael, "Consumer Misperceptions, Product Failure and Producer Liability" (1977) 44 *Rev. Econ. Stud.* 561.

If... the inescapable accident cost of a given hazardous activity ought to be so allocated by law that this cost can ultimately be passed on in dilution as a charge upon the numerous consumers or users of the goods or services produced by the activity, then it would seem that the enterprise - the individual or corporation that conducts the activity - in the appropriate unit that should initially shoulder the cost burden; for the enterpriser is in the best position to convert the anticipated accident charge into an item of capital cost, to insure against it, and to transfer the resulting premium cost into the price structure of the goods or services the activity produces. Furthermore, it is only the enterpriser who is in a position to adopt or to devise those precautionary measures that may serve in the future to minimize the chance of a recurrence of the tragedy.³⁶

The market deterrence effect is not achievable only by imposing liability for negligence, as even then a hazardous product or service may still be subject to high levels of consumption if its benefits outweigh its associated risks.³⁷ Harper *et al* also note that another benefit of strict liability is tending 'to increase the pressure towards accident prevention on large groups and enterprises, where... it will do the most good, rather than on the individual, where it will do relatively little good.' They submit three reasons for this, namely, "(a) large units are involved in many accidents and appear often as defendants, rarely as claimants; (b) even where the accidents is caused by an individual while acting for himself, as a potential defendant he is increasingly becoming covered by liability insurance, so that the pressure is put in the first instance on the insurance company; (c) the restriction of the defense of contributory or comparative negligence - which often accompanies a shift to strict liability - clearly adds a further incentive to safety on the part of perennial defendants and if there is a corresponding loss of incentive (which is not at all clear) it is on the part of the individuals who are potential accident victims."³⁸ The larger unit is in a better position to reduce unilateral accidents and with the effect of a strict

³⁶ Malone, "The Work of the Louisiana Appellate Courts for the 1969-70 Term - Torts," (1971) 31 *La .L. Rev.* 231, at p.241.

³⁷ Henderson, p.933.

³⁸ Harper *et al*, *supra*, para.12.4, pp.123-4.

liability system's pressure on that unit, it follows that a system of strict liability will often be a greater spur to safety than a system based on negligence.³⁹

Strict liability may also be seen as the more efficient system in relation to unilateral accidents between parties with a market relationship from a consumer-oriented perspective in that it operates regardless of the misperception of risks by consumers. As Shavell notes, in the case of a unilateral accident under a negligence theory, the outcome is only efficient where the consumer has correctly perceived the risk as the product or service price will not necessarily reflect the costs of taking due care as the effect of such is negligible on accidents in Posner's second category.⁴⁰ This is unlikely as studies show that there is a greater tendency to underestimate risks.⁴¹ If the supplier of the service were not liable at all, only where the consumer perceives the risk presented by each supplier could the system be efficient.⁴² This appears to be the approach behind the Commercial Space Law Amendment Act 2004 which requires waivers by space flight participants thus rendering the supplier of the space service and their contractors and subcontractors not liable at all, yet attempts to ensure that the risk is correctly perceived by the space flight participant through extensive pre-contractual disclosure requirements by the supplier. In the event that consumers do not perceive the risk at all in this system where the supplier faces no liability, Shavell identifies two possible sources of inefficiency:

The first is that, given the risk of loss, the quantity purchased by consumers may not be correct; of course, this will be true if customers misperceive the risk. The second source of inefficiency is that sellers will not be motivated by market forces to appropriately reduce risks... [as] have consumers know the risk presented by a group of sellers as a group but do not have the ability to observe the risk presented by sellers on an individual basis.⁴³

³⁹ Harper *et al*, *supra*, para.12.4 pp.124.

⁴⁰ Shavell, p.4

⁴¹ Calbresi, G., *The Costs of Accidents: A Legal and Economic Analysis*, p.245.

⁴² Shavell, p.5.

⁴³ Shavell, p.5

However, the mandatory requirements for insurance in the U.S. and other regimes⁴⁴ ensures that the socially correct price is the one paid, so the misperception or non-perception of risk by consumers is likely to be very low. It may be disputed as to whether such a strict liability approach is economically desirable in relation to bilateral accidents between strangers.⁴⁵ This is because under a strict liability regime (with a defence of contributory negligence) it is presumed that the victim of such an accident will have correctly chosen an appropriate level of care and activity.⁴⁶ Posner illustrated the difference between care and activity adjustment as methods of accident prevention⁴⁷ through the decision in *Guille v Swan*,⁴⁸ an action in trespass. Here the appellant had landed his balloon in the respondent's vegetable field causing damage. A crowd followed of some two hundred persons causing significant further damage to the crops. The defendant was liable in trespass for all the damage caused. The judgment was resolved on the basis that although the appellant could not be accused of carelessness in his control of the balloon as that was a matter of hazard, it was ordinary and natural to draw a crowd and the Court found that he had called for assistance and was therefore liable for the damage caused. A rule of strict liability provided the proper incentive for accident prevention where the exercise of care was not in doubt; a rule of negligence would not. In other words, as the victim has no incentive to reduce the latter because the requirement to recover is, like that of the tortfeasor, to take due care, they may freely engage in high levels of activity with due care and still be sure of recovery. Injurers therefore knowing this inefficient behaviour take due care and chose the appropriate level of activity but the system is inefficient because the behaviour of the tortfeasors is insufficient to reduce activity levels. However, in a negligence system as the product or service price will not reflect accident losses, overconsumption of the hazardous product or service will not

⁴⁴ These are set out below, for example, Art.18(4) of Russia's Commercialisation of Space and Commercial Space Activity and art.6(1) of France's Loi 2008-518.

⁴⁵ Nell, Martin and Richter, Andreas, "The Design of Liability Rules for Highly Risky Activities – Is Strict Liability Superior When Risk Allocation Matters?" (2003) 23 *International Review of Law and Economics* 31-47.

⁴⁶ See Calabresi, "Optimal Deterrence and Accidents," (1975) 84 *Yale L.J.* 656 at 657.

⁴⁷ *Tort Law: Cases and Economic Analysis*, op cit, at p. 498.

⁴⁸ 19 Johns (NY) 381, 10 A. Dec. 234 (1822).

be checked and lead to inefficiency. As such, neither system would appear to induce efficient behaviour. In short:

Strict liability with the defense [of contributory negligence] will be superior to the negligence rule when it is more important that injurers be given an incentive through a liability rule to reduce their activity level than that victims be given a similar incentive...⁴⁹

Applying this logic, it would appear preferable to apply a strict liability system to such bilateral accidents. It appears that in relation to bilateral accidents between strangers in aviation, negligence rather than strict liability is favoured. So in *Cubitt and Terry v Gower*,⁵⁰ where two airplanes had crashed while moving on the ground, Acton J. applied negligence rules in determining liability. This suggests one possible approach where two entities' space objects collided while on the surface of earth, although the imposition of negligence rules could more properly be justified on a fairness rationale in such a case. This logic is borne out in the Liability Convention where a fault-based liability system is adopted in Article III where damage was caused elsewhere than on the surface of the earth to a space object of one launching State or to persons or property on board such a space object by a space object of another launching State.

In the case of bilateral accidents that are between parties with a market relationship or where the risks have been correctly perceived, both negligence and strict liability (with contributory negligence defence) result in efficient outcomes controlling the level of care and activity of both tortfeasor and victim. Where the knowledge of the risk is imperfect, only a strict liability regime is efficient. The decision in any case among theories of liability is ultimately a policy decision.⁵¹ In such cases in relation

⁴⁹ Shavell, p.7.

⁵⁰ (1933) 47 Ll. L.Rep. 65 (not applying the Air Navigation Act 1920 s.9 (now superseded by s.76 of the Civil Aviation Act 1982) which did not apply to taxiing planes).

⁵¹ *Kent v. Gulf States Utilities Co.*, 418 So. 2d 493, 498 (La. 1982) where the Court stated that "liability is imposed [upon the enterpriser] as a matter of policy when harm results from the risks inherent in the nature of the [ultra-hazardous] activity" even though the enterpriser may not have been "negligent in any respect".

to space activities both international and national, the knowledge or risk is coupled with its distribution by means of contractual waivers that necessitates insurance (which is required by law in any case). Insurance, through the imposition of premiums, impacts on the level of activity and, accordingly, on the numbers of accidents.

2.3 Fairness Rationale for Strict Liability⁵²

It is also submitted that strict liability may be viewed as the fairer system⁵³ where one party has created ‘nonreciprocal risks’⁵⁴ through engagement in hazardous activities.⁵⁵ Fletcher and Epstein submit that strict liability is justified by this and not economic rationales. The idea that a defendant can escape liability because of the cost of risk prevention or because of the benefit to the community from the activity is unpalatable to them. Liability cannot be avoided morally on the basis of justification, only excuses.⁵⁶ For Fletcher, where one party is ‘unavoidably ignorant’ of the risk attaching to the activity, this will provide adequate excuse.⁵⁷ However both Fletcher and Epstein favour different approaches to the application of strict liability. For the former, the engagement by the defendant in a risky activity causing injury is sufficient; for the latter it is the non reciprocal risk element to the activity in addition

⁵² See Epstein, “A Theory of Strict Liability,” (1973) 2 *J. Legal Studies* 151; Fletcher, “Fairness and Utility in Tort Theory,” (1972) 85 *Harv. L. Rev.* 537. See also Schwartz, p.979 *et seq.*

⁵³ See Calabresi, *The Costs of Accidents*, pp.291-308; Epstein, “A Theory of Strict Liability,” (1973) 2 *J. Legal Stud.* 151; Fletcher, “Fairness and Utility in Tort Theory,” (1972) 85 *Harv. L. Rev.* 537 but Henderson is skeptical and observes that “the allocation of accident losses to producers irrespective of fault seems to be primarily a means of reducing social waste rather than as a means of promoting fairness: pp. 934-5

⁵⁴ Fletcher, “Fairness and Utility in Tort Theory,” (1972) 85 *Harv. L. Rev.* 537, pp.547-49 [hereafter Fletcher].

⁵⁵ See the court’s analysis in *Chavez v. Southern Pacific Transp. Co.* 413 F. Supp.1203 (E.D. Cal. 1976).

⁵⁶ See Schwartz, p.983.

⁵⁷ Fletcher, p.552

to causation⁵⁸ that justifies the use of strict liability.⁵⁹ Epstein also rejects a number of excuses, such as necessity, infancy, insanity and actual coercion.⁶⁰ However, both commentators accept that this is applicable in cases of accidents between strangers rather than those in a market relationship and that special rules may apply otherwise.⁶¹ Such relationships allow parties to share the risks associated with the activity. Nonetheless, strict liability has been applied in market relationship cases, regardless such as in the case of worker's compensation schemes and arguably on a fairness rationale where the party gaining the benefit is the economically weaker party in the relationship. However, as the main argument behind the fairness rationale is the nature of the risk attaching to the activity, it falls to be considered whether space activities are ultra-hazardous.

International law has taken the view that space activities are ultra-hazardous and attaches absolute liability in unilateral accident cases. This concept of ultra-hazardous activities derives from U.S. tort law which has used the concept in its development of the tort in *Rylands v Fletcher*,⁶² unlike English and Irish courts which have chosen instead to focus on natural and non-natural user. Space activities will be considered under both headings.

2.3.1 Space Activities as Ultra-Hazardous⁶³

An ultra-hazardous activity has been defined as “an activity which [sic], even when conducted with the greatest of care and prudence, could cause a foreseeable harm or

⁵⁸ See Ben-Shahar, Omri, “Causation and Foreseeability,” in Faure, Michael (ed), *Tort Law and Economics*, (Edward Elgar, Cheltenham, 2009), 83 at p.87.

⁵⁹ See Schwartz, p.979.

⁶⁰ Epstein, “Defences and Subsequent Pleas,” (1974) 3 *J. Legal Studies* 165, at pp.169-74.

‘Unavoidably ignorant’ is not mentioned as an excuse.

⁶¹ Fletcher, p.546; Epstein, p. 27

⁶² See Anderson, Jon G., Note: “The *Rylands v. Fletcher* Doctrine in America : Abnormally Dangerous, Ultrahazardous or Absolute Nuisance (1978) *Ariz. St. L. J.* 99 *cf. Turner v Big Lake Oil Co.* 128 Tex 155, 96 S.W. 2d 221 (1936) where *Rylands* was not followed.

⁶³ See generally, Morris, “Hazardous Enterprises and Risk Bearing Capacity,” (1952) 61 *Yale L.J.* 1172.

damage to those in the neighborhood.”⁶⁴ Under §520 of the Restatement of Torts an activity is defined as ultra-hazardous if it “(a) necessarily involves a risk of serious harm to the person, land or chattels of others which cannot be eliminated by the exercise of the utmost care, and (b) is not a matter of common usage.”⁶⁵ The Restatement is of persuasive authority only and has had a mixed reception from State Courts with the majority citing it⁶⁶ or treating it as relevant, if not determinative.⁶⁷ The Courts have accepted that the application of strict liability “virtually makes the enterpriser an insurer.”⁶⁸

In determining whether an activity is abnormally dangerous so as to give rise to strict liability, a court will consider the (a) existence of a high degree of risk of some harm to the person, land or chattels of others;(b) likelihood that the harm that results from it will be great; (c) inability to eliminate the risk by the exercise of reasonable care;⁶⁹ (d) extent to which the activity is not a matter of common usage; (e)

⁶⁴ *Schexnayder v. Bunge Corp.* 508 F.2d 1069 (5th Cir. 1975) at p.1072 n.3; see also *Taylor v. Cincinnati*, 143 Ohio St. 426, 435 (1944).

⁶⁵ See Schwartz, p.970 *et seq.*

⁶⁶This has been adopted in decisions such as *Ashland Oil, Inc. v. Miller Oil Purchasing Co.*, 5 Cir. 1982, 678 F.2d 1293; *Clark-Aiken Corp. v. Cromwell-Wright Corp.* 323 N.E. 2d 876 (Mass. 1978); *Doundoulakis v. Town of Hampstead* 42 2d 448, 368 N.E. 2d 27, 398 N.Y.S. 2d 404 (1977), *Mc Lane v. Northwest Gas Co.* 255 Ore. 324, 467 P. 2d 635 (1970); *Moore v. R.G. Industries*, 789 F.2d 1326 (9th Cir. 1986); *N.Y. Pacific Northwest Bell Tel. Co. v. Port of Seattle* 80 Wash. 2d 59, 491 P. 2d 1037; *Siegler v. Kuhlman* 81 Wash. 2d 448, 502 P. 2d 1181 (1972); *Cities Service Co. v. State* 312 So.2d 799 (Fla. Dist Ct. App. 1975); *Yommer v. McKenzie* 255 Md 220,257 A. 2d 138 (1969); *Otero v. Burgess* 84 N.M. 575, 505 P. 2d 1251 (1973); *Luthringer v. Moore* (1948) 31 Cal.2d 489, at p.500; 190 P.2d 1, *Williams v. Detroit Edison Co.*, 63 Mich. App. 559, 234 N.W.2d 702 (1975), *Kosters v. Seven-Up Co.*, 595 F.2d 347, 354 (6th Cir. 1979) and *Richman v. Charter Arms Corp.*, 571 F. Supp. 192, 194 (E.D.La. 1983). But see *Yukon Equip., Inc. v. Fireman's Ins. Co.* 585 P. 2d 1206 (Alaska 1978).

⁶⁷ *Goodwin v. Reilley* (1985) 176 Cal.App.3d 86, 91; 221 Cal. Rptr. 374; *SKF Farms v. Superior Court* (1984) 153 Cal.App.3d 902, 906; 200 Cal.Rptr. 497 *cf Perkins v. F. I. E. Corp.* 762 F.2d 1250 (5th Cir. 1985) 1267-68; 1985 U.S. App. LEXIS 30610; CCH Prod. Liab. Rep. P10

⁶⁸ *Kent v. Gulf States Utilities Co.*, 418 So. 2d 493, 498 (La. 1982).

⁶⁹ See *Continental Bldg. Corp. v. Union Oil Co.*, 152 Ill. App. 3d 513, 504 N.E.2d 787, 790, 105 Ill. Dec. 502 (1987).

inappropriateness of the activity to the place where it is carried on;⁷⁰ and (f) extent to which its value to the community is outweighed by its dangerous attributes. Schwartz observes that the final factor seemingly bears on the reasonableness of the activity, in contradistinction to the First Restatement.⁷¹ All these factors do not however have to be present. Causation is essential.⁷²

An alternate test to that in the Restatement has been established by the Louisiana Court provides that an activity is ultrahazardous if it (1) relates to land or to other immovables; (2) causes the injury, and the defendant was directly engaged in the injury-producing activity; and (3) does not require the substandard conduct of a third party to cause injury.⁷³ The New Mexico Courts also have a two-step test for the determinations of ultra-hazardous activity, *viz*, whether the activity is a matter of common usage or not, and whether the danger cannot be eliminated by the exercise of the utmost care.⁷⁴ Established examples of ultra-hazardous activities⁷⁵ include the storage and transportation of explosives,⁷⁶ manufacture of a handgun (where the gun was marketed specifically for the commission of crimes),⁷⁷ the discharge of

⁷⁰ See *Colton v. Onderdonk* (1886) 69 Cal. 155; 10 P. 395, 398; *Munro v. Dredging etc. Co.* (1890) 84 Cal. 515; 24 P. 303 *cf Houghton v. Loma Prieta Lumber Co.* (1907) 152 Cal. 500.

⁷¹ Schwartz, p.970.

⁷² *Hawkins v. Evans Cooperage Co., Inc.*, 766 F.2d 904, 907 (5th Cir. 1985); *Boudreaux v. American Ins. Co.*, 262 La.721, 264 So.2d 621 (1972).

⁷³ *Perkins v. F. I. E. Corp.* 762 F.2d 1250 (5th Cir. 1985) 1267-68; 1985 U.S. App. LEXIS 30610; CCH Prod. Liab. Rep. 10.

⁷⁴ *First National Bank v. Nor-Am Agricultural Products, Inc.*, 88 N.M. 74 (Ct.App.1975) at p.79.

⁷⁵ See Cantu, Charles E., "Distinguishing the Concept of Strict Liability in Tort from Strict Products Liability: Medusa Unveiled," [2003] *Univ. Memphis L. Rev.* 823 generally on the application of strict liability within other torts and Ursin, Edmund, "The Revitalization of Hazardous Activity Strict Liability," (1987) 65 *N.C. L. Rev.* 257.

⁷⁶ *Chavez v. So. Pac. Transp. Co.* 413 F. Supp. 1203 (E.D. Calif. 1976); *Yukon Equip., Inc. v. Fireman's Fund Ins. Co.*, 585 P. 2d 1206 (Alaska 1978); California Health & Safety Code § 12005.5. See Harper *et al*, §14.6, p.233 et seq.

⁷⁷ *Kelley v R.G. Industries Inc.*, 304 Md. 2d 124; 497 A. 2d 1143 (1985) but the overwhelming approach appears to deny liability: *Armijo v. Ex Cam, Inc.*, 656 F.Supp 771 (D.N.M. 1987); *Burkett v. Freedom Arms, Inc.*, 299 Or. 551, 704 P.2d 118, 122 (1985); *Delahanty v. Hinckley*, Nos. 82-409 and 82-490 (D.C.D.C., Dec. 9, 1986, *DeRosa v. Remington Arms Co.*, 509 F.Supp. 762 (E.D.N.Y. 1981), *Robertson v. Grogan Investment Co.*, 710 S.W.2d 678 (Tex. App. 1986), *Perkins v. F. I. E. Corp.* 762

hazardous substances into water such as to pollute or create a nuisance,⁷⁸ pile driving causing vibration,⁷⁹ crop dusting that contaminates other crops,⁸⁰ blasting causing debris,⁸¹ the storage of poisonous gases⁸² and the keeping of *ferae naturae*.⁸³ As Cantu points out, in all cases where strict liability has been imposed on this “the appropriateness of the dangerous activity to the surroundings is the controlling issue.” Space travel is inherently risky⁸⁴. Indeed, almost as soon as man began to

F.2d 1250 (5th Cir. 1985) 1267-68; 1985 U.S. App. LEXIS 30610; CCH Prod. Liab. Rep. P10 (marketing of guns not hazardous); *Martin v. Harrington & Richardson, Inc.*, 743 F.2d 1200 (7 Cir. 1984); *Patterson v. Rohm Gesellschaft*, 608 F. Supp. 1206 (N.D.Tex. 1985); *Fiella v. Bangor Punta Corp.*, No. 756 of 1984 (Pa.C.P. Beaver County Feb. 7, 1985); *Moore v. R.G. Industries*, 789 F.2d 1326 (9th Cir. 1986); *Mavilia v. Stoeger Indus.*, D.Mass. 574 F. Supp. 107 (1983); *Rhodes v. R.G. Industries, Inc.*, 173 Ga. App. 51, 325 S.E.2d 465(1985), *Riordan v. International Armament Corp.* No. 81 L 27923 (Pa.Cir.Ct. Cook County July 21, 1983), *aff'd* 132 Ill.App.3d 642, 87 Ill.Dec. 765, 477 N.E.2d 1293 (1985); *Trespalacious v. Valor Corp.*, 486 So.2d 649 (Fla. 1986), *Francis v. Diamond Int'l Corp.*, Nos. CV82-11-1279 & CV83-02-0215 (Ohio C.P. Butler County Mar. 22, 1983), *Caveny v. Raven Arms*, 665 F.Supp. 530 (D.S.Ohio 1987) (use of gun not hazardous).

⁷⁸ California Water Code § 13350(b).

⁷⁹ *Oja & Assocs. v. Washington Park Towers Inc.* 89 Wash. 2d 72; 569 P.2d 1141 (1977). See Anderson, Jon G., Note, (1978) *Ariz. St. L. J.* at p. 126 and *Craig v. Montelepre Realty Co.*, 252 La. 502, 211 So. 2d 627 (1968); *D'Albora v. Tulane Univ.*, La.Ct.App., 274 So. 2d 825, *aff'd mem.*, 278 So. 2d 504, 505 (La. 1973); *Gulf Ins. Co. v. Employers Liability Assurance Corp.*, 170 So. 2d 125 (La.Ct.App. 1965); *Bruno v. Employers Liability Assurance Corp.*, 67 So. 2d 920 (La.Ct.App. 1953).

⁸⁰ *Gotreux v Gary* 232 La.373; 94 So.2d 293 (1957); *Young v Darter* 363 P.2d 829 (Okla. 1961); *Russell v. Windsor Properties, Inc.*, 366 So. 2d 219, 223 (La.Ct.App. 1978); *Loe v Lenhart* 227 Ore.242, 362 P.2d 218 (1977) and *Langan v Valicopters Inc.* 88 Wash 2d855, 567 P.2d 218 (1977). This is not universally accepted however: Kennedy, “Liability in the Aerial Application of Pesticide (1977) 22 *S.D. L Rev.* 75. See also Harper *et al*, §14.16 pp.334-38.

⁸¹ *Asheville Contr. Co. v. Southern Rly.* 19 F. 2d 32 (4th Cir. 1927). See Note: Torts – Blasting – Imposition of Liability Without Regard to Fault (1972) 37 *Mo. L. Rev.* 561 and *Fontenot v. Magnolia Petroleum Corp.*, 227 La. 866, 80 So. 2d 845 (1955); *Price v. State*, La.Ct. App.1984, 451 So. 2d 644 (La.Ct.App. 1984); *Wright v. Superior Oil Co.*, 138 So. 2d 688 (La.Ct.App. 1962); *Pate v. Western Geophysical Co.*, 91 So. 2d 431 (La.Ct.App. 1956).

⁸² *Langlois v. Allied Chemical Corp.*, 258 La. 1067, 249 So. 2d 133 (1971); *Hampton v. Rubicon Chemicals, Inc.*, 458 So. 2d 1260 (La. 1984).

⁸³ Restatement (Second) Torts §507. Harper, *et al*, *The Law of Torts*, Vol.3, §14.11 and §14.12 p.265 et seq.

⁸⁴ See CLSAA, section 2.

conquer the skies did he begin to have flying accidents.⁸⁵ The possibility of a fatal accident onboard a shuttle is 1%.⁸⁶

Dunstan is critical of whether space launch activities are indeed ultra-hazardous activities.⁸⁷ It is doubtful if a space object on the ground when it is not in the process of being launched is in fact an inherently dangerous thing, as with other vehicles, the danger arises from the fact of its movement or, in the case of launching a space object, attempted movement. On this ground, the English Courts have held that an aircraft is not an inherently dangerous thing⁸⁸ nor a dangerous thing in itself. An aircraft here is widely defined as “all balloons (whether captive or free), kites, gliders, airships and flying machines.”⁸⁹ It is unclear if some space objects, such as space planes, will be found to come within the definition of ‘flying machines’. This would be most significant in terms of the imposition of liability as under the Civil Aviation Act 1982 s.76, the owner of a civil aircraft is almost absolutely liable for all material loss caused by it or any article, animal or person falling therefrom, whilst taking-off,⁹⁰ landing or in flight. Irish law also provides for such liability⁹¹ as did s.5 of the Uniform State Aeronautics Act, though the latter is not adhered to as

⁸⁵ Jean Pilâtre de Rozier who, with the Marquis d’Arlandes, became one of the first aeronauts when he flew his balloon over Paris on November 21st, 1783, made history again two years later as the first man to be killed in a flying accident. See Clarke, *Man and Space*, (Time Life International, Netherlands, 1971), at p. 27.

⁸⁶ O’Neill D., Bekey I., Mankins J., Rogers T.F. and Stallmer E.W., *General Public Space Travel and Tourism*, Vol 1 Executive Summary (NASA/ ISTA, Washington DC, 1998) NP-1998-03-11- MSFC, available at <
http://www.spacefuture.com/archive/general_public_space_travel_and_tourism.shtml#Passengers>
(last visited November 5th, 2004).

⁸⁷ “Is Launching a Rocket Still an Ultra-Hazardous Activity? Toward a Negligence Theory for Launch Professional Activities,” *Proceedings of the Eleventh Space Studies Institute/Princeton Conference on Space Manufacturing*, 1993.

⁸⁸ *Fosbroke-Hobbs v Airwork Ltd.* [1937] 1 All E.R. 108 at 112 *per* Goddard J.: “I do not think I can hold that arranging for a journey by aeroplane is setting in motion a thing dangerous in itself.” See Walton, Cooper and Wood, *Charlesworth and Percy on Negligence*, 10th ed. (Sweet and Maxwell, London, 2001), para. 12-219.

⁸⁹ Air Navigation Order 1949 U.K. (S.I. No. 349 of 1949).

⁹⁰ This does not include taxiing to the runway: *Blankley v Godley* [1952] 1 All E.R. 436.

⁹¹ Section 21 Air Navigation and Transport Act 1936.

proposed.⁹² The problem still exists in Irish law which defines an aircraft differently as “any machine that can derive support in the atmosphere from the reactions of the air other than the reactions of the air against the earth’s surface”⁹³ insofar as space objects that straddle the technological divide with hybrid engines like space planes or otherwise like the space shuttle may still be caught by this definition. The only defence available is the partial defence of contributory negligence. This may be of little significance as the U.S. district and appeal courts have held that an ‘inherently dangerous’ activity does not fit within the ‘special category’ of ultrahazardous liability.⁹⁴ However the storage of the explosive substances used for fuel, the transport or pollution caused by the fuel may give rise to the opinion that the fuel is inherently dangerous. This would parallel the developments in the carriage and storage of other substances such as gasoline. In *Siegler v Kuhlmann*,⁹⁵ the Washington Supreme Court imposed strict liability on the defendant when his tanker leaked gasoline on to a public highway resulting in the death of the plaintiff’s descendent died in a explosion driving through it. The defendant was found to have created an abnormal risk in transporting the gasoline in such a fashion rather using an underground tank. Liability has also been imposed by statute on shipowners that discharge gasoline from their vessels.⁹⁶ Existing tort law on nuclear activities also suggest that where space objects use nuclear electric propulsion, the transport of the atomic elements, the construction of the engine, the testing of the engine and the

⁹² Harper *et al*, §14.13 pp.313-317.

⁹³ Article 3 of the Air Navigation (Nationality and Registration of Aircraft) Order, 1963 (S.I. No. 88 of 1963), Article 2 (1) of the Air Navigation (Operations) Order, 1964 (S.I. No. 140 of 1964), Article 2 (1) of the Air Navigation (Airworthiness of Aircraft) Order, 1964 (S.I. No. 141 of 1964), and Article 2 (1) of the Air Navigation (Personnel Licensing) Order, 1966 (S.I. No. 165 of 1966); Air Navigation (Definition of Aircraft) Order 1968 Reg.3; Air Navigation (Carriage of Munitions of War, Weapons and Dangerous Goods) Order 1973 S.I. No. 224 of 1973, s.2. Aeroplane is defined separately as “a power-driven heavier-than-air aircraft, deriving its lift in flight chiefly from aerodynamic reactions on surfaces which remain fixed under given conditions of flight” Air Navigation (Rules of the Air) Order 1992 Schedule.

⁹⁴ *Roberts v. Cardinal Services, Inc.*, 2000 U.S. Dist. LEXIS 13690, at *8, 2000 WL 1300390, at *3 (E.D.La. 2000); *Roberts et al v Cardinal Services* 266 F.3d 368; 2001 U.S. App. LEXIS 21256; 2002 AMC 83 *cf White v. McLouth Steel Corp.*, 18 Mich. App. 688, 171 N.W.2d 662 (1969).

⁹⁵ 81 Wash. 2d 448, 502 P. 2d 1181 (1972). See Ehrenzweig, p.56 who argues oil transportation is ultra-hazardous.

⁹⁶ Trans-Alaskan Authorisation Act 43 U.S.C. §1653 (a) (1), (c)(1).

object itself, the launch or attempted launching may all be viewed as nuclear activities and therefore as ultra-hazardous.⁹⁷ However, there is an exception to this, viz, in the handling of nuclear warheads by federal agencies where liability is predicated on negligence. Aside from the legality and desirability of placing nuclear warheads in outer space, liability action before a domestic tribunal may be subject to negligence, certainly, this would appear to be the position in relation to proceedings brought in the U.S. following *Bartholomae Corp. v. United States*.⁹⁸ Early aviation tort cases concerning damage to those on the surface are indicative of one possible approach that domestic space tort cases may take.⁹⁹

The position has been summed up thus:

The majority view originally was that aviation was an activity of such untested and speculative nature that those harmed by such an activity should be able to recover without proving fault. As American courts became more familiar with the activity, many felt that the safety record indicated that aviation was not so dangerous as to require strict liability.¹⁰⁰

⁹⁷ See Anderson, Jon G., Note, (1978) *Ariz. St. L. J.* at pp.125-126. See *Department of Environmental Protection v. Ventron Corporation*, 94 N.J. 473, 468 A.2d 150 (1983); *T&E Industries, Inc. v. Safety Light Corporation*, Supreme Court of New Jersey. March 27th 1991; see also the Price Anderson Act 42 USC §2210(n)(1) (1976) which creates strict liability for damage caused by nuclear powerplant accidents with a financial cap (see *Duke Power Co. v Carolina Environmental Study Group* 438 U.S. 59 (1978), Freedman, "Nuisance, Ultrahazardous Activities and the Atomic Reactor," 30 *Temp. L.Q.* 77, 90-104 (1957) and Van Dyke, Jon M., "The Legal Regime Governing the Sea Transport of Ultrahazardous Radioactive Materials," (2002) 33 *Ocean Development and International Law* 77, at p.79.

⁹⁸ 253 F. 2d 716 (9th Cir. 1958).

⁹⁹ See Speiser and Krause, *Aviation Tort Law* (Lawyers Co-operative Pub. Co., Rochester N.Y., 1978).

¹⁰⁰ Footnotes omitted. Anderson, Jon G., Note: "The *Rylands v. Fletcher* Doctrine in America: Abnormally Dangerous, Ultrahazardous or Absolute Nuisance (1978) *Ariz. St. L. J.* 99, 113.

Thus liability for ground damage from aviation will be imposed in negligence rather than strict liability (save where a statute mandates it).¹⁰¹ Rocket testing has been affirmatively held to be an ultra-hazardous activity in *Smith v Lockheed Propulsion Co.*¹⁰² which comes from the Californian State courts and is of particular merit as that jurisdiction is notably forward in its development of ultra-hazardous activity doctrine.¹⁰³ Here the plaintiff's alleged that the defendant's rocket testing resulted in seismic vibrations that had caused structural damage to their home. The testing had been conducted in accordance with a contract with the U.S. government. The plaintiff's sought to rely on both negligence and strict liability. The Court endorsed a fairness rationale for the imposition of strict liability:

In our opinion, defendant's activity must be classed as ultrahazardous. The fuel rocket motor was the largest ever tested to that date. Test firing such a device is not a matter of common occurrence... In these circumstances, public policy calls for strict liability.¹⁰⁴ There is no basis, either in reason or justice, for requiring the innocent neighboring landowner to bear the loss. Defendant, who is engaged in the enterprise for profit, is in a position best able to administer the loss so that it will ultimately be borne by the public. As Professor Prosser summarizes the rationale for the imposition of strict liability: 'The problem is dealt with as one of allocating a more or less inevitable loss to be charged against a complex and dangerous civilization, and liability is placed upon the party best able to shoulder it.'¹⁰⁵

¹⁰¹ See *Dickens v U.S.* 378 F. Supp. 845 (S.D. Tex. 1974) aff'd 545 F.2d 886 (5th Cir. 1977); *Boyd v. White* 128 Cal. 2d 641; 276 P.2d 92 (1966); *Nichols v Jones* 260 So. 2d 748 (La. 1971).

¹⁰² 247 Cal. App.2d 774, 56 Cal. Rptr.128 (1967). See Anderson, Jon G., Note, (1978) *Ariz. St. L. J.* at p. 128.

¹⁰³ See Anderson, Jon G., Note, (1978) *Ariz. St. L. J.* at p. 104.

¹⁰⁴ *Luthringer v. Moore*, 31 Cal.2d 489, 500, 190 P.2d 1; Rest., Torts, § 520.

¹⁰⁵ Prosser, *Law of Torts* 2d ed., (1955) p.318.

It held that the question was one of law, not fact.¹⁰⁶ The Court of Appeal in *Smith* followed the earlier decision in *Berg v. Reaction Motors Co.*¹⁰⁷ by the New Jersey Courts. In *Berg*, the defendant also had a public contract; it was for the development of a rocket engine for the X-15 for use by the Air Force. Complaints had been made consistently regarding the activity by the township. Before the lower court, a jury had awarded the full compensatory damages claimed by the sixteen plaintiffs for the structural damage to their homes and had awarded almost three times the sum in punitive damages.¹⁰⁸ The challenge by the defendant was to the payment of damages as no injunction was sought. The Court rejected the challenge on grounds of fairness stating:

[E]very consideration of fairness and justness dictates that the defendant, at least, make its neighbors whole for the structural damage it caused. Professor Keeton in his article on "Trespass, Nuisance, and Strict Liability," 59 *Colum. L. Rev.* 457, 470 (1959), points out that when a defendant is put on notice that his conduct, such as blasting or other dangerous activity, is causing damage to neighbors' homes, the question is whether he may destroy another's property "to serve his own and the public interest". The Professor notes that "the answer would seem clearly to be that the enterprise that must do such physical damage is liable therefore, however socially desirable the actor's conduct might be, even though the operations might not be enjoined."¹⁰⁹ In *Harper, Torts* § 203, at p.408 (1933) the author [states]:

¹⁰⁶ *Luthringer v. Moore*, 31 Cal.2d 496, 190 P.2d 1; *O'Neal v. International Paper Co.*, 715 F.2d 199, 201 (5 Cir. 1983); *Ashland Oil, Inc. v. Miller Oil Purchasing Co.*, 5 Cir. 1982, 678 F.2d 1293, 1308 (5 Cir. 1982); *Touchstone v. G.B.Q. Corp.*, 596 F. Supp. 805, 814 (E.D.La. 1984), *Ainsworth v. Shell Offshore, Inc.*, 829 F.2d 548, 549 (5th Cir. 1987); *Beck v. Bel Air Properties, Inc.*, 134 Cal.App.2d 842, 286 P.2d 503; Rest., Torts, § 520, comment h.

¹⁰⁷ 37 N.J. 396; 181 A.2d 487 (1967)

¹⁰⁸ See Visscher, Louis, "Tort Damages," in Faure, Michael (ed), *Tort Law and Economics*, (Edward Elgar, Cheltenham, 2009), 153 at p.166.

¹⁰⁹ Citing *Whitney v. Ralph Myers Contracting Corporation*, 118 S.E. 2d 622 (W. Va. 1961); *Whitman Hotel Corp. v. Elliott & Watrous Eng. Co.*, 137 Conn. 562, 79 A. 2d 591 (1951); *Thigpen v. Skousen & Hise*, 64 N.M. 290, 327 P. 2d 802 (1958); *Brooks v. Ready Mix Concrete Co.*, 94 Ga. App. 791, 96 S.E. 2d 213 (1956); *Fontenot v. Magnolia Petroleum Co.*, 227 La. 866, 80 So. 2d 845 (1955); *Federoff*

Defendant is not regarded as engaging in blameworthy conduct. He is creating hazards to others, to be sure, but they are ordinary, and reasonable risks incident to desirable social and economic activity. But common notions of fairness require that the defendant make good any harm that results even though his conduct is free from fault.¹¹⁰

The Court proceeded to examine a number of blasting cases and applied these by analogy to the vibrations caused by rockets. It concluded that “although careful blasting may not involve an unreasonable risk of harm and should therefore not be entirely prohibited, it nonetheless is an ultrahazardous activity which introduces an unusual danger into the community and should pay its own way in the event it actually causes damage to others.” As such, the Court found that the cost of any damage was to be absorbed as an operating business expense “for the enterprise may not reasonably expect its wholly innocent neighbors to shoulder the loss.”¹¹¹ The Court laid great weight on the fact that there had been repeated complaints made to the defendants. Nonetheless, the Court did find that the defendant’s conduct was not such as to amount to the willfulness, wantonness or consciousness of wrongdoing that was required before punitive damages could be imposed and that part of the order was vacated.

However, these findings were made against private entities that were performing these activities in pursuit of their own interests. In a case against the U.S. government directly or for rocket testing, the test applied is based on negligence as the Federal Tort Claims Act¹¹² does not authorize suit against the United States for

v. Harrison Const. Co., 362 Pa. 181, 66 A. 2d 817 (1949); *Brown v. L.S. Lunder Const. Co.*, 240 Wis. 122, 2 N.W. 2d 859 (1942).

¹¹⁰ 37 N.J. 396 at p. 406; 181 A.2d 487, at pp.492-3 (1967) citing *McAndrews v. Collerd*, 42 N.J.L. 189 (E. & A. 1880); *Thompson v. Jannarone Contracting Co.*, 6 N.J. Misc. 320, 141 A. 25 (Sup. Ct. 1928); but cf. *Simon v. Henry*, 62 N.J.L. 486 (Sup. Ct. 1898); *Whitla v. Ippolito*, 102 N.J.L. 354 (E. & A. 1926). See also *Majestic Realty Associates, Inc. v. Toti Contracting Co.*, 30 N.J. 425, 433-436 (1959).

¹¹¹ 37 N.J. 396 at 410; 181 A.2d 487 (1967) at 494.

¹¹² 28 U.S.C. §1346 (1982).

claims based upon strict or absolute liability.¹¹³ But the federal government has been held liable in the absence of a showing of negligence where it has failed to exercise reasonable care in its non-delegable duty to prevent harm to third parties. Thus in *H.L. Properties Ltd. v. Aerojet-General Corp.*¹¹⁴ liability was imposed on the federal government where negligence was not shown where rocket testing had led to hydrochloric rain that damaged the plaintiff's fruit as it had failed to exercise reasonable care. The matter of whether to apply strict liability or negligence is less clear cut in relation to rocket testing carried by the contractors of the federal government in accordance with their public contract. The Mississippi Supreme Court found that this constituted a sufficient reason to guard against the imposition of strict liability in *Pigott v. Boeing Corp.*¹¹⁵ In that case, the plaintiffs alleged that damage to their house had resulted from the vibrations caused by the defendant during the testing of the Saturn Booster Rocket at a NASA test site. Boeing had test fired the rocket under contract with NASA, a state agency. The plaintiff's home was just outside the buffer zone. The Court found that the plaintiffs had not pleaded facts that showed actionable negligence; it had simply been alleged.¹¹⁶ In addition, Boeing had raised the affirmative defence that it was not liable for damage to private property in the absence of a finding of negligence while engaged in performing a lawfully authorized public function of the U.S. Government in accordance with a public contract. The Court agreed with this following *Curtis v. Mississippi State Highway*

¹¹³ As Gex III J. observed in *Breland and Ors v. U.S.* 791 F. Supp. 1128, at 1137-8: "[a] claim for relief against the United States cannot be predicated upon a theory of strict liability or the fact that the United States engages in ultrahazardous activities such as the use of explosives."

See *Dalehite v. United States*, 346 U.S. 15, 97 L. Ed. 1427, 73 S. Ct. 956 (1953). There must be proof of a specific act or omission on the part of the Government's employee: *Simpson v. United States*, 454 F.2d 691(6th Cir. 1972); *Wright v. United States*, 404 F.2d 244 (7th Cir. 1968); *Laird v. Nelms*, 406 U.S. 797, 32 L. Ed. 2d 499, 92 S. Ct. 1899 (1972); *Tindall v U.S.*, 901 F.2d 53 (5th Cir. 1990), at p.55 n.3; *Voytas v. United States*, 256 F.2d 786 (7th Cir.1958) and *United States v. Coffey*, 233 F.2d 41 (9th Cir. 1956). Under the FTCA 28 U.S.C. § 1346(b), the plaintiffs must prove that the injuries and damages sued upon were "caused by the negligent or wrongful act or omission of [an] employee of the Government while acting within the scope of his office or employment."

¹¹⁴ 331 F. Supp. 1006 (S.D. Fla. 1971).

¹¹⁵ 240 So. 2d 63 (Miss. 1970).

¹¹⁶ See *King v. Mississippi Power & Light Co.*, 244 Miss. 486, 142 So.2d 222 (1962).

*Comm'n and Continental, Inc.*¹¹⁷ In *Curtis*, the court held that “the contractor was not liable for damages resulting from the contractor's execution of the work of constructing a highway in accordance with the plans and specifications and under the direction of the state highway engineers if such improvement was made without negligence.” So the Court reasoned in *Pigott*:

In the absence of negligence on the part of Boeing, the plaintiffs' remedy, if any, for damages suffered to their property is against the United States. We do not research the question of the liability of the United States or whether, if the United States is immune from suit, Boeing can claim such immunity. We rest our decision on the proposition that a contractor lawfully acting on behalf of the United States in performing a lawful public function without negligence is not liable for consequential damages resulting therefrom. Mississippi Constitution §17 (1890) provides that private property shall not be taken or damaged for public use, except on due compensation being first made to the owner in a manner to be prescribed by law. The liability thus imposed on the public agency is not based on tort, *Stephens v. Beaver Dam Drainage District*, 123 Miss. 884, 86 So. 641 (1920). Such liability is based upon the public agency's obligation to compensate for the damages resulting from the rightful exercise of its power.

As no negligence was proven, the plaintiffs failed. But the Californian and New Jersey Courts have rejected this defence and imposed strict liability regardless.¹¹⁸ In *Berg*, the Court relied on a number of blasting cases in reaching its conclusion. In *Whitman Hotel Corp. v. Elliott & Watrous Eng. Co.*¹¹⁹ the defendant had engaged in blasting activities pursuant to a contract with the United States War Department, Corps of Engineers, to widen and deepen the channel of the Shetucket River. The vibrations damaged the plaintiff's hotel. The trial court, finding that the defendant had caused the damage though it had not been negligent and allowed recovery for the

¹¹⁷ 195 So.2d 497 (Miss.1967).

¹¹⁸ *Smith v. Lockheed Propulsion Co.* 247 Cal. App.2d 774, 56 Cal. Rptr.128 (1967); *Berg v Reaction Motors Ltd.*, 37 N.J. 396, 181 A. 2d. 487 (1962).

¹¹⁹ 137 Conn. 562, 79 A. 2d 591 (1951).

cost of the repairs. This was upheld by the Supreme Court of Errors of Connecticut which found that most decisions held such defendants absolutely liable for damage caused to neighboring property and drew no distinction between instances where the damage is caused by vibrations and instances where it is caused by falling rocks or other debris. Given J. observed that while the use of explosives was within the contemplation of the contracting parties, there was nothing to indicate that the manner of its use was not left to the judgment and discretion of the contractor or that the work could not have been done so as to have avoided the damages.¹²⁰ The same conclusion has been reached in relation to State contracts, rather than federal contracts. In *Ashville Const. Co. v. Southern Ry. Co.*¹²¹ and *Scranton v. L.G. DeFelice & Son*¹²² the Court refused to allow independent contractors to state contracts to assert the governmental immunity of the states and imposed strict liability upon them for damage to nearby property from their blasting activities.¹²³ In *Berg*, the Court held that such an argument was without merit. It agreed that had the tests been conducted by the Government itself, the plaintiffs' damage claims would have been forestalled by the Government's sovereign immunity and that the Federal Tort Claims Act would be restrictively construed as insufficient to cover them. But here the plaintiffs were suing "an independent contractor which was engaged in a profit-making undertaking and which could readily be expected to make suitable provision for damage claims whether they arose from negligence or strict liability."¹²⁴ The impact of any transfer in the burden on insurance costs was without 'any controlling significance' and where such a premium could be passed on previous case law¹²⁵ admitted that the contractor may not take advantage of the Government's immunity. The defendant had sought to rely on *Valley Forge Gardens*

¹²⁰ See 118 S.E. 2d 628.

¹²¹ 19 F. 2d 32 (4 Cir. 1927).

¹²² 137 Conn. 580, 79 A. 2d 600 (1951).

¹²³ Cf. *Lydecker v. Freeholders of Passaic*, 91 N.J.L. 622, 627 (E. & A. 1917) as cited by the Court in *Berg*.

¹²⁴ 37 N.J. 396 at 415-16.

¹²⁵ See *Palin v. General Construction Company*, 47 Wash. 2d 246, 287 P. 2d 325, 328 (1955); *State Const. Co. v. Johnson*, 82 Ga. App. 698, 62 S.E. 2d 413, 414 (1950); Annot., 69 A.L.R. 489, 492 (1930); cf. *James Stewart & Co. v. Sadrakula*, 309 U.S. 94, 105, 60 S. Ct. 431, 84 L. Ed. 596, 603 (1940); *Alabama v. King & Boozer*, 314 U.S. 1, 62 S. Ct. 43, 86 L. Ed. 3 (1941).

v. *James D. Morrissey, Inc*¹²⁶ and *Pumphrey v. J.A. Jones Construction Company*¹²⁷ but the Court rejected that the situations were comparable. In the former, although the independent contractor was not liable for damage resulting from its blasting done in pursuance of its contract, it affirmatively proved that all of its work had been done in strict accordance with the contract and the plans and specifications drawn up by the State Highway and Bridge Authority.¹²⁸ The U.S. government in *Pumphrey* had also drawn up specific plans, their methods were subject to prior approval by the government and agents of the government had inspected the work. There had been no deviation from the contract in the blasting that caused the damage and so no liability was imposed on the defendant.

In *Converse v. Portsmouth Cotton Oil Refining Corp.*,¹²⁹ the defendants had dumped materials which escaped from their location into a waterway causing damage to the plaintiff's plant and business. The defendant had a dredging contract with the U.S. and argued that it was not liable where its actions were subject to the Government's directions. While the Court cautiously accepted that the defense could be sound, it was so only if the work could not have been done without inflicting the injury caused but found as a fact that this was not the case; other dumping grounds could have been used subject only to the approval of the officer in charge. In *Whitney v. Ralph Myers Contracting Corporation*,¹³⁰ where the defendant had engaged in blasting in the performance of a contract with the State Road Commission causing vibrations that damaged the plaintiff's home, the Supreme Court of Appeals of West Virginia accepted that fairness required that the defendant make good the harm he caused even though he was without fault. It rejected the argument that the contractor could rely on the State's immunity. In *Berg*, the Court found the principles in *Converse* and *Whitney* applicable. It found nothing "to indicate that the government had prescribed the site of the tests, or the location of the test stands, or the manner of conducting the

¹²⁶ 385 Pa. 477, 123 A. 2d 888 (1956).

¹²⁷ 250 Iowa 559, 94 N.W. 2d 737 (1959), adversely commented upon in 12 *Stan. L. Rev.* 691 (1960).

¹²⁸ See 123 A. 2d, at p. 889.

¹²⁹ 281 F., at p. 985.

¹³⁰ 118 S.E. 2d 622 (W. Va. 1961).

tests”¹³¹ because the contracts had not been adduced in evidence before the trial court and could not then be raised for the first time on appeal.¹³²

Extension of the Government's immunity to independent contractors would run counter to recent trends and expressions which emphasize the need for restricting the immunity and the rightness of affording relief to those who suffer special damage without regard to whether the activity which caused the damage was governmental or private.¹³³

So a defence relying on Government immunity, whether federal or state, is only applicable where the damage is caused pursuant to the directions, plans or specifications of the Government, but where this is not the case, no defence exists. This is of less significance in Ireland, where the State has no immunity from suit as the prerogative from whence such immunity could derive in Ireland, did not survive.¹³⁴ The absence of any administrative system for the grant of space launch licenses renders the point entirely moot for the Irish jurisdiction. Clearly, the distinction between private and public space activities is of importance in the U.S. determination of the correct theory of liability to impose although this will be of less significance if the Mississippi approach is not followed. It will be of less merit if space travel evolves along the lines of aviation, in terms of its safety record, such that it too may come to be viewed as no longer posing significant nonreciprocal risks in

¹³¹ 37 N.J. 396 at p.418; 181 A.2d 487 (1967) at p.535 citing *Converse v. Portsmouth Cotton Oil Refining Corp.*, 281 F. 981 (4 Cir. 1922), cert. denied 260 U.S. 724, 43 S. Ct. 13, 67 L. Ed. 482 (1922) and *Whitney v. Ralph Myers Contracting Corporation* 118 S.E. 2d 622 (W. Va. 1961).

¹³² See *Gibraltar Factors Corp. v. Slapo*, 23 N.J. 459, 461 (1957), appeal dismissed 355 U.S. 13, 78 S. Ct. 44, 2 L. Ed. 2d 20 (1957); *Mancuso v. Rothenberg*, 67 N.J. Super. 248, 257 (App. Div. 1961); *Yoerg v. Northern New Jersey Mtg. Associates*, 44 N.J. Super. 286, 289 (App. Div. 1957) and *Ex-Cell-o Corp. v. Farmers Coop. Dairies Ass'n.*, 28 N.J. Super. 159, 161 (App. Div. 1953).

¹³³ 37 N.J. 396 at p.416, 181 A.2d 487 (1967) at p.497 citing *McCabe v. N.J. Turnpike Auth.*, 35 N.J. 26, 33, (1961); *Taylor v. N.J. Highway Authority*, 22 N.J. 454, 470 (1956); cf. *Schwartz v. Stockton*, 32 N.J. 141, 147 (1960); *Cloyes v. Delaware Tp.*, 23 N.J. 324, 327 (1957). See also, *Griggs v. Allegheny County*, 369 U.S. 84, 82 S. Ct. 531, 7 L. Ed. 2d 585 (1962); *United States v. Causby*, 328 U.S. 256, 66 S. Ct. 1062, 90 L. Ed. 1206 (1946); cf. *Malone v. Bowdoin*, 369 U.S. 643, 82 S. Ct. 980, 8 L. Ed. 2d 168 (1962) (Douglas, J., dissenting).

¹³⁴ *Byrne v Ireland* [1972] IR 241.

turn mandating a negligence standard overall. Nonetheless, till that stage the distinction remains significant.

Defences do exist to liability under §520.¹³⁵ These do not include the ‘innocent, negligent or reckless conduct of a third person or the action of an animal or the operation of a force of nature in the case of harm arising from carrying on abnormally dangerous activity.’¹³⁶ Defences that are available include that the defendant was acting under a public duty,¹³⁷ for instance as a common carrier. This is significant because providers of commercial satellite services have been viewed by the Courts as common carriers, such as COMSAT¹³⁸ although national space agencies, such as NASA, are not.¹³⁹ Other defences include statutory authorisation or government contract.¹⁴⁰ It is questionable whether the defence of statutory authorisation should derive from the launch licence. The American Bar Institute added a caveat observing that it expressed no view regarding activities carried out in the absence of a public duty but that was publicly authorised or with statutory sanction.¹⁴¹ It is submitted that a launch licence should not ground such a defence. It should be viewed in law as analogical to a grant of planning permission. It simply demonstrates compliance with a particular statutory scheme in place to regulate the particular activity in the general public interest, rather than as immunity from suit in actions arising from the conduct of the activity even where in accordance with the

¹³⁵ See Anderson, Jon G., Note, (1978) *Ariz. St. L. J.* at p.105.

¹³⁶ Restatement (Second) Torts §522.

¹³⁷ Restatement (Second) Torts §521.

¹³⁸ See *Alpha Lyracom Space Communications Ltd. v Communications Satellite Corp.* 946 F. 2d. 168 at 176 (2d Cir. 1991).

¹³⁹ Hosenball, S. O’Neill, “The Space Shuttle in Perspective: Commercial Aspects,” in *Space Shuttle and the Law*, (Monograph No.3, University of Mississippi Law Centre, 1980), pp.117-118 and p.120, Mossinghoff and Sloup, “Legal Issues Inherent in Space Shuttle Operations,” (1978) 6 *J. Sp. L.* 47 and Brown, Bruce A., “Commercial Law and Liability Issues of the Space Transport System,” (1982-1983) 23 *Air Force Law Review* 424 at p.427 but see Robinson, “Private Management and Operation of the Space Shuttle: Some Legal Problems Related to Market Entry,” (1980) 13 *Akron. L. Rev.* 601 at p.610 who disagrees.

¹⁴⁰ *Pigott v. Boeing Corp.*, 240 So. 2d 63 (Miss. 1970); *Smith v. Lockheed Propulsion Co.* 247 Cal. App.2d 774, 56 Cal. Rptr.128 (1967); *Berg v Reaction Motors Ltd.*, 37 N.J. 396, 181 A. 2d. 487 (1962).

¹⁴¹ Restatement (Second) Torts §521, caveat 46.

permission. This is because the statutory scheme has been created by a Legislature in light of all the conflicting interests and where public safety or property is concerned it is a general rather than a specific concern, that is, the interests and rights of a specific individual are not a dominant matter. *Novus actus interveniens*,¹⁴² *vis major*¹⁴³ and *volenti non fit injuria*¹⁴⁴ also furnish defences to §520 actions, as does the plaintiff who benefits from the activity or whose activity was abnormally sensitive to harm.¹⁴⁵

2.3.1.1 Space Activities and Non-Natural User

The rule in *Rylands v Fletcher*¹⁴⁶ imposes strict liability on “a neighbour, who has brought something on land which was not naturally there.”¹⁴⁷ As Lord Cairns in the House of Lords stated, the defendants in the case who had accumulated water in a reservoir on their own land, they could have used their land for “any purpose for which it might in the ordinary course of the enjoyment of land be used.”¹⁴⁸ A ‘natural use’ of land has come to be equated with ordinary and usual uses of land;¹⁴⁹ while non-natural is equated with the opposite.¹⁵⁰ ‘Non-natural’ use¹⁵¹ has been defined as

¹⁴² *Bianchini v. Humble Pipeline Co.* 480 F. 2d 251 (5th Cir. 1973); *Wheatland Irrig. Dist. v. McGuire* 437 P. 2d. 1128 (Wyo. 1975).

¹⁴³ *Barr v. Game, Fish Parks Comm'n.*, 30 Colo. App. 482, 497 P. 2d 340 (1973); *Smith v. Bd. of County Comm'ers*, 5 Mich. App. 370; 146 N. W. 2d 702 (1966).

¹⁴⁴ Restatement (Second) Torts §523; *Ramada Inns Inc. v. Salt River Valley Waters Users Ass'n*, 111 Ariz 65; 523 P.2d 496 (1974); *E.I. Dupont de Nemours & Co. v Cudd* 176 F. 2d 855 (10th Cir. 1949).

¹⁴⁵ Restatement (Second) Torts §524A.

¹⁴⁶(1865-68) 3 H. & C. 774 (Exch.); L.R. 1 Ex. 265 (Exch. Ch.); L.R. 3 H.L. 330 (H.L.). On the historical and factual setting of the case, see Simpson, A.W.B., “Legal Liability for Bursting Reservoirs: The Historical Context of *Rylands v Fletcher*,” (1984) 13 *J. Legal Stud.* 209. See also Bohlen, Francis H., “The Rule in *Ryland v Fletcher*,” (1911) 59 *U. Pa. L. Rev.* 298.

¹⁴⁷ L.R. 1 Ex. 265 *per* Blackburn J.

¹⁴⁸See also *Hurdman v. North Eastern Rly. Co.* (1878) 3 C.P.D. 168 where this aspect of the rule was applied. This provided one means of distinguishing the previous decision of *Smith v Kenrick* (1849) 7 C.B.515. See Newark, “Non-natural User and *Rylands v Fletcher*,” (1961) 24 *M.L.R.* 557 at p. 561.

¹⁴⁹ See *Farrer v Nelson* (1885) 15 Q.B.D. 258; 52 L.T. (n.s.) 766 and Newark, p.566.

¹⁵⁰ See Kekewich J. in *National Telephone Co. v. Baker* [1893] 2 Ch. 186, Alverstone C.J. in *West v. Bristol Tramways Co.* [1908] 2 K.B. 14 and Newark, p. 567.

“some special use bringing with it an increased danger to others, and must not merely be the ordinary use of land or such a use as is proper for the general benefit of the community.”¹⁵² Clearly, on this test, the distinction between civilian, whether State-funded, private or both, and military space activities is pronounced. It will be far easier to show that a use is ‘proper for the general benefit of the community’ in the case of the latter. Thus the storage of flammable substances such as NOx for space activities *may not be considered a non-natural user. This is supported by the obiter dicta of Bramwell B. in Nichols v Marsland*¹⁵³ where he opined that no liability would be imposed under *Rylands* for a ‘reasonable use of the property in a way beneficial to the community.’ *Ellison v MOD*¹⁵⁴ illustrates this. Here bulk aviation fuel installations for a U.S. airforce base were found not to constitute non-natural use as the works were deemed to be of benefit to the community as a whole.

2.4 Other Fairness-Based Arguments

It is arguable that in a regime where insurance is mandatory the language or moral wrongdoing associated with negligence is misplaced entirely and fails to reflect the evolution of the law in the post-industrial phase. However, the application of strict liability on a fairness rationale alone cannot continue indefinitely and may be subject to change in the light of evolving knowledge. As Tatzusawa states in relation to space product liability:

It seems that, in internal law, strict liability should be applied to personal injuries or damage to property caused by products made in outer space until knowledge about the character of products is popularized through the diffusion

¹⁵¹ See Stallybrass, “Dangerous Things and the Non-Natural User of Land,” (1929) 3 *Camb. L.J.* 376; Goodhart, Liability for Things Naturally on Land,” (1930) 4 *Camb. L. J.* 13 and Fletcher, who is critical of the justification for the imposition as provided by Cairns and Blackburn p. 545.

¹⁵² *Rickards v Lothian* [1913] AC 263 (PC) at 280. See Binchy and McMahon, *The Law of Torts*, 3rd ed. (Butterworths, Dublin, 2000) p.719 *et seq* and Newark, “Non-natural User and *Rylands v Fletcher*,” (1961) 24 *M.L.R.* 557.

¹⁵³ (1875) L.R. 10 Ex. 255; 2 Ex. D.1.

¹⁵⁴ (1996) 81 *Build. L. R.* 101 (Q.B.).

of its manufacturing techniques. The manufacturer of a defective product must bear responsibility for product-caused injuries. They are also in the best position to cover the cost of the risk by the price of a product. Strict liability serves as a stimulus to take precautionary measures. If, at the time of distribution of a product by a manufacturer, scientific or technological development is not sufficient to find the defects of such a product, the manufacturer should be exonerated from liability.¹⁵⁵

In addition, the advent of a private commercial space carriage of persons industry favours the application of strict liability in order to ensure harmonious international passenger law which applies strict liability theories even for less hazardous modes of transport such as rail and liner, albeit that such a theory is applied in addition to a financial cap on recovery such as to avoid any claims crippling the industry.

Applying a fairness rationale based on non-reciprocal risks it is clear that such torts as occur which are not a direct consequence of engagement in the hazardous activity should not then be subject to strict liability. This would appear to be supported by §519 which provides that:

Except as stated in §521-4, one who carries on an ultra-hazardous activity is liable to another whose person, land or chattels the actor should recognize as being likely to be harmed by the unpreventable miscarriage of the activity for harm resulting thereto from that which makes the activity ultra-hazardous, although the utmost care is exercised to prevent the harm.

This ensures that the hazardous enterprise must pay but only within reasonable limits thus the “duty to insure safety extends only to certain consequences” i.e. those that are the ‘proximate cause’ of the damage.¹⁵⁶ This was applied in *Foster v Preston Mill*

¹⁵⁵ Tatsuzawa, “The Regulation of Commercial Space Activities by the Non-Governmental Entities in Space Law,” (1988) 32 *Proc. Coll. L.Out. Sp.* 83.

¹⁵⁶ *Prosser on Torts* p. 457 §60 quoted by Hamley J. in *Foster v Preston Mill Co.* 44 Wash 2d 440, 268 P. 2d 645 (1954).

*Co.*¹⁵⁷ where the court held that the damage caused arose not because of the kind of risk that made the activity at issue (blasting) ultra-hazardous and thus did not apply a theory of absolute liability. Here the mink in an adjoining mink farm had become excited by the vibrations during the whelping season and had killed their own young. Between international law and national law, all of these theories may be seen to operate with regard to space activities.

3. Applicable Theory in International Law¹⁵⁸

In the Liability Convention, absolute liability is imposed on launching States to pay compensation to other States or their national or juridical persons for any damage¹⁵⁹ caused by its space objects on the surface of earth or to aircraft in flight.¹⁶⁰ Liability is also absolute for damage caused to a third State on the surface of the earth or to aircraft in flight as a result of damage being caused to a space object or its personnel other than on the surface by another State's space object, both the latter States being jointly and severally responsible to the third State.¹⁶¹ However, liability is strict where damage is caused to the space object of a third State other than on the surface of the earth or to aircraft in flight.¹⁶² So where one State's space object (regardless of its location) directly damages another State's space object other than on the surface on earth (and therefore even where it is still in airspace and not outer space) liability will be imposed save where "the damage is due to its fault or the fault of persons for

¹⁵⁷ *Foster v Preston Mill Co.* 44 Wash 2d 440, 268 P. 2d 645 (1954).

¹⁵⁸ See DeSaussure, H., "Do We Need A Strict Limited Liability Regime in Outer Space?" (1978) 22 *Proc. Coll. L. Out. Sp.* 113; Jenks, "Liability for Ultra-Hazardous Activities in International Law", (1966) I *Recueil des Cours* 105.

¹⁵⁹ Damage is defined here as "loss of life, personal injury or other impairment of health; or loss of or damage to property of States or of persons, natural or juridical, or property of international intergovernmental organizations."

¹⁶⁰ Art. II of the Liability Convention. See Foster, "The Convention on International Liability for Damage Caused by Space Objects," (1972) 10 *Can. Y.B. Intn'l L.* 137; Bosco, Joseph A., "Practical Analysis of International Third Party Liability for Outer Space Activity – A U.S. Perspective," (1985) 29 *Trial Law Guide* 298.

¹⁶¹ Art. IV(1)(a) of the Liability Convention.

¹⁶² Art. III of the Liability Convention.

whom it is responsible.” Similarly where space objects of different States are damaged by each other with the result that damage is then done to the space object of a third state that otherwise than on the surface of the earth, liability is based on the fault of either of the first two States or on the fault of persons for whom either is responsible.¹⁶³ However, although such liability is joint and severable, the burden of compensation for the damage must be apportioned between the first two States in accordance with the extent to which they were at fault and equally if the extent of their respective fault cannot be established.¹⁶⁴ This is without prejudice to the rights of the third State to seek the entire sum of compensation from all the States that are jointly and severally responsible. Clearly, international law draws a distinction between those States which are actively involved in space activities (in the sense that they have a space object in airspace or outer space, rather than), and therefore accepted some element of risk, and those that are not, otherwise there would be no reason to distinguish between aircraft and space objects in airspace. Aside from the Liability Convention, the Cosmos 954 claim stated that:

The standard of absolute liability for space activities, in particular activities involving the use of nuclear energy, is considered to have become a general principle of international law.¹⁶⁵

International maritime law in contrast provides for liability to attach to those parties at fault in the event of a collision between non-State vessels,¹⁶⁶ irrespective of waters¹⁶⁷ with costs distributed in accordance with the proportion of fault or equally

¹⁶³ Art. IV(1)(b) of the Liability Convention.

¹⁶⁴ Art IV(2) of the Liability Convention.

¹⁶⁵ Settlement of Claim between Canada and the Union of Soviet Socialist Republics for Damage Caused by ‘Cosmos 954’ (Released on April 2, 1981), para.22. See also Christol, Carl Q., “International Liability for Damage Caused by Space Objects,” (1980) *American Journal of International Law* 346-71; Galloway, “Nuclear Powered Satellites: The U.S.S.R. Cosmos 954 and the Canadian Claim (1979) 12 *Akron L. Rev* 401; Haanappel, “Some Observations on the Crash of Cosmos 954,” (1978) 6 *J. Sp. L.* 147 and Matte, “Cosmos 954: Coexistence Pacifique et Vide Juridique,” (1978) 3 *Annals of Air and Space Law* 483.

¹⁶⁶ Art 11 of the International Convention regarding the Unification of Certain Rules of Law regarding Collisions between Vessels, Bruxelles, Sept. 23rd 1970.

¹⁶⁷ *Ibid* Art. 3

if such apportionment is not possible.¹⁶⁸ If the damage is for death or personal injury the parties at fault will be jointly and severally liable.¹⁶⁹ There is no presumption of fault applicable.¹⁷⁰ The costs for the collision must be borne by the victim if the collision was accidental, as a result of force majeure or if the cause is left in doubt.¹⁷¹ The position with regard to liability for damage caused to third parties on the surface of earth from the collision of aircraft is regulated under the Rome Convention 1952 as amended in 1978. Article I of that Convention provides for strict liability where “any person who suffers damage on the surface [proves] that the damage was caused by an aircraft in flight or by any person or thing falling.”¹⁷² Where damage is caused to a passenger on an aircraft during international carriage or from the collision of two or more aircraft and liability is brought under the Montreal Convention, the passenger will succeed if they can prove that damage was caused but they can only bring their claims within the first tier, i.e. there is a financial cap on their recovery. If they attempted to bring the claim within the second tier where no such cap exists, in addition to the further proofs required, the excess of the claim could be met by the carrier with the defence that the “damage was not due to the negligence or other wrongful act or omission of the carrier or its servants or agents or such damage was solely due to the negligence or other wrongful act or omission of a third party.” Alternatively, the claim could be taken under the Warsaw Convention which resembles the first tier of Warsaw. Under these Conventions, the plaintiff will bring the claim against their own carrier. Where the plaintiff wishes to bring proceedings against the colliding carrier, no international treaty is in place and such a claim will have to be taken under national law. On this point, Rey submits that “there's a good

¹⁶⁸ *Ibid*, art 4.

¹⁶⁹ *Ibid*

¹⁷⁰ *Ibid* Art 6

¹⁷¹ *Ibid* art 2.

¹⁷² This parallels §520 of the Restatement of Torts which found aviation to be an ultra-hazardous activity. In the Restatement (Second) of Torts, a new §520A was added so that strict liability was applied for any ground damage. See Harper *et al*, §14.13 pp.308-312. But under State statute law, negligence theories have been applied and this is the case even under the outdated Uniform State Aeronautics Act which has been repealed in many states or modified.

chance that any collision claims will be based on fault liability, because the parties involved are subject to the same degree of hazard.”¹⁷³

4. Applicable Theory in Domestic Law

Under national laws, while conditions in the launch licences may prescribe indemnification,¹⁷⁴ insurance¹⁷⁵ and liability on licensees, the position of the State’s liability at the national level is determined on a negligence standard. Thus under the South African Space Affairs Act s.21 the State or any person in the employment of the State, the Minister or the Council is not “liable in respect of anything done under this Act in good faith *and* without negligence.” This is even more difficult than simply a question of showing negligence, as even a decision with *mala fides* will not be sufficient without negligence. Under the Russian Federation’s Law on Space Activity 1993, art.29 provides that State bodies and their officials, other organizations and their officials, as well as citizens guilty of violation of this Law and other legislative acts governing space activity shall be held responsible in accordance with its legislation. Under art.30, the State guarantees “full compensation for direct damage inflicted as a result of accidents while carrying out space activity in accordance with [its law].” However, the compensation itself must be paid by the organizations and citizens responsible for operation of the space technology involved. It goes on to state in art.30(2) that if such damage is the result of errors committed at the creation and use of space technology, liability for damages must be partly or fully laid upon the appropriate organizations and citizens. Significantly it provides that liability for damages inflicted by a space object of the Russian Federation within its territory or outside the jurisdiction of any state, except outer space, ‘shall arise regardless of the fault of the inflictor thereof.’¹⁷⁶ Presumably, fault is applicable where damage occurs in outer space. However, where damage is caused

¹⁷³ Rey, Rene’J, “Legal Issues for Commercial Reusable Launch Flight Operations,” Space Treaties and Legislation, Sp St 565, December 1996.

¹⁷⁴ See Ch.IV, section 2.4.

¹⁷⁵ See Ch. IV, section 2.

¹⁷⁶ Art 30(3) Law of the Russian Federation on Space Activities Decree No. 5663-1 of the Russian House of Soviets.

to a space object of the State or on property on board of such object by another space object, other than on the surface of earth, the liability of organizations and citizens will be in proportion to their fault. Limits are placed on the amount recoverable to the insured sum or insurance indemnity provided in contracts of insurance of space technology and risks involved in space activity.¹⁷⁷ If this is insufficient for compensation recourse may be taken against the property of relevant organizations and citizens in the manner specified by law. The South African Space Affairs Act also permits conditions in licences which may determine, exclude or limit the liability of the licensee. Under the Law relating to JAXA, JAXA may seek indemnification for damage caused by a consigned launch from the parties involved only if the damage was caused by the willful default of the latter.¹⁷⁸

Under the Korean Space Liability Act 2007, the launching party is strictly liable for space damage. 'Space damage' is defined as physical damage such as death, bodily injury or other impairment of health of the third party and property loss such as destruction of, damage to or loss of property arising from the launch and operation of space object.¹⁷⁹ However, in case of space damage caused by armed conflict, hostile activity, civil war or rebellion or caused in outer space, the launching party is liable only if the damage is due to his wilful misconduct or negligence.¹⁸⁰ Where the launching party paid compensation for damage due to a third party's wilful misconduct or negligence, it may present a claim for indemnification to that third party.¹⁸¹ But, if the damage was due to the supply of components, materials or service (including labour), the launching party may present a claim for indemnification to the supplier only if the damage is due to wilful misconduct or gross negligence of the supplier or his employees.

Under the Australian Space Activities Act, the responsible party for the launch or return of a space object is liable to pay compensation for any damage the space object causes to a third party on Earth or as a result of damage to aircraft in flight.

¹⁷⁷ Id Art 30(4).

¹⁷⁸ Art.22 of the Law on the Japanese Aerospace Agency.

¹⁷⁹ Art. 2(4) of the Space Liability Act 2007.

¹⁸⁰ Art. 4(1) of the Space Liability Act 2007.

¹⁸¹ Art.4(2) of the Space Liability Act 2007.

But that the responsible party is not liable to the extent that it establishes that the damage resulted from either the gross negligence of the third party or any conduct (whether by act or omission) that the third party engaged in with intent to cause the damage. However, following the approach in the Liability Convention, liability is based on fault for damage which is not caused to the surface of earth or to aircraft in flight. Thus for liability arising from damage to a space object launched or operated by a third party or to a third party, or the property of a third party, on board such a space object, the responsible party is liable to pay compensation for that damage caused due to its fault. These provisions do not apply if the responsible party for the return is not an Australian national nor if the space object or part thereof was not launched from Australian territory. As in Russia, there are limits imposed on the amount that may be recovered. These limits are applicable where the launch or return of a space object that causes the damage was authorised by a launch permit or an overseas launch licence and the damage did not result from a breach of any of the conditions of the permit or of the relevant space licence, from any conduct (whether by act or omission) that the responsible party or a related party engaged in with intent to cause the damage or from the gross negligence of the responsible party or a related party. In such circumstances, liability of the responsible party or a related party does not extend beyond the insured amount for the launch permit or overseas launch certificate. In the case of damage caused by a space object in connection with the return of the space object where neither the object, nor any part of it, was launched from a launch facility located within Australia and the responsible party for the return is not an Australian national, no such limit is applicable. Under the Space Affairs Act 1993, there is no specific theory to be applied in the case of licensees, however, under s.22, the State or any person in the employment of the State, the Minister or the Council is liable in respect of anything done under the Act in good faith and without negligence.

The most recent national space legislation is the French Loi 518 of 2008 under which an operator is absolutely liable for third party damage caused to the ground or in airspace, with fault-based liability applied elsewhere.¹⁸² However, in *both* cases contributory negligence is permitted.¹⁸³ Liability is limited to when all the

¹⁸² Art.13(1)-(2) of Loi 2008-518.

¹⁸³ Art.13 of Loi 2008-518.

obligations set out in the authorization or the license are fulfilled, or at the latest one year after the date on which these obligations should have been fulfilled, save in the case of wilful misconduct. Outside of this timeframe, the French Government will itself meet any liability that arises.¹⁸⁴ In the case of parties participants engaged in the activity, one participant cannot be held liable by the others where there is insurance or governmental guarantee in place except for wilful misconduct.¹⁸⁵ In the case of damage caused by a space operation or the production of a space object to a participant, any other person taking part cannot be held liable for that damage, unless otherwise expressly stipulated or in case of a wilful misconduct.¹⁸⁶ This has the same practical effect as the US law on cross waivers.

5. Conclusion on Theories of Liability

With regard to the foregoing, it is possible to distinguish between several separate categories of accidents in relation to space activities. The first category includes unilateral accidents where the tortfeasor has engaged in the space activity and the alleged victim has been an innocent bystander, for example where the satellite launched by a private company on another company's launcher explodes and debris causes damage to the real victim on earth, whether on land or as a result of damage to a ship on the High Seas, or in airspace as a result of damage caused to an aircraft in flight. It would seem that where the particular space related activity is accepted as ultra-hazardous by the court, strict liability theory will apply, as opposed to absolute. This category also includes bilateral accidents between strangers where the damage is done on the surface of earth or to a launch facility. So where the debris from the tortfeasor's satellite causes damage to a launch facility on the High Seas, the same rules should apply. The strict liability approach is supported by Charlesworth and Percy although with the caution that one must 'wait and see'. The victim need simply show that damage resulted as a consequence of the defendant's actions. Full and partial defences such as contributory negligence may be available, as is the case in

¹⁸⁴ Art.13 of Loi 2008-518.

¹⁸⁵ Art. 19.

¹⁸⁶ Art. 20 of the Loi 2008-518.

France. The justification for such a theory can be found both in economic and fairness rationales.

The second category encompasses bilateral accidents between parties that are not strangers including a subcategory of accidents within employer/employee relationships and bilateral accidents between strangers where the damage occurs while the space object or launch vehicle is in airspace or outerspace and the damage in all cases is a risk that runs with the activity. In this category, some of the arguments in favour of strict liability, such as fairness, are less persuasive and the system is less efficient than a negligence system. In addition, current requirements for insurance, suggests that parties disputing liability for space activities are simply disputing which party should have the burden of insuring against the risk in issue. Such a dispute is usually resolved through an interpretation of the contract between the parties and whether it excluded or not liability for the risk that materialised and whether any liability in tort could arise independently of the contract in the circumstances. If such liability was found to exist, though current domestic case law on concurrent liability in tort and contract and on space activities suggests that this is not probable, it is most likely to be judged on a negligence standard.

In the third category, are bilateral accidents between parties that are not strangers that arise in relation to space activities but not from the materialisation of a risk that runs with the activity in question, it is submitted that the motivations for applying a theory of strict liability are restricted in the full scope of their application, and such cases should be judged according to ordinary negligence-based standards. This would include such incidents as defamation, trespass to chattels and trespass to the person where these acts occur on a space object and passing-off. However, practically, it appears that national laws will impose a theory dependant on the locus of harm. For instance, according to this theory, the collision of two space objects of different parties on the surface of the earth, for instance while taxiing, should be governed by negligence theory but it would in fact be regulated by strict liability in France.

CHAPTER IV: INSURANCE, INDEMNITIES AND SPACE ACTIVITIES

CHAPTER IV: INSURANCE, INDEMNITIES AND SPACE ACTIVITIES ..	141
1. INTRODUCTION.....	142
2. INSURANCE AND SPACE ACTIVITIES.....	143
3. TYPES OF INSURANCE.....	147
3.1 Pre-Launch Insurance.....	147
3.2 Launch Insurance	148
3.3 In-Orbit Insurance	149
3.4 Third Party Liability Insurance	150
3.5 Liability to Space Flight Participants.....	151
3.6 Other Available Types of Insurance.....	152
4. THE SCOPE OF THE INSURER'S LIABILITY.....	153
4.1 Mandatory Insurance.....	155
4.1 <i>International Insurance Requirements</i>	155
4.2 <i>Domestic Space Law Insurance Requirements</i>	157
4.2.1 <i>Australia</i>	157
4.2.2 <i>Brazil</i>	159
4.2.3 <i>France</i>	160
4.2.4 <i>The Republic of Korea</i>	161
4.2.5 <i>The Netherlands</i>	161
4.2.6 <i>Russia</i>	162
4.2.7 <i>The United Kingdom</i>	163
4.2.8 <i>The United States of America</i>	163
4.2.8.1 <i>NASA</i>	166
4.2.9 <i>Other National Law Provisions</i>	170
5. INDEMNITIES	171
6. THE EUROPEAN SPACE AGENCY (E.S.A.)	173
3. CONCLUSION	173

1. Introduction

The availability of insurance is critical to the development of all ultra-hazardous endeavours and space activities are no exception. The importance of having insurance to guard against risk cannot be over-emphasised and it is intrinsic and inter-related to the development of the space industry. Losses affecting the space industry are relieved by the insurance industry and through higher premiums, in turn, impact on activity levels. The cyclical nature of insurance is more pronounced with regard to space activities where the insurance market is highly globalised in order to cover the high risk. The history of the space industry which illustrates this cyclical relationship is examined in this chapter. Under strict liability regimes, as a practical consideration, liability must be met with insurance or some other form of financial

guarantee. The types of insurance will be assessed in terms of the phase of the activity covered in order to demonstrate the scope of the financial insulation currently available from such regimes. The need for a regime imposing liability¹ cannot be separated from the need to guarantee that liability under such a scheme will be met. To argue in favour of the former, requires the latter in order to make such a scheme efficacious. Currently, there is no international requirement for States to guarantee that their nationals' activities in space will be insured or subject to a financial guarantee, although they do have a responsibility to supervise their activities.² Nonetheless, national space laws invariably provide for insurance either as a condition in the launch/re-entry permit or as a pre-condition to the grant of a successful launch/re-entry permit. The varied scope of these national laws is considered below. Indemnities, as they are factor which may increase financial liability, will also be considered here.

2. Insurance and Space Activities³

Liability insurance has a long history, the oldest form being marine insurance which was in use prior to 1400. It emerged in England in the 1880s for the protection of employers against the claims of employees.⁴ Ehrenzweig and James submit that the impact of insurance on the torts process has been profound,⁵ although this is disputed.⁶ In relation to the space industry, Allenspach head of Underwriting in Swiss Space observed:

¹ See Ch.VII, Pt.I and Pt.II.

² See Ch.VII, pt.I.

³ See generally Hosenball, "Space Law, Liability and Insurable Risk," (1976) 12 *Forum* 141.

⁴ Henderson and Pearson, *The Torts Process*, 3rd ed. (Little Book, Co., Boston, 1988), p. 291.

⁵ Ehrenzweig, "Negligence without Fault" (1966) 54 *Cal. L. Rev.* 1422; James, "Accident Liability Reconsidered: The Impact of Liability Insurance," (1948) 57 *Yale L. J.* 549.

⁶ See Prosser and Keeton, *The Law of Torts*, 5th ed., (West Group, Minn., 1984), p. 589.

Services provided using communications satellites generate several billion dollars of revenue every year, and no market of this magnitude would be possible without the insurance industry.⁷

Space insurance is a unique market as it involves limited numbers of underwriters providing coverage for catastrophic events. Huge premiums provide an initial attraction, but difficulty in risk evaluation coupled with the catastrophic nature of any loss serve to diminish the interest of underwriters in the space insurance market. These difficulties in relation to risk evaluation stem from the fact that reliability is central to any such evaluation but due to the limited number of annual launches (25-30) reliability is, in itself, problematic to assess. The provision of technical information is also essential to ascertain reliability, indeed, a failure to provide sufficient information may result in underwriters providing for higher premiums or refusing to insure. The U.S. restrictions on the transfer of technical data has been criticised in this regard for being unnecessary by non-U.S. underwriters.⁸ However, The U.S. has imposed sanctions against companies for violating national security policies and the ITARs.⁹ For instance, the Office of Defense Trade Controls imposed an administrative debarment against Hughes Network Systems (Beijing) Co. Ltd. in 2005 and the company had to pay fines for 123 violations of national security.

Originally space insurance was available for pre-launch and third party liability; no underwriter was willing to cover risks associated with launching or the spacecraft's operational life.¹⁰ Intelsat's 1.1 'Early Bird' satellite, the first commercial communications satellite launched into geostationary orbit on the 6th April 1965 was covered for risks arising during the pre-launch phase (\$25m) and for third party liability (\$5m). In 1968, Intelsat's III F.1 satellite failed to reach GEO owing to

⁷ "Satellite Insurance – Exotic Market or Profitable Sideline?" available at www.swissre.com

⁸ Vinter, John, International Space Brokers presentation to the Senate hearings <http://commerce.senate.gov/hearings/0923vin.pdf>

⁹ See Blount, PJ, "The ITAR Treaty and Its Implications for US Space Exploration Policy and the Commercial Space Industry," (2008) 73(4) *Journal of Air L. & Comm.* 705.

¹⁰ See Meredith, Pamela, L. and Robinson, George S., *Space Law: A Case Study for the Practitioner*, Kluwer Law International (Martinus Nijhoff Publishers, Dordrecht, 1992), pp 335-369 [hereafter Meredith and Robinson].

problems with the launch vehicle. The manager of the remaining three satellites in the series, COMSAT, subsequently procured launch insurance to cover these. Policies generally covered a series of satellites and their launches although during the mid-1970s, it was possible to procure insurance for individual launches. In-orbit policies emerged at the same time, with RCA Corporation's SATCOM 1 being the first to have such coverage. No claims were made that decade until the failure of ESA's Orbital Test Satellite (OTS 1) in 1977 due to its Delta launch vehicle failure, resulting in a rise in premiums of 1%.¹¹ This was followed by the loss of Japan's Experimental Communications Satellites in 1978 depleting the premium base by \$12m. However, it was the claim by RCA for the loss of SATCOM3 in 1979 for \$77m which resulted in a capacity crisis in the market. Capacity increased with the involvement of marine and non-marine underwriters and the absence of claims for two subsequent years. But 1982-1983 saw several losses¹² that led to a marked reduction in the worldwide capacity, resulting in high premiums. The industry faced further set backs in 1984. The insurance industry had to pay out U.S. \$300m that year in claims while premiums amounted to only U.S. \$100m.¹³ In 1986, the failure of Western launch systems with the loss of *Challenger* (though this did not have insured cargo), Titan, Delta and Ariane launch vehicles crippled the industry and resulted in premiums rising to 25-30% of launch costs in 1987. O'Doherty submits that the volatility in the market during this period stemmed from the undiversifiable nature of the risk. Where the risks assumed were separated into undiversifiable and diversifiable risks, insurance contracts were found to be more efficient, particularly in relation to in-orbit policies.¹⁴ Commercially space launches recommenced in 1988 and the insurance industry faced net losses of \$20m.¹⁵ However, a very successful year of launch activity in 1989 resulted in premiums equalising the costs of claims and resulted in a drop in premiums to 16.5-17%.

¹¹ Meredith and Robinson, p 339.

¹² Goudge, B., "Proton and Long March – Are they Insurable?" (1987) 2 *Space* 3; Meredith and Robinson, p338-339.

¹³ Levine, Arthur L., "Commercialisation of Space: Policy and Administration Issues" (1985) *Public Administration Review* 562 at 565.

¹⁴ O'Doherty, Neil A., "Risk-bearing Contracts for Space Enterprises" (1989) *Journal of Risk and Insurance* 397.

¹⁵ Meredith and Robinson, p.341.

In the early nineties, the industry's aim was to product cheaper satellites faster; this however led to a number of satellite failures that followed from launch failures, such as on the Boeing 702 series, resulting in a reduction in the capacity provided by space insurers. "Risk appetite" on both the sides of the insurers and the capital providers suffered greatly. Following this difficult period emerged the relatively stable market of today. The first underwriter devoted exclusively to technical space underwriting was International Technology Underwriters founded in 1981 (AXA Space from 1998 onwards). The first broker devoted exclusively to the space industry is ISB (International Space Brokers) founded in 1991. It currently controls 30-35% of the market share. Sixty-five per cent of space insurance capacity comes from the United Kingdom, France, Germany, Italy and Bermuda.¹⁶ Approximately twenty-five to thirty satellites are launched per annum; in 2005 this generated revenues of 900 USD worldwide. Between 1965 and 1995, the space insurance industry generated premium revenues of U.S. \$4.2b, paying out \$3.4b in claims.¹⁷ However, Allensprach observes:

Nevertheless we have to be aware that we are insuring an industry that operates highly complex technology in a high-risk space environment. Paired with the low number of risks, this makes the business indeed volatile.

The requirements for space insurance, considered in detail below, coupled with the history and premium levels of the insurance industry has meant that the latter industry has controlled and can control activity levels through the grant or refusal of insurance. It illustrates the volatility of the market despite its current stability and demonstrates that it is possible for the global industry to go into a deficit. In light of

¹⁶ Vinter, John, *International Space Brokers Presentation to the Senate Hearings*

<<http://commerce.senate.gov/hearings/0923vin.pdf>>

¹⁷ Cox, Dicks, Goss, Hansen, Spratt, Weldon, Roybal-Allard, Scott, Bereuter, *Report of the United States House of Representatives Select Committee on U.S. National Security and Military/Commercial Concerns with the People's Republic of China*, May 25, 1999, Ch.8 Commercial Space Insurance: Technical Afterword, available at

<<http://www.house.gov/coxreport/body/ch8bod.html#anchor4553428>> [Hereafter The Cox Report].

the level of control the industry exerts and its potential to be unable to underwrite risk where high levels of actualisation has occurred, it may be of merit to consider a parallel scheme for meeting liability with compensation to ensure that activity level control does not rest entirely with one industry. This would distribute the burden of meeting liability which is an advantage where the burden is financially heavy enough to cripple the insurance industry.

3. Types of insurance¹⁸

There are many different types of space insurance, for satellites insurance coverage extends to pre-launch, launch and early orbit, in-orbit, FCC licence bond, service interruption/loss of revenue, liability, broadcast events and political risks¹⁹ with many firms offering cradle-to-the-grave policies. Most insurance premium paid relate to the launch portion of the policy.

3.1 Pre-Launch Insurance²⁰

Pre-launch insurance covers the spacecraft during transit from the moment it leaves the manufacturer's premises until the intentional ignition of the launch vehicle designated to launch it (usually at the ignition of the first-stage engines) or at lift-off²¹ and may extend for between a hundred and twenty to a hundred and eighty days after successful deployment.²² It covers physical loss of or damage to the spacecraft during this time. Launch site equipment, spacecraft carriage to the launch site, integration of the spacecraft into the launch vehicle, manufacturing and testing of the spacecraft may also be covered. Additionally, coverage is available for contingent exposures until the launch due to damage to the spacecraft or the delay or

¹⁸ Meredith and Robinson, p. 346 et seq.

¹⁹ International Space Brokers, *Insurance Coverage*, available at <http://www.isbworld.com/products_services/insurance_coverages.shtml>

²⁰ Meredith and Robinson, pp 346-349.

²¹ Margo, Rod D., "Spacecraft Insurance" in *Aviation Insurance*, 3rd ed. (Butterworths, Dublin, 2000), p.373, para.21.10 [hereafter Margo].

²² Meredith and Robinson, p.336.

termination of a launch, additional launch support service costs and for any indirect loss of revenue incurred due to business interruption. As Margo observes, the policy usually excludes war risks (but not hijacking), nuclear risks (save for radiation naturally occurring in the space environment), faulty design, wear and tear and mechanical or electrical breakdown or failure.²³ Many manufacturers seek pre-launch insurance as they usually carry the risk until the launch; this was so in relation to INSAT 1D which was damaged by a crane hook during loading by McDonnell Douglas on to their Delta launch vehicle. Ford repaired the satellite and claimed on their policy. Lloyd's, the underwriters, subsequently brought a subrogation suit against McDonnell Douglas for negligence.²⁴ However, satellite customers may prefer to obtain pre-launch insurance for themselves, as Western Union Corporation does.

3.2 Launch Insurance²⁵

Launch insurance takes up where pre-launch ends remaining in effect for one hundred and eighty days and may extend till the satellite has completed in-orbit testing, although this may vary with the policy. Loss, damage or failure, whether partial²⁶ or total,²⁷ will be covered during the agreed period, including that which is caused by an undiscovered pre-launch condition.²⁸ The sum recoverable under the insurance in the event of transponder failure or loss of operational life is pre-agreed and is calculated as the combined cost or replacement and re-launch.²⁹ Owing to the licensing regulations in the launching state, the transfer of title during salvage to the insurers may be problematic and impractical, although this is not to say it cannot be

²³ Margo, p. 374, para. 21.11.

²⁴ *Lloyd's v. McDonnell Douglas; Mc Donnell Douglas v Union of India* [1993] 1 Lloyd's Rep 48.

²⁵ Meredith and Robinson, p.349.

²⁶ Partial Loss under the Sample Willis Corroon Launch Policy calculates the indemnity as follows: Partial Loss Factor = 1 - ((the Number of Transponders Capable of Being Operated Simultaneously not exceeding twelve/12) x (the Actual Satellite Life expressed in Years/ 9.5)).

²⁷ See *Echostar Satellite Corporation v Ace Bermuda Insurance Co.* (2004, arbitration in London and New York). See Dykewicz, P. "Echo Star Gambles on Insurance," *Satellite News* 3rd March 2003, pp.1 and 9.

²⁸ Margo, p. 375, fn.40.

²⁹ Margo, p.375, para. 21.17.

done. The insured may agree in the policy to pay an agreed percentage of any revenue subsequently received from the satellite or part thereof on which the insurer paid off. A salvage mission was successfully conducted using the NASA's space shuttle in 1984 to bring two errant communications satellites, WESTAR VI and PALAPA 2-B, back to earth. The title to both on return to earth rested with the insurer, Appalachian Insurance Co., and the satellites were subsequently refurbished and re-sold by Appalachian. However Appalachian's subrogation suit against McDonnell Douglas and its subcontractors (the manufacturer's of the malfunctioning component) was unsuccessful due to the inclusion of the statutory cross-waivers of liability.³⁰ Hughes Global Space salvaged Asia-Sat 3³¹ in 1998 after coming to an agreement with the twenty-seven strong insurance consortium (which had declared it a total loss and paid out \$200m) for title of the satellite. In its agreement, the insurance companies would receive financial benefits from any successful subsequent marketing of the satellite's services.³² Exclusions for launch policies typically include loss or damage caused by was, anti-satellite devices, insurrection, strikes, riots, civil commotions, rebellion, revolution, civil war, usurpation, confiscation by government order, nuclear reaction, electromagnetic or radio frequency interference and wilful acts of the insured, its contractors or subcontractors.³³

3.3 In-Orbit Insurance³⁴

In-orbit insurance specifically covers technical problems and damages during the spacecraft's operational life³⁵ and usually runs concurrently with launch insurance from ignition or lift-off, although it may begin 180 days after launch. The amount

³⁰ *Appalachian Insurance Co. v McDonnell Douglas Corp*, 262 Cal. Rptr 716; 214 Cal, Appl. 3d 1 (1989); (1990) 18(1) *Journal of Space Law* 41-44.

³¹ It was renamed HGS 1 (Norad ID: 25126) and then later as PAS 22 after it was appropriated by PanAmSat.

³² Hess, Christopher, "HGS-1 Salvage Successful After Moon-Flybys", (1998) 9 *Flug Revue* 50.

³³ Margo, pp 376-377, para 21.23; Clarke, pp 801-802.

³⁴ Meredith and Robinson, p. 358.

³⁵ Bureau of Transportation Statistics, *Fourth Quarter 2002: Quarterly Launch Report Commercial, Commercial Space Launch Insurance: Current Market and Future Outlook*, available at <<http://ntl.bts.gov/lib/23000/23100/23199/q42002.pdf>>, p.8

recoverable under the policy is the same as for launch insurance. It is renewable annually although it may be available for up to five years.³⁶ Loss of revenue may also be sought by individual satellite transponder users.

3.4 Third Party Liability Insurance³⁷

Liability insurance is available to cover liability to third parties arising out of pre-launch, launch, orbiting and re-entry of the space object. Standard general liability insurance will not normally cover the risk of loss or damage from these activities. Launch service providers may require the operator to carry such insurance to protect itself. For instance, NASA requires spacecraft operators to do so.³⁸ In many cases, this is mandatory under some provision of municipal law. These are examined below. Manufacturers usually carry third party liability during construction, testing and carriage to the launch site. Third party liability insurance usually excludes liability for war risks, radioactive contamination, noise, pollution and related risks, any obligation of the insured to its employees under any employment law, liability for damage to the insured's property, liability to the insured as a manufacturer, telecommunications interruptions claims, and the failure of the satellite to provide a communications service.³⁹ Where the satellite has been declared operational, third party insurance is uncommon, as the satellite is in geostationary orbit, the risk of harm to third parties on the surface is 'virtually non-existent'.⁴⁰ The risk of damage to third parties' space objects in GEO is 'not substantial'.⁴¹ However, in the case of low earth orbit satellites where orbital decay is a possibility, the risk of harm to third parties on the surface may necessitate coverage. In the case of satellites that have reached the end of their operational life, no third party liability insurance is available. Under the Outer Space Treaty 1967 and the Liability Convention, in order for

³⁶Margo, p.377 para 21.26 and International Space Brokers, *In-Orbit Insurance*, available at <http://www.isbworld.com/products_services/in_orbit.shtml>

³⁷ Meredith and Robinson, p.365.

³⁸ NASA Launch Services Agreement, Art. V(2).

³⁹ Margo, pp 381-382, para 21.35

⁴⁰ Meredith and Robinson, p.365.

⁴¹ *Ibid.*

liability to attach in the event of a collision with another space object in outer space, there must be some element of fault attaching to the launching State of the non-operational satellite. Meredith and Robinson observe:

Assuming the fault standard is negligence/ *culpa* it would be almost impossible to establish fault given the *current* practice with respect to satellites at end-of-life, the lack of recovery options, and the prohibitive cost of recovery missions. While liability may be unlikely today and in the near future, this will not always be true. As space operations mature, technology evolves, and certain debris disposal methods become standard practice and even legally required, liability will be established and insurance protection will have to be considered.⁴²

In any case, liability will attach to a launching state for any third party damage on the surface of earth or to an aircraft in flight if caused by a non-operational satellite. The satellite owner may be liable to indemnify the government for such costs. In addition, the satellite owner may be sued under provisions of municipal tort law where a non-operational satellite (not in GEO) suffered a decaying orbit and crashed to the surface.

3.5 Liability to Space Flight Participants

Insurance to cover the risk to spaceflight participants or other non-personnel onboard may or may not be mandatory under national law depending on the jurisdiction. In the US, parties may be obliged to cross-waiver any liability under the CSLAA against permittees and licensees and against the operator in Florida and Virginia, which leaves insurance as the only means of guarding against the risk of actualisation. But in France it is necessary that any insurance of financial guarantee cover “les personnes qui ont participé à la production de l'objet spatial ou à l'opération spatiale”.⁴³ As Montpert has observed, 90% of space insurance involves

⁴² Meredith and Robinson, p. 366. Emphasis authors' own.

⁴³ Loi 2008-518 Art. 6(III)(3).

performance contracts, rather than third party liability insurance.⁴⁴ Indeed, there has been only one recorded instance of third party insurance claims in the past decade in contrast to sixty-five in-orbit claims and eighteen launch claims. Space tourism still remains the next frontier and it remains to be seen how the space insurance industry will adapt to accommodate this new element to the market.

3.6 Other Available Types of Insurance

Insurance for testing in large space simulators is also available. Insurance against political risks covers events where political decisions have financial impacts, examples include “the withdrawal of an export license to a launch site, or the preclusion of a foreign investor in a partnership”⁴⁵. This is available specifically for Russia and China. Other types of insurance coverage include protection for re-boost and recovery missions. Service interruption insurance protects against loss in the event of a satellite failing to meet its contractual specifications.⁴⁶ It is possible to cover the surety bond filed with the U.S. Federal Communications Commission within the thirty days following the grant of a license to construct, launch and operate a satellite and is specific to the US aerospace insurance industry.⁴⁷ The difference between a launch risk guarantee and the contractual conditions may also be covered; however, this is again is specific to the US space industry.

The largest capacity worldwide is offered by a single firm is \$95m USD from AGF (affiliated to Allianz).⁴⁸ The estimated capacity of the market is “between \$850 million and \$1 billion for each satellite program, with an estimated range of \$250 to

⁴⁴ Montpert, P., “Liability and Insurance Issues” Paper delivered at the 2006 European Centre for Space Law’s Practitioner’s Forum on “Space Tourism: Legal and Institutional Issues,” 17th March 2006, Paris.

⁴⁵ International Space Brokers, *Political Risks*, available at <http://www.isbworld.com/products_services/political_risks.shtml>

⁴⁶ International Space Brokers, *Interruption*, available at <http://www.isbworld.com/products_services/interruption.shtml>

⁴⁷ International Space Brokers, *FCC License Bond*, available at <http://www.isbworld.com/products_services/FCC_License_Bond.shtml>

⁴⁸ http://www.agf-corporatebusiness.com/DGC_DPI_uk/3_03_06_000e.html

\$300 million per launch.”⁴⁹ The manufacturers of on-board equipment, satellites and payloads may obtain products liability insurance.⁵⁰ In this regard, collective schemes are available, for example the Aircraft Builders Council’s products liability policy.⁵¹

4. The Scope of the Insurer’s Liability

An insurer is liable to cover the loss or damage that is proximately caused by the risks covered in the policy (*causa proxima non remota spectatur*).⁵² As Margo states, “the risk insured against must be the direct, dominant, operative and efficient or materially effective cause of the insured’s loss or damage or injury”.⁵³ What is or is not the proximate cause is determined on the facts of each case with common sense as the guide. Where there is no single identifiable cause of the loss, “provided that the causes have inevitable followed one another in such a manner that each can reasonably be said to have been the result of the case preceding it (at least from the risk insured against to the final cause) then the loss will be said to have been the proximately caused by the risk insured against”.⁵⁴ However, this will not be the case if the chain of causation is started by the actualisation of an uninsured risk.⁵⁵ If there are two equally operable causes for the loss, one arising from an insured risk and the other from that which was uninsured, the loss will not be recoverable under the policy.⁵⁶ *Novus actus interveniens* may break the chain of causation, however, reasonable attempts on the part of the insured or its employees to avoid the actualisation of the risk or mitigate its effects, even if negligent, will not constitute a

⁴⁹ See generally the Cox Report.

⁵⁰ See Craft, “Manufacturer’s Liability under United States Law for Products Used in Commercial Space Activities,” (1986) 14 *Journal of Space Law* 113.

⁵¹ Margo, p.382, para 21.39.

⁵² Margo, ch.23, p.395, para 23.01. See *Leyland Shipping Co. v Norwich Union Fire Insurance Society* [1918] AC 350. See Clarke, Malcolm, A., *The Law of Insurance Contracts*, 4th ed. (Lloyd’s London Press, London, 2002) [hereafter Clarke], pp.821-844.

⁵³ Margo, *ibidem*. Footnotes omitted.

⁵⁴ Margo, p.396, para 23.01.

⁵⁵ *Rabinowitz & King NNO v Ned-Equity Ins Co Ltd.*, 1980 1 (SA) 403.

⁵⁶ *Lloyd Instruments Ltd. v Northern Star Ins Co* [1987] 1 Lloyd’s Rep 32 (UK CA).

novus actus.⁵⁷ The policy may, however, impose a condition requiring the insured to act with due diligence to prevent and mitigate loss. Wilful misconduct by the insured will exclude the liability of the insurer to the insured (but not to innocent third parties⁵⁸) for either the damage or any indemnity:⁵⁹ *ex turpi causa non oritur actio*.⁶⁰ Where the insured has been found guilty of criminal conduct and has punitive damages awarded against him or her, no indemnification may be paid to the insured by the insurer on public policy grounds.⁶¹ The payment of punitive damages may be explicitly excluded by the policy itself. The burden of proving proximate cause rests on the insured⁶² although the doctrine may be excluded or modified by the wording of the policy itself.⁶³ The insured has a duty of good faith in disclosing information relating to the satellite. This was an issue in the proceedings taken against Boeing in relation to the 702 claims where it was alleged by insurers that Boeing did not disclose the results of tests conducted on the 702-type satellites.⁶⁴ The insured is under a duty to inform the insurer of any material change in any information previously provided. A material change may justify the cancellation of the policy. The dispute in *INTELSAT v Lexington Insurance Co.*⁶⁵ concerning the total loss of the INTELSAT VA (F-14) satellite specifically turned on this issue with Lexington claiming that the policy had been cancelled owing to a material change in the satellite. Where payment is made in the event of a claim, the claim is subrogated to the insurer thus involving it directly in the process. As a result, the insured's role is limited in significance usually to the provision of testimony. Indeed, an insurer can

⁵⁷ *Canada Rice Mills Ltd. v Union Marine & General Insurance Co.* [1941] AC 55.

⁵⁸ *Gardner v Moore* [1984] AC 548; *Hardy v Motor Insurer's Bureau* [1964] 2 QB 745. See Clarke, p.907.

⁵⁹ *Gray v Barr* [1971] 2 QB 554. See Clarke, p.907.

⁶⁰ *Cleaver v Mutual Life Fund Assurance* [1892] 1 QB 147; *Beresford v Royal Insurance Co. Ltd.* [1938] AC 586. See Clarke, p.782-801.

⁶¹ *Lancashire County Council v Municipal Mutual Ins Ltd.* [1996] 3 All ER 545.

⁶² *Rhesa Shipping Co SA v Edmunds* [1985] 2 Lloyd's Rep 1.

⁶³ *Rabinowitz & King NNO v Ned-Equity Ins Co Ltd.*, 1980 1 (SA) 403.

⁶⁴ Ravillon, Laurence, "Space Law and Mechanisms for Dispute Settlement" (2004) 28 *Bulletin of the European Centre for Space Law* 2, de Selding, P.B., "Insurers to Seek Payment on Boeing 702 Claims", *Space News*, Sept 6 2004, p. 20.

⁶⁵ This case was settled before it reached court.

settle claims notwithstanding the objections of the insured to the terms of the settlement.⁶⁶

4.1 Mandatory Insurance

4.1 International Insurance Requirements

The Intergovernmental Agreement requires that each State bear liability for the parts it registers, thus in effect all fifteen state parties to the IGA must resort to insurance to cover the risks. Insurance for damage to third parties in relation to the ISS is generally mandatory up to between \$100 and \$500 million. Damage in excess of this must be covered by the launching State.⁶⁷ Mission participants may take insurance for their own damage. The *corpus iuris spatialis* does not require States to ensure that their nationals engaged in space activities carry insurance nor do insurance details need to be accessible publicly on the State registry⁶⁸ (although this may be a requirement in national law as is the case in Argentina).⁶⁹ Mandatory insurance provisions would be unnecessary to guarantee damages to third parties due to the liability imposed directly on States by the 1967 Treaty and the Liability Convention 1972. This is in direct contrast to the position in air law, environmental law and international transport law.

Under the Rome Conventions of 1933⁷⁰ and 1952⁷¹ on damage caused by aircraft to third parties on the surface⁷² every aircraft must be insured or guaranteed against the

⁶⁶ See for example: *Marginian v Allstate Insurance Co.* (1985) 18 Ohio St 3d 345; 481 N.E. 2d 600

⁶⁷ De Dinechin, Guillaume, "Liability and Insurance Coverage", UNESCO Symposium on Legal and Ethical Considerations for Astronauts in Space Sojourns, Paris, 29th October 2004, see the Report on the Symposium, available at

http://portal.unesco.org/shs/en/file_download.php/c1583de3b91725ef07b19b837cd9bceaReport.pdf

⁶⁸ Art. IV of the Registration Convention does not specify this.

⁶⁹ Article 5(9) Decreto Nacional 125/95.

⁷⁰ As supplemented by the Brussels Insurance Protocol 1938.

⁷¹ As amended by the Montreal Protocol 1978. See Wilberforce, R.O., "Convention on Damage caused by Foreign Aircraft to Third Parties on the Surface" (1953) 2 *ICLQ* 90. Only four EU Member States have ratified this and it is not well-ratified generally (neither Japan nor the US have ratified it).

⁷² See Margo, 'Compulsory Insurance' pp 15-20, paras 3.02-3.25.

liability of the aircraft carrier⁷³ and any contracting state may require the operator of an aircraft to be covered by insurance or guaranteed by other security in respect of his liability for damage sustained in its territory.⁷⁴ Under Art.10(a) of the Convention on Third Party Liability in the Field of Nuclear Energy of 29th July 1960, as amended by the Additional Protocol of 28th January 1964 and by the Protocol of 16th November 1982, the operators⁷⁵ of nuclear installations⁷⁶ are required to have and maintain insurance or other financial security to the maximum amount to which they may be held liable under the Convention.⁷⁷

⁷³ See Ch.VII s7.1.The 1952 Convention permits an overflown State to require insurance but the Convention does not permit such a State to impose burdensome requirements. Insurance must therefore be accepted as satisfactory where it conforms to the Convention and has been effected by an insurer under the laws of the State where the aircraft is registered or of the State where the insurer resides or has his or her principal place of business and whose financial responsibility has been verified by either of these States (Art.15).

⁷⁴ An overflown contracting State may at any time require consultation with the State of the aircraft's registry, with the State of the operator or with any other contracting State where the guarantees are provided, if it believes that the insurer or other person providing the guarantee is not financially capable of meeting the obligations imposed by the convention.

⁷⁵ Art. 1(a)(vi) defines an operator as "the person designated or recognized by the competent public authority as the operator of that installation."

⁷⁶ Art. 1(a)(ii) defines this "as reactors other than those comprised in any means of transport; factories for the manufacture or processing of nuclear substances; factories for the separation of isotopes of nuclear fuel; factories for the reprocessing of irradiated nuclear fuel; facilities for the storage of nuclear substances other than storage incidental to the carriage of such substances; and such other installations in which there are nuclear fuel or radioactive products or waste as the Steering Committee for Nuclear Energy of the Organisation (hereinafter referred to as the "Steering Committee") shall from time to time determine; any Contracting Party may determine that two or more nuclear installations of one operator which are located on the same site shall, together with any other premises on that site where radioactive material is held, be treated as a single nuclear installation."

⁷⁷ This is 15,000,000SDR. Although Contracting States may establish lower limits of liability under national law, provided it is not less than 5,000,000 SDR. The insurance or financial security must be of such type and on such terms as the competent public authority specifies. It is also provided that no insurer or other financial guarantor may suspend or cancel the insurance or other financial security provided for under Art. 10(a) "without giving notice in writing of at least two months to the competent public authority or in so far as such insurance or other financial security relates to the carriage of nuclear substances, during the period of the carriage in question". Under Art.12,

The Montreal Convention provides for carrier insurance in article 50. Protocol 2002 to the Athens Convention relating to the Carriage of Passengers and their Luggage by Sea 1974 imposes a requirement on carriers to have insurance or financial security under Article 4.⁷⁸ It is clear that an insurance or guarantee scheme is invariably coupled with liability regimes for non-State parties in international law. Therefore, as it is argued in Chapter VII that an equivalent scheme to Rome and Montreal should be adopted at international level, it follows that an insurance and guarantee scheme should also be established, notwithstanding the various existing domestic space law regimes also impose requirement of mandatory insurance.⁷⁹

4.2 Domestic Space Law Insurance Requirements

As noted above, national space law regimes rightfully require insurance and insurance details for those seeking licences to conduct space activities. The extent and scope of this requirement varies from one State to another. For instance, in the UK, the requirement may be integrated as a condition within the licence itself,⁸⁰ rather than as a prerequisite for obtaining a licence, and is specifically stated to apply to damage or loss suffered by third parties in the State or elsewhere.

4.2.1 Australia

In Australia, the launch permit may only be granted if the Minister is satisfied that the insurance and financial requirements will be met.⁸¹ Furthermore, it is a standard condition of the launch permit the holder of the permit must satisfy these requirements.⁸² The holder of a launch permit must not contravene a condition of the

compensation payable under the insurance and reinsurance premiums or otherwise is freely transferable under the monetary areas of the contracting states.

⁷⁸ See also Conference Resolution 3 of the International Maritime Organization Conference 2002.

⁷⁹ See, for example, Article 25 of the Space Activities Act 1993 of the Russian Federation and Article 48 of the Australian Space Activities Act 1998.

⁸⁰ Section 5(2)(f) provides that a licence may include conditions “requiring the licensee to insure himself against liability incurred in respect of damage or loss suffered by third parties, in the United Kingdom or elsewhere, as a result of the activities authorised by the licence”.

⁸¹ Space Activities Act Div. 3, 26(3)(d).

⁸² Space Activities Act Div. 3, 29(d).

launch permit although this is not an offence where it occurs.⁸³ However if the holder of a launch permit by any intentional act or omission, contravenes a standard launch permit condition of the permit and is reckless as to whether the act or omission contravenes the condition, this will constitute an offence.⁸⁴ In the case of overseas launch certificates, these may be granted where the Minister is satisfied that the insurance and financial requirements are met or where it is not necessary to insist that these be met.⁸⁵ Failure to meet these requirements can result in the suspension of the overseas launch certificate.⁸⁶ Similarly in relation to return permits, the Minister must be satisfied that insurance/financial requirements will be met.⁸⁷ If a person returns a space object purportedly in accordance with the permit fails to meet the insurance/financial requirements, they will have committed an offence.⁸⁸

These insurance/financial requirements are met in the case of a return permit (s.43 authorisation) or a launch permit where the holder of the permit or authorisation is insured against any liability that the holder might incur under this Act to pay compensation for any damage to third parties that the launch or return causes⁸⁹ and the Commonwealth is insured against any liability that the Commonwealth might incur, under the Liability Convention or otherwise under international law, to pay compensation for such damage.⁹⁰ In the case of an overseas launch certificate, the insurance requirements are satisfied if the Commonwealth is insured against any liability of the Commonwealth, under the Liability Convention or otherwise under international law, to pay compensation for any damage to third parties that the launch causes.⁹¹

The total insurance, for each launch or return concerned, must be for an amount not less than the amount of the maximum probable loss that may be incurred in respect

⁸³ Space Activities Act Div. 3, 30(1).

⁸⁴ Space Activities Act Div. 3, 30(2).

⁸⁵ Space Activities Act Div. 4, 35(2)(a)(i) and (ii).

⁸⁶ Space Activities Act Div. 4, s. 41(1)(b).

⁸⁷ Space Activities Act Div. 5, s. 43(3)(b).

⁸⁸ Space Activities Act Div. 5, s. 44 (d).

⁸⁹ Space Activities Act Div.7, s. 48 (1)(c).

⁹⁰ Space Activities Act Div.7, s. 48 (1)(d).

⁹¹ Space Activities Act Div.7, s. 48(2).

of damage to third parties caused by the launch or return, as determined using the method set out in the regulations or if the regulations set out a different method of determining the sum, the amount determined using that method.⁹² The applicant for a launch licence must enclose an insurance compliance plan.⁹³ The holder of a launch permit, overseas launch certificate or section 43 authorisation covering a launch or return may also show direct financial responsibility. It must provide evidence that it has net assets sufficient to cover any liability that it might incur for any damage to third parties caused by the launch or return concerned, or other evidence that shows that it is able to comply with any obligation of the holder to pay compensation for such damage and any information that the Minister asks for in writing for the purpose of showing that the holder is able to comply with any obligation of the holder to pay compensation for such damage.⁹⁴ If the holder is incorporated by or under a law of the Commonwealth or of a State or Territory and is a subsidiary of, or is under the direction or financial control of, another body having legal personality, it must provide as above or provide evidence that the holder and the other body together have net assets sufficient to cover any liability that the holder might incur for such damage, or other evidence that shows that the holder is able to comply with any obligation of the holder to pay compensation for such damage and a guarantee by the other body that, to the extent that any part of any obligation of the holder to pay compensation for such damage is to be covered by the other body's net assets, it will meet that part of the obligation or evidence that the other body has net assets sufficient to cover any liability that the holder might incur for such damage, or other evidence that shows that the holder is able to comply with any obligation of the holder to pay compensation for such damage and a guarantee by the other body that it will meet any obligation of the holder to pay compensation for such damage.

4.2.2 Brazil

Under the Resolution on Commercial Launching Activities from Brazilian Territory, the Agencia Espacial Brasileira is conferred with the authority to grant licenses⁹⁵ and

⁹² Space Activities Act, Div. 7. s. 48(3).

⁹³ Space Activities Regulations 2001 (Statutory Rules 2001 No. 186), Reg. 3.11.

⁹⁴ Space Activities Regulations 2001, Reg. 7.01(2).

⁹⁵ Art.2 of the Resolution on Commercial Launching Activities from Brazilian Territory (Resolution No.51 of January 26th 2001).

to oversee, control and inspect licensees and their contractors and sub-contractors.⁹⁶ Under Art.7, the licensee is required to take responsibility for damage caused to a third party on account of engaging in space activities. The AEB must require the licensee to contract insurance, periodically updated, to cover the damage for which it is responsible.⁹⁷ However, the licence may be suspended or cancelled where the licensee becomes bankrupt or where its financial capacity to engage in launching activities is in doubt.

4.2.3 France

Under the recent law of 2008 as mentioned above, either insurance or an approved guarantee is mandatory for any operator receiving French authorisation for as long as it may be held liable under the act, though an operator may be exempt by decree.⁹⁸ An operator for these purposes is “toute personne physique ou morale qui conduit, sous sa responsabilité et de façon indépendante, une opération spatiale”.⁹⁹ The insurance/guarantee must cover all damage to third parties. ‘Damage’ is defined widely including “toute atteinte aux personnes, aux biens, et notamment à la santé publique ou à l’environnement directement causée par un objet spatial dans le cadre d’une opération spatiale” but excludes damages consequential to the use of signals transmitted by the object.¹⁰⁰ The insurance/guarantee must also cover damage caused by the object to the States and its emanations,¹⁰¹ ESA and its Member States,¹⁰² the operator and, as noted above, participants in the space operation¹⁰³ or

⁹⁶ *Ibid.*, Art.5.

⁹⁷ The text of Art.7 provides “[a] licenciada responderá pelos danos causados a terceiros em razão da atividade que exerça, podendo a AEB, para o deferimento da licença, exigir-lhe a contratação de seguro, a ser periodicamente atualizado, para cobertura dos danos de sua responsabilidade.”

⁹⁸ Loi 2008-518, Art.6(I).

⁹⁹ Loi 2008-518, Art.I(2).

¹⁰⁰ *Ibid.*, Art.I(1).

¹⁰¹ *Ibid.*, Art.6(III)(1).

¹⁰² *Ibid.*, Art.6(III)(2).

¹⁰³ ‘Space operation’ is defined under Art.1(3) as “toute activité consistant à lancer ou tenter de lancer un objet dans l’espace extra-atmosphérique ou à assurer la maîtrise d’un objet spatial pendant son

the production of the space object.¹⁰⁴ In covering both production and space operations, third parties and the State, but also to an intergovernmental organisation and participants, the French law is the most comprehensive with regard to insurance of those considered here.

4.2.4 The Republic of Korea

Under the Korea's Space Development and Promotion Act 2005, the National Space Committee has the power to grant launch permits.¹⁰⁵ The application for the permit must be made to the Minister of Science and Technology who sits as the chair of the Committee. A person, legal or natural, will be disqualified from obtaining a permit where bankrupt.¹⁰⁶ Under Art.15(1) any person seeking to obtain such a permit must insure against liability. The Act prescribes that third-party liability insurance must be of an amount capable of compensating for damage possibly occurring due to space activities. The minimum amount set by Ministerial decree having regard to domestic and foreign insurance markets¹⁰⁷ is limited to two hundred billion won (€149.5m approx.).¹⁰⁸ Unlike the French law, no mention is made of insuring itself, participants or the State, although in the case of the State, indemnity provisions are in place.

4.2.5 The Netherlands

Under s.3(4) of the Dutch Space Activities Act 2006, a license for space activity will be issued on the condition that the prospective holder must have and maintain "the maximum possible cover for the liability arising from the space activities for which a licence is requested". The Rules specifically provide that account will be taken of what can reasonably be covered by insurance. The State may seek indemnification

séjour dans l'espace extra-atmosphérique, y compris la Lune et les autres corps célestes, ainsi que, le cas échéant, lors de son retour sur Terre."

¹⁰⁴ Ibid., Art.6(III)(3).

¹⁰⁵ Art.6(2)(6) of the Space Development and Promotion Act 2005.

¹⁰⁶ Ibid., Art.12(2).

¹⁰⁷ Ibid., Art.15(2).

¹⁰⁸ Arts 5 and 6 of the Space Liability Act 2007.

directly from the licence-holder or from their insured but only up to the amount in s.3(4).¹⁰⁹

4.2.6 Russia

In Russia, customers of a commercial space project have a duty to insure against *civil* claims. Failure to discharge this duty justifies a refusal for a licence for the right to work on a commercial space project, suspension and/or termination of the licence.¹¹⁰ Art.25 of the Space Activities Act provides for compulsory insurance “against damage to the life and health of the cosmonauts and the personnel at the ground and other objects of space infrastructure, as well as against property damage to third parties.” Contrary to the law, most state-funded launches were not in fact insured between 1996 and 2000. Rosaviakosmos, the Russian Space Agency, issued an edict requiring Russian companies controlled by it to obtain third party liability for both state and commercial launches following the loss of two Proton launch vehicles in Kazakhstan which cost the Government \$700,000. The edict was ostensibly “to protect the property of enterprises that participate in the preparation and the carrying out of launches, taking into account that insurance of space risks will allow [them] to attract additional funds to compensate for damage done to third parties, to restore the infrastructure of launch facilities of cosmodromes and to compensate for losses of space hardware during failed launches.”¹¹¹ Each Proton rocket launch must be insured for a minimum of \$300m in relation to third party liabilities and \$40m for the risk of damage to the launch site. Soyuz and Zenit launches must have a minimum cover of \$200m for third party liability and \$25m for launch facility damage, while Cyclone, Rockot and Cosmos launches must have \$150m and \$5m to cover these risks respectively.¹¹² Organizations and citizens carrying out space activity may take

¹⁰⁹ Space Activities Act 2006: Rules Concerning Space Activities and the Establishment of a Registry of Space Objects, s.12 (3) and (4).

¹¹⁰ Legislation of the Russian Federation on Commercialization of Space Activity and Commercial Space Activity, Article 18.

¹¹¹ Edict of Yuri Koptev, January 26th, 2000. See Saradzhyan, Simon, “Liability Coverage Ordered – Russian Edict calls for Industry to Insure Launches,” *Space News*, 21st February 2000.

¹¹² Saradzhyan, Simon, “Liability Coverage Ordered – Russian Edict calls for Industry to Insure Launches,” *Space News*, 21st February 2000.

voluntary insurance over space technology, as well as risks connected with such activity.

4.2.7 *The United Kingdom*

The Outer Space Act 1986 provides that a licence is required for launching or procuring the launch of a space object, operating a space object and ‘any activity in outer space’ (although ‘outer space’ is not defined within the Act) conducted in the United Kingdom or elsewhere by United Kingdom nationals, Scottish firms or bodies incorporated under the law of any part of the United Kingdom.¹¹³ Section 5(2) states that a licence may in particular contain conditions “requiring the licensee to insure himself against liability incurred in respect of damage or loss suffered by third parties, in the United Kingdom or elsewhere, as a result of the activities authorised by the licence.”

4.2.8 *The United States of America*¹¹⁴

The regulations set down by the Federal Aviation Administration require commercial launch licensees (any person licensed to launch a launch vehicle into a suborbital trajectory, Earth orbit in outer space or otherwise in outer space¹¹⁵ or operate a launch or re-entry site) to obtain insurance to cover third-party and government property damage claims that could arise from their launch activities or to demonstrate financial responsibility to compensate to the maximum probable loss¹¹⁶ Under § 70112(1) of Title 49 of the USC, when a launch or re-entry license is issued or transferred, the licensee or transferee must obtain liability insurance or demonstrate financial responsibility in amounts to compensate for the maximum probable loss from claims by “a third party for death, bodily injury, or property

¹¹³ Outer Space Act 1986 s1-2.

¹¹⁴ See Margo, pp 378-382, paras 21.29-21.35 and Bender, James, *Space Transport Liability: National and International Aspects* (Martinus Nijhoff, London, 1995), pp.249-258.

¹¹⁵ Commercial Space Launch Act §70102(3).

¹¹⁶ U.S. Department of Transportation/Federal Aviation Administration, *Liability Risk-Sharing Regime for U.S. Commercial Space Transportation: Study and Analysis*, (FAA, April 2002).

damage or loss resulting from an activity carried out under the license¹¹⁷ and the United States Government against a person for damage or loss to Government property resulting from an activity carried out under the license.”¹¹⁸ This amount is determined by the Secretary of Transportation¹¹⁹ following consultation with the Administrator of NASA, the Secretary of the Air Force, and the heads of other appropriate executive agencies. Significantly, §70112(3) provides that for the total claims related to one launch or re-entry, a licensee or transferee is not required to obtain insurance or demonstrate financial responsibility of more than \$500m (in relation to third parties, as above) or \$100m (in relation to the US government) or “the maximum liability insurance available on the world market at reasonable cost” if the amount is less than these applicable amounts. Insurance required under the Commercial Space Launch Act 1988 must be effective till the cessation of the licensed activities at the launch site or thirty days following launch ignition or payload separation or attempted separation for orbital launches.¹²⁰ For suborbital launches, the insurance must be effective from motor impact and payload recovery or when the Office of transport determines the risk is so small that financial responsibility is unnecessary, whichever is the later.¹²¹

Policies under this section protect the Government, its executive agencies and personnel, contractors and subcontractor, customers of the licensee or transferee and contractors and subcontractors of the customer to the extent of their potential liability for involvement in launch services or re-entry services.¹²² Launch and re-entry licenses must include a clause “requiring the licensee or transferee to make a reciprocal waiver of claims with its contractors, subcontractors, and customers, and

¹¹⁷ §70112(1)(a) of Title 49 (XI) USC.

¹¹⁸ §70112(1)(b) of Title 49 (XI) USC.

¹¹⁹ §70112(2) of Title 49 (XI) USC.

¹²⁰ See Margo, p. 380, para.21.32. See for example Martin Marietta Commercial Titan Inc. Office of Commercial Space Transportation License No. 90-013 February 15, 1990 Regarding Responsibilities for Requirements under Sections 15(c) and 16 of the Commercial Space Launch Act, p.3. In the case of Arianespace, the standard draft launch agreement provides for third party liability insurance to remain in effect for thirty-six months or while the payload is attached to the launch vehicle, whichever is the shorter. See Meredith and Robinson, p. 368.

¹²¹ Margo, p380, para 21.32.

¹²² §70112(4)(a) of Title 49 (XI) USC.

contractors and subcontractors of the customers, involved in launch services or re-entry services under which each party to the waiver agrees to be responsible for property damage or loss it sustains, or for personal injury to, death of, or property damage or loss sustained by its own employees resulting from an activity carried out under the applicable license.”¹²³

The Secretary of Transportation on behalf of the Government, its executive agencies and contractors and subcontractors involved in launch services or re-entry services must make a reciprocal waiver of “claims with the licensee or transferee, contractors, subcontractors, and customers of the licensee or transferee, and contractors and subcontractors of the customers, involved in launch services or re-entry services under which each party to the waiver agrees to be responsible for property damage or loss it sustains, or for personal injury to, death of, or property damage or loss sustained by its own employees resulting from an activity carried out under the applicable license.” However, it is stated that the waiver “applies only to the extent that claims are more than the amount of insurance or demonstration of financial responsibility required.” The Secretary may waive the right to recover damages for the Government, a department, agency or instrumentality of the Government for damage or loss to Government property to the extent insurance is not available because of a policy exclusion the Secretary of Transportation decides is usual for the type of insurance involved.¹²⁴

In relation to launches or re-entries that involve Government Facilities and personnel, requirements must be set down by the Secretary “for proof of financial responsibility and other assurances necessary to protect the Government and its executive agencies and personnel from liability, death, bodily injury, or property damage or loss as a result of a launch or operation of a launch site or re-entry site or a re-entry involving a facility or personnel of the Government”. But the Secretary may not relieve the Government of liability for death, bodily injury, or property damage or loss resulting from the wilful misconduct of the Government or its agents.

¹²³ §70112(4)(b)(1) of Title 49 (XI) USC.

¹²⁴ §70112(4)(b)(2) of Title 49 (XI) USC.

4.2.8.1 NASA

The NASA is self-insured, although its civil service employees are covered with International SOS on international travel. NASA employees also have two separate forms of insurance: federal employees group life insurance and NASA Employees Benefit Association life assurance. Section 308 (2458b(a)) of the NASA Act¹²⁵ provides:

The Administration is authorized on such terms and to the extent it may deem appropriate to provide liability insurance for any user¹²⁶ of a space vehicle¹²⁷ to compensate all or a portion of claims by third parties¹²⁸ for death, bodily injury, or loss of or damage to property resulting from activities carried on in connection with the launch, operations or recovery of the space vehicle. Appropriations available to the Administration may be used to acquire such insurance, but such appropriations shall be reimbursed to the maximum extent practicable by the users under reimbursement policies established pursuant to section 2473(c) of this title.

No payment may be made under this section unless it is certified as 'just and reasonable' by the Administrator or his designee.¹²⁹ Indemnification is provided for under regulations prescribed by the Administrator "taking into account the availability, cost and terms of liability insurance".¹³⁰

¹²⁵ Pub. L. 85-568, title III, Sec. 308, as added Pub. L. 96-48, Sec. 6(b)(2), Aug. 8, 1979, 93 Stat. 348.

¹²⁶ A 'user' for this purposes 'includes anyone who enters into an agreement with the Administration for use of all or a portion of a space vehicle, who owns or provides property to be flown on a space vehicle, or who employs a person to be flown on a space vehicle' (Sec. 2458b(f)).

¹²⁷ The term "space vehicle" is defined for the purposes of this section as "an object intended for launch, launched or assembled in outer space, including the Space Shuttle and other components of a space transportation system, together with related equipment, devices, components and parts." (Sec. 2458b(f)).

¹²⁸ This is "any person who may institute a claim against a user for death, bodily injury or loss of or damage to property" (Sec. 2458b(f)).

¹²⁹ 42 USC Sec. 2458b (d).

¹³⁰ In addition, a user of a space vehicle "may provide that the United States will indemnify the user against claims (including reasonable expenses of litigation or settlement) by third parties for death, bodily injury, or loss of or damage to property resulting from activities carried on in connection with

Under subpart 1828 of the procurement regulations, the procurement officer may approve a requirement for property damage liability insurance in the case of cost-reimbursement contracts when a commingling of operations permits property damage coverage at a nominal cost to NASA under insurance carried by the contractor in the course of its commercial operations or where the contractor is engaged in the handling of high explosives or in extra hazardous research and development activities undertaken in populated areas.¹³¹ The contractor must also agree to submit any other insurance maintained thereby in connection with the performance of the contract and for which the contractor seeks reimbursement to the contracting officer for his/her approval.¹³²

The contractor will be reimbursed for that portion of the reasonable cost of required or approved insurance allocable to the contract in question and for certain liabilities (and expenses incidental to such liabilities) to third persons not compensated by insurance or otherwise as an exception to the limitation of cost or funds clause of the contract.¹³³ However, these liabilities, whether caused by the contractor's or its agents' negligence, must arise out of the performance of the contract and be represented by final settlements approved in writing by the Government. The liability is specifically for loss of or damage to property (other than that owned, occupied or used by the contractor), death or bodily injury. The Government's liability is also

the launch, operations or recovery of the space vehicle, but only to the extent that such claims are not compensated by the liability insurance of the user: provided, that such indemnification may be limited to claims resulting from *other than* the actual negligence or wilful misconduct of the user."

¹³¹ Procurement Regulations Subpart 1828.307-2 Liability (b)(2)(A). In addition, all cost reimbursement contracts must insert a clause, as set out in the Federal Aviation Regulations (FAR 52.228-7), requiring the contractor to provide and maintain workers' compensation, employer's liability, comprehensive general liability (bodily injury), comprehensive automobile liability (bodily injury and property damage) insurance, (with respect to workers' compensation), although this is only where the contractor is so qualified under statute and such other insurance as required by the Contracting Officer except where the contracting officer has approved the contractor's self-insurance program.

The amount, form and duration of the insurance must be as the contracting officer requires or approves: FAR 52.228-7(a)(3)Insurance Liability to Third Parties, prescribed in FAR 28.311-1.

¹³² FAR 52.228-7(b).

¹³³ FAR 52.228-7(c)(1-2).

expressly limited by a clause providing that this is subject to the availability of appropriated funds at the time of the contingency.¹³⁴ The cost-reimbursement contract will also provide that the contractor will not be reimbursed for liabilities (and expenses incidental to such liabilities) that the Contractor is responsible for under the express terms of any clause in the contract or its schedule or has failed to insure or to maintain insurance as required by the Contracting Officer or that result from willful misconduct or lack of good faith on the part of any of the Contractor's directors, officers, etc. Where a claim is filed against the contractor for a risk which is then uninsured or underinsured, the cost of which may be reimbursable under the contract, the contractor must notify the contracting officer, authorize collaboration between Government representatives and counsel with the insurance carrier to settle or defend the claim and authorize the Government representative to settle or defend the claim.¹³⁵ These clauses do not have to be included within the contract where they are "waived by the procurement officer or the successful offeror represents in its offer that it is totally immune from tort liability as a State agency or as a charitable institution".

In the case of NASA solicitation contracts, certain clauses must be included by the contracting officer, dependant on the subject-matter of the contract. In the case of cost-reimbursement contracts for the development, production, modification, maintenance, or overhaul of aircraft, or otherwise involving the furnishing of aircraft to the contractor, except when the aircraft are covered by a separate bailment (used for the transport of shuttles etc), a clause must be inserted providing that the Contractor will not be relieved of liability for damage to, or loss or destruction of, aircraft¹³⁶ sustained during flight¹³⁷ or be reimbursed for liabilities to third persons

¹³⁴ FAR 52.228-7(d).

¹³⁵ FAR 52.228-7(g): Insurance Liability to Third Parties, prescribed in FAR 28.311-1.

¹³⁶ This "includes any aircraft, whether furnished by the Contractor under this contract (either before or after Government acceptance) or furnished by the Government to the Contractor under this contract, including all Government property placed or installed or attached to the aircraft, unless the aircraft and property are covered by a separate bailment agreement."

¹³⁷ This "includes any flight demonstration, flight test, taxi test, or other flight made in the performance of this contract, or for the purpose of safeguarding the aircraft, or previously approved in writing by the Contracting Officer.

- (i) With respect to land-based aircraft, flight commences with the taxi roll from a flight line

for loss of or damage to property or for death or bodily injury caused by aircraft during flight, unless the flight crew members¹³⁸ have previously been approved in writing by the Contracting Officer. However, where an aircraft is “damaged, lost, or destroyed during flight and the amount of the damage, loss, or destruction exceeds \$100,000 or 20% of the estimated cost, exclusive of any fee, of the contract, (whichever is less) and if the Contractor is not liable for the damage, loss, or destruction under the Government Property (Cost-Reimbursement, Time-and-Materials, or Labor-Hour Contracts) clause” or the provision above, then an equitable adjustment for any resulting repair, restoration, or replacement required under the contract will be made in the estimated cost, the delivery schedule, or both and in the amount of any fee to be paid to the Contractor, taking into account the fault of the contractor, its employees or subcontractor in materially contributing to the loss or damage.

In the case of in solicitations for research and development where a cost-reimbursement contract is contemplated, certain clauses must be included depending on the offeror’s level of immunity from tort liability to third parties. Where the offeror is so immune, either partially or totally, as a State agency or as a charitable institution, a representation to that effect must be included in its offer. In the case of a partially immune offeror FAR 52.228-7 must be included and the associated NFS clause 1852.228-81. NFS clause 1852.228-81(a) provides that “the Government does not assume any liability to third persons, nor will the Government reimburse the Contractor for its liability to third persons, with respect to loss due to death, bodily

and continues until the aircraft has completed the taxi roll to a flight line.

(ii) With respect to sea-planes, flight commences with the launching from a ramp and continues until the aircraft has completed its landing run and is beached at a ramp.

(iii) With respect to helicopters, flight commences upon engagement of the rotors for the purpose of take-off and continues until the aircraft has returned to the ground and rotors are disengaged.

(iv) With respect to vertical take-off aircraft, flight commences upon disengagement from any launching platform or device and continues until the aircraft has been re-engaged to any launching platform or device.”

¹³⁸ This is defined as “the pilot, copilot, and, unless otherwise specifically provided in the Schedule, the flight engineer and navigator when required or assigned to their respective crew positions to conduct any flight on behalf of the Contractor.”

injury, or damage to property resulting in any way from the performance of [the] contract”. But NFS clause 1852.228-81(b) provides that the contractor does not have to provide or maintain insurance coverage as required by paragraph (a) of FAR clause 52.228-7, instead “the Contractor may obtain any insurance coverage deemed necessary, subject to approval by the Contracting Officer as to form, amount, and duration.” The Contractor will be reimbursed for the cost of such insurance and, to the extent provided in FAR clause 52.228-7(c), for liabilities to third person for which the Contractor has obtained insurance coverage as provided in this paragraph, but for which such coverage is insufficient in amount.¹³⁹

Where the offeror is totally immune the clause at NFS 1852.228-82 must be included in the resulting contract. NFS 1852.228-82(a) provides that the Government does not assume any liability to third persons, nor will it reimburse the Contractor for its liability to third persons, with respect to loss due to death, bodily injury, or damage to property resulting in any way from the performance of this contract or any subcontract. NFS 1852.228-82(b) is substantially the same as FAR 52.228-7(g).¹⁴⁰

4.2.9 Other National Law Provisions

Other States may also specify certain financial requirements rather than insurance specifically. Under s.14(1)(ii) of the South African Space Affairs Act, licences may contain conditions relating to security for any damage caused. Launches by State agencies may also require security by law. Thus JAXA must obtain insurance before any satellites are launched.¹⁴¹ Similarly under the US procurement regulations, in the case of industrial facilities provided by the US Government under a facilities contract or a lease, the contract or lease, the contract or ease must require that during the period of construction, installation, alteration, repair, or use, and at any other time as directed by the contracting officer, the contractor or lessee insure or otherwise provide approved security for liabilities to third persons (including employees of the

¹³⁹ 1852.228-81, Insurance – Partial Immunity From Tort Liability

¹⁴⁰ http://www.hq.nasa.gov/office/procurement/regs/1828.htm#28_3

¹⁴¹ Art 21 Law Concerning Japanese Aerospace Exploration Agency. See also previously art. 24-2 Law of the National Space Development Agency of Japan (Law No. 150 June 23rd, 1969).

contractor or lessee) in the manner and to the same extent as required in FAR 28.307-2.¹⁴²

5. Indemnities

Indemnification covers two separate situations. The first is where the Government offers to indemnify claims above or outside the scope of liability which must be insured against. The second aspect covers the scope that operators may be required to indemnify the State for its exposure to liability under international law.¹⁴³ The first system is seen in the US and, to a lesser degree, in France. Under §70113(f) of title 49 of the United States Code, satellite launchers are obligated to obtain insurance to cover third party liability to the ‘maximum probable loss’ level (as determined by government).¹⁴⁴ However, under §70113(a)(1) the Secretary of Transportation will provide for the payment by the U.S. Government of a successful claim (including reasonable litigation or settlement expenses) of a third party against a licensee or transferee, a contractor, subcontractor, or customer of the licensee or transferee, or a contractor or subcontractor of a customer, resulting from an activity carried out under the license issued or transferred for death, bodily injury, or property damage or loss resulting from an activity carried out under the license. Claims under this section¹⁴⁵ may be paid “only to the extent the total amount of successful claims related to one launch or re-entry is more than the amount of insurance or demonstration of financial responsibility required under section 70112 (a)(1)(A)...and is not more than \$1,500m (plus additional amounts necessary to reflect inflation occurring after January 1, 1989).” But the Secretary may not pay any part of a claim which results

¹⁴² See NFS clause 1828.307-70.

¹⁴³ See Ch.V s.3.

¹⁴⁴ The previous indemnification provisions which were due to expire on the 31st of December 2004 have been extended by five years by Public Law No: 108-428 (Bill HR 5245).

¹⁴⁵ Claims must be made on notice to the Government: § 70113(1)(b)(1-2).

from wilful misconduct by the licensee or transferee.¹⁴⁶ Payment may be withheld if the Secretary certifies that the amount is not reasonable.¹⁴⁷

Under the French law, liability for damage to third parties, save in the case of ‘faute intentionnelle’ is limited to when all the obligations imposed by the authorisation/licence are fulfilled or at the latest, one year after the date when the obligations should have been fulfilled. After this time, the State is substituted for the operator for damage.¹⁴⁸ Additionally, when an operator must compensate a third party for damage arising from an authorised activity where that operation has been undertaken from French territory, facility or means under French jurisdiction or the territory, facility or means under the jurisdiction of another Member State of the EU, EEA, the operator will benefit from a governmental guarantee save in the case of intentional fault.¹⁴⁹ The compensation available under this guarantee varies in relation to the stage of the space operation and is subject to the Finance Act where in excess of the amounts.¹⁵⁰ The stages covered include damage caused during the launching phase and damage caused on the ground or in airspace after the launching phase. Therefore the guarantee will not apply to damage caused in outer space. The guarantee may extend to cover damage from the launching phase¹⁵¹ to non-third parties if necessary subject to the same conditions.¹⁵²

¹⁴⁶ Where there is an insurance policy exclusion to the extent that insurance required under section 70112 (a)(1)(A) is not available to cover a successful third party liability claim, the Secretary may provide for paying such a claim “without regard to the limitation contained in section 70112 (a)(1).”

¹⁴⁷ § 70113(c). But it must be deemed reasonable by the Secretary where the claim is finally decided by a court of competent jurisdiction

¹⁴⁸ Loi 2008-518, Art.13.

¹⁴⁹ Loi 2008-518, Art.15.

¹⁵⁰ The compensation exceeding the amount in Art.16 for damage caused during the launching phase are set out in Art.16 while damage occurring after the launch phase is prescribed by Art.17.

¹⁵¹ The ‘launching phase’ is defined as “la période de temps qui, dans le cadre d'une opération spatiale, débute à l'instant où les opérations de lancement deviennent irréversibles et qui, sous réserve des dispositions contenues, le cas échéant, dans l'autorisation délivrée en application de la présente loi, s'achève à la séparation du lanceur et de l'objet destiné à être placé dans l'espace extra-atmosphérique.

”

¹⁵² Loi 2008-518, Art.15.

6. The European Space Agency (E.S.A.)¹⁵³

The European Space Agency as a legal entity with separate legal personality may be held accountable for any damage or injuries it causes.¹⁵⁴ It has several insurance coverage schemes in place to cover risks, including third party liability insurance, multi-year launch insurance covering E.S.A. establishments, comprehensive all-risk coverage for the Ariane launcher and specific schemes to cover ESA astronauts.¹⁵⁵ Under the resolution of E.S.A.'s Council on the Agency's Legal Liability, when the Agency performs a launching service, it must "ensure that the beneficiary takes out an insurance policy covering his own and the Agency's liability for any damage that may result from that service"¹⁵⁶. However, the Agency "will remain liable for any damage resulting from gross negligence or a deliberate act or omission on its own part or on the part of persons in-its service"¹⁵⁷ save where the Council unanimously decides to conclude an agreement derogating from the principles within the resolution.

3. Conclusion

Space insurance is mandatory in many States, certainly in the major space-faring nations. The U.S. and French provisions are notable in providing for a guarantee for damage in excess of the mandatory insured sum, although the French law will not guarantee damage in space. Such a system would appear to the advantage of the industry while at the same time ensuring that third parties do not find themselves faced with a defendant unable to meet the costs of the damage caused either through their insurance or other financial responsibility. The denial of the indemnity in the case of wilful misconduct also ensures that parties to launch agreements cannot benefit from their wrongdoing by escaping the full financial impact of their actions.

¹⁵³ See Ch.V.

¹⁵⁴ Resolution of the Council of the European Space Agency on the Agency's Legal Liability (ESA/C/XXII/Res.3, 13 December 1977).

¹⁵⁵ E.S.A., *Annual Report 2003*, (E.S.A. Publications, Noordwijk, 2003). p.104.

¹⁵⁶ Resolution of the Council of the European Space Agency on the Agency's Legal Liability (ESA/C/XXII/Res.3, 13 December 1977) Art. B-II (1).

¹⁵⁷ Ibid.

Such an approach would appear to balance the standard approach of unlimited liability where coupled with ultra-hazardous activities as well as the needs of industry. It is a testament to the willingness of the State to encourage private commercial enterprise, a very strong and concerted movement on the part of the Government within the United States. While such a provision would be beneficial to the space industry of any State, the willingness of other States to expose themselves to additional costs of liability may not be seen to be justified by a need to foster the space industry and thus such measures are unlikely to recommend themselves. It is recommended that the requirement for insurance or guarantee scheme be adopted at an international level. This recommendation is coupled with that of establishing a liability scheme for private space operators, specifically carriers.

CHAPTER V: LIABILITY IN NATIONAL LAW

CHAPTER V: LIABILITY IN NATIONAL LAW	175
1. INTRODUCTION.....	175
2. LIABILITY OF THE STATE.....	177
2.1 Liability of Space Agencies	179
2.2 Liability of Government Contractors	181
2.3 Liability to Non-Nationals injured within State.....	182
2.4 Liability to Private Contractors.....	182
3. LIABILITY TO THE STATE.....	186
4. LIABILITY AND THIRD PARTIES	189
4.1 Trespass and Property Rights.....	189
4.2 Nuisance.....	195
4.3 The Rule in Rylands v Fletcher.....	196
4.4 Negligence	198
4.4.1 <i>Vicarious Liability for Negligence of Servants or Employees</i>	199
5. INTER-PARTY LIABILITY IN CONTRACT AND TORT	200
5.1 Inter-Party Liability under U.S. Federal Law	200
5.2 Waivers between Parties of Unequal Bargaining Power	206
5.2.1 <i>Definition of a 'Space Tourist'</i>	206
5.2.2 <i>The Space Tourist as a Consumer</i>	207
5.3 Waivers, Spaceflight Participants and Licensees/Permittees.....	210
5.3.1 <i>Virginia's Spaceflight Liabilities and Immunities Act 2007</i>	212
5.3.2 <i>Florida's Informed Consent to Spaceflight Act</i>	214
5.3.3 <i>New Mexico's Spaceflight Informed Consent Act</i>	215
5.3.4 <i>Waivers in Irish Law</i>	216
5.3.5 <i>Freedom to Contract and Exclusion Clauses</i>	219
5.3.6 <i>Exclusion Clauses Generally</i>	220
5.3.7 <i>Exclusion Clauses in Non-Standard From Contracts</i>	222
5.3.8 <i>The Sale of Goods and Supply of Services Act 1980</i>	230
6. CONCLUSION.....	233

1. Introduction

This chapter examines the liability in tort, if any, of national agencies and of private companies to injured third parties of the State that is responsible for the supervision of those activities and of other parties that have a degree of involvement in the activity as provided for in the relevant domestic space law regimes. The central distinction to be maintained between the two under current space law regimes is that the former falls under a theory of liability while the latter falls under a theory of

insurance. This is owing to the requirements for waivers under national law. There are several reasons to consider national law in addition to this.

First, civil actions before national courts in relation to space activities are necessary as the current remedies for damage caused by space activities in international law are, of course, limited to remedies that may be taken by a State against another and therefore any actual victim can only expect an *ex gratia* payment by way of compensation at best. No international convention is in place in relation to space transport contracts between private parties as there is in air,¹ maritime² and rail law³ setting down a particular theory of liability to be applied to actions arising out of such contracts, therefore, any injured party must have recourse to such actions as exist purely within national law. However, parties that are involved in bringing to fruition projects envisaged by bilateral or multilateral agreements between State parties may require cross-waivers of liability that filter-down through all the parties, as the IGA does. A direct action against the tortfeasor or other party to the contract under the relevant applicable tort or contract law may be of greater efficacy in obtaining compensation and is the only remedy where injunctions or other equitable measures are sought.

Secondly, international law remedies, in accordance with the recognition of State sovereignty, do not provide any remedies for nationals against their own launching State nor indeed to foreign nationals 'during such time as they are participating in the operation of that space object from the time of its launching or at any stages thereafter until its descent, or during such time as they are in the immediate vicinity of a planned launching or recovery area as the result of an invitation by that launching State'.⁴ In both cases, such parties must bring a civil law action as no other option is open to them.

¹ Convention for the Unification of Certain Rules for International Carriage by Air 1929 and Convention for the Unification of Certain Rules for International Carriage by Air 1999.

² Athens Convention relating to the Carriage of Passengers and their Luggage by Sea 1974 (PAL).

³ Uniform Rules concerning the Contract for International Carriage of Passengers and Luggage by Rail (Appendix to Convention Concerning International Carriage by Rail 1980).

⁴ Article VII of the Liability Convention.

Liability in tort and contract will therefore be examined. This section will examine the liability of parties, including the State, state space agencies and private parties under the law in the US and examine the possibility of adopting a similar approach in EC states. The liability and distribution of risk, arising out of cause in tort as well as in contract, as and between parties to the space activities, whether involving the State as a party or not, will be governed by the exclusion clauses and covenants within the launch service contract. In relation to contract, there is the potential for conflict between the older capitalist freedom to contract and the more modern welfare state approach that places some constraints on the proper exercise of such freedom. While this has not been a significant issue in relation to space activities so far, this is primarily owing to the nature of the parties to the contracts. These have been overwhelmingly legal persons with a significant understanding of the risks involved both financial and legal. However, with the emergence of the space adventure market, space contracts, i.e. contracts for or for the provision of activities related to, in or through space, the parties that are privy to such contracts looks set to grow beyond its pre-existing limitations. Space flight participants, employees, crew, manufacturers and space tourist operators all fall into this category. This gives rise to the potential for a significant imbalance between the parties to the contract that justifies the imposition of existing limitations on the freedom to contract, such as consumer protection laws. The role, validity and propriety of waivers and exclusion clauses in such circumstances is separately assessed and evaluated in relation to parties in an unequal bargaining relationship.

2. Liability of the State

Following from *Byrne v Ireland*,⁵ *Webb v Ireland*⁶ and *Howard v OPW*,⁷ the doctrine that the State cannot be sued in its own courts without its consent is no longer applicable in Ireland. Therefore the State where it causes harm to its own nationals, cannot invoke a doctrine of sovereign immunity to avoid liability. In such circumstances, Ireland will be liable for the tortious consequences of any space

⁵ [1972] I.R. 241.

⁶ [1988] IR 353.

⁷ [1994] 1 I.R. 101.

activities in which it is engaged towards its own nationals. The State will also be liable by reason of agency and vicarious liability for the wrongful acts of its public servants.⁸ However, the royal prerogative is generally found to have survived in other states where the Legislature must specifically exclude the operation of the doctrine through the law.⁹ In the U.S., any act that limits the scope of the doctrine is therefore interpreted restrictively as an exception to the norm.¹⁰ In such cases, the consent given by Congress to depart from the norm must be express, explicit and unambiguous.¹¹ Congress may also impose further conditions to the use of the exception that must be rigidly adhered to.¹² The broadest statutory waiver of sovereign immunity in U.S. law occurs in the Federal Tort Claims Act. The Act applies to the U.S. Government's activities in outer space and offers less protection to their own nationals as victims of space related torts, than to a foreign national who have not participated in the activities to whose State it is absolutely liable under the Liability Convention. Such claims may also arise out of non-Government activity; however, as Bosco noted as far back as 1988:

There is no comparable right of redress against the United States Government for injuries resulting from private activities *given to U.S. citizens*.¹³

This remains the case. This coupled with the FTCA which requires that the liability of the Government be interpreted as equal to that of a private individual in the same circumstances¹⁴ confers upon the Government of the U.S. benefits that are in fact beyond the scope of those enjoyed by private actors in the space industry. While the FTCA does not apply the traditional sovereign immunity doctrine that was rejected

⁸ *Byrne v Ireland* [1972] I.R. 241.

⁹ See Bosco, Joseph A., "The United States Government as a Defendant – One Example of the Need for a Uniform Liability Regime to Govern Outer Space and Space-Related Activities," (1987-1988) 15 *Pepperdine L Rev.* 581, at p.581.

¹⁰ *Dahelite v U.S.* 346 U.S. 15 (1952) at p.30

¹¹ *Malman v. U.S.* 207 F. 2d 897 (2nd Cir. 1953), at 898.

¹² *United States v Alberty* 63 F.2d 965 (10th Cir. 1933).

¹³ See Bosco, *supra*, (1988) 15 *Pepp L Rev* at p.592 (emphasis author's own).

¹⁴ *Eastern Airlines v. Union Trust Co.* 221 F. 2d 62; (DC Cir. 1955) *rev'd sub nom United States v. Union Trust Co.* 350 U.S.907 (1952).

in *Byrne*, thus rendering the US “liable for injuries caused by the negligent or wrongful act or omission of any federal employee acting within the scope of employment, in accordance with the law of the state where the act or omission occurred.”¹⁵ This is only a general rule; three primary exceptions exist, which have a significant bearing on those involved in space activities. The first major exception to the FTCA was carved out in *Feres v US*.¹⁶ where it was held that the “Government is not liable under [FTCA] for injuries to servicemen where the injuries arise out of or are in the course of activity incident to the service.” This was specifically applied to relieve the US of liability in a suit by the widow of the pilot of Challenger where the pilot was in the military and was detailed to NASA as part of a military programme.¹⁷ Second, under the discretionary function exception, the US is not liable for acts or omissions of its employees that involve policy decisions. This is clearly applicable to NASA which has been conferred with the power to make policy decisions with regard to space. Third is the intentional tort exception which precludes recovery for same against the US unless committed by federal law enforcement or investigative officials.

2.1 Liability of Space Agencies

In some cases, decisions regarding space policy are made directly by a department of Government. For example, the decisions regarding space policy are taken by the Department of Enterprise, Trade and Employment in Ireland. In other jurisdictions, a separate entity may be established by legislative act which conducts the State’s public space activities and engages in procurement processes for launching for private operators, such as NASA. In addition, there may be an intergovernmental organisation which also exposes the State to liability. Such organisations may be directly liable under the *corpus iuris* for their activities where they have agreed to be bound by the obligations in those agreements and may be liable under general

¹⁵ Murnane Andrew W. and Inkelas, Daniel, *Liability Issues Associated with the Space Shuttle Columbia Disaster*, (CRS Report for Congress RS21426, 2003) available at <<http://www.fas.org/spp/civil/crs/RS21426.pdf>>(last visited 1st October 2009), p.2.

¹⁶ 340 U.S. 135, 146 (1950).

¹⁷ *Smith v. Morton Thiokol, Inc.* 712 F.Supp. 893 (M.D. Fla. 1988), *aff’d*, 877 F.2d 40 (11th Cir. 1989).

principles of international law. The Member States of such an organisation will remain liable for injury, loss or damage to third party States which is examined in Chapter V. As to state space agencies or organisations, their capacity to sue or be sued and their potential exposure to liability is dependant upon the particular statutory instrument upon which their existence is founded. Where they have separate legal personality,¹⁸ they may be sued under national law for damage or loss to nationals of the founding state unless the instrument otherwise precludes this. However, even where possessed of separate legal personality, they may still render the State liable under general principles of international law where they are acting on behalf of the State.

For example, NASA was established under the National Aeronautics and Space Administration Act of 1958¹⁹ with the purpose of *inter alia* planning, directing and conducting aeronautical and space activities.²⁰ The Act as amended provides for NASA “to consider, ascertain, adjust, determine, settle, and pay, on behalf of the United States, in full satisfaction thereof, any claim for \$25,000²¹ or less against the United States for bodily injury, death, or damage to or loss of real or personal property resulting from the conduct of the Administration's functions” where such claim is presented to the Administration in writing within two years after the accident or incident out of which the claim arises. Furthermore, if the Administration considers that a claim in excess of \$25,000 is meritorious and would otherwise be covered by this paragraph, to report the facts and circumstances thereof to the

¹⁸ *Solomon v Solomon* [1897] A.C. 22.

¹⁹ For the preceding developments see generally, Hansen, James R., *Engineer in Charge: A History of Langley Aeronautical Laboratory 1917-1958* (Scientific and Technical Information Office, Washington D.C., 1987). On the history of the NASA Act, see generally Logsdon, John M. (mod), *The Legislative Origins of the NASA Act of 1958, Proceedings of an Oral History Workshop, April 3rd 1982* (NASA, Washington D.C., 1998).

²⁰ Section 203(a)(1) of the NASA Act 1958.

²¹ National Aeronautics and Space Administration Authorization Act, 1980 Public Law 96-48, August 8, 1979 by section 6(a), (93 Stat. 348) substituted ‘\$25,000’ for ‘\$5,000’.

Congress for its consideration. NASA settled claims arising from damage caused by the debris from the *Columbia* shuttle disaster.²²

With regard to liability arising from NASA's employees as against the State, it is clear that those on detail to NASA from the US military are precluded from taking an action arising from activity incident to that service under the *Feres* exception. This was specifically demonstrated in *Smith v Morton Thiokol* where the Government was relieved of liability in a suit by the widow of the pilot of Challenger. The pilot was in the military and was detailed to NASA as part of a military programme at the time of the incident.²³ In relation to civilian employees, the Federal Employer's Compensation Act (FECA)²⁴ precludes actions by federal employees against the US for injuries arising out of work and recovery is limited to a schedule in the Act setting out the applicable amounts of compensation.²⁵ Employees therefore must obtain private insurance to guard against the actualisation risk in order to secure further financial security in the event of death or injury. In contrast, in Ireland where there is no state space agency and no equivalent to the FCTA or FECA, the state may incur liability directly from its employees, even when engaged in military service.

2.2 Liability of Government Contractors

In relation to the liability of private contractors who were contracted to provide components for NASA and therefore to the US, actions against such contractors are precluded by virtue of the defence recognised in *Boyle v. United Technologies Corporation*.²⁶ Under this defence a contractor which is sued for damages may escape liability where it can show that the product that caused the harm was manufactured to a government contract and the design to specifications. This is analogous to the European exception to products liability which excludes liability

²² See Murnane Andrew W. and Inkelas, Daniel, *Liability Issues Associated with the Space Shuttle Columbia Disaster* (CRS Report for Congress RS21426, 2003) available at <<http://www.fas.org/spp/civil/crs/RS21426.pdf>> (last visited 1st October 2009), p.1.

²³ 712 F.Supp. 893 (M.D. Fla. 1988), *aff'd*, 877 F.2d 40 (11th Cir.1989).

²⁴ 5 U.S.C. §§ 8101, 8116(c).

²⁵ 5 U.S.C. § 8133.

²⁶ 487 U.S. 500 (1988).

where the alleged defect arises due to statutory compliance. Settlements were reached with the families of those who died in the *Challenger* disaster although they were reached before *Boyle*.²⁷

2.3 Liability to Non-Nationals injured within State

States of third parties injured on the surface of earth (whether on land, territorial waters or vessel flying its flag on the High seas) or on an aircraft in flight that are not launching states involved in the space activity giving rise to the liability may exercise diplomatic protection in favour of such individuals and may make a claim under international law, as examined in Ch.VII. The launching state will be liable strictly in such circumstances. Other States may only take such actions on behalf of another State's nationals where the launching state's activities have breached an *erga omnes* obligation following *Barcelona Traction*.²⁸ Nationals of launching States will have their claims met by municipal law as will non-nationals that participate in the activity.

2.4 Liability to Private Contractors

The liability of the State to private contractors is delimited by waiver law.²⁹ Waivers “may refer to the forbearance from exercising a right or to an abandonment of a right”.³⁰ Waivers and cross waivers of liability by contract are common in space activities as and between parties and may be mandatory in some states. Such covenants may require filter-down provisions that require the execution of the

²⁷ Murnane and Inkelas, *supra*, CRS-3.

²⁸ *Barcelona Traction, Light and Power Co. Ltd. (Belgium v Spain)* [1970] ICJ Rep. 32. See Tams, Christian, *Enforcing Obligations Erga Omnes in International Law* (CUP, 2005), pp.162-163.

²⁹ On waivers generally, see Wilken and Villiers, *The Law of Waivers, Variation and Estoppel* (OUP, 2002).

³⁰ *Motor Oil Hellas (Corinth) Refineries SA v Shipping Corporation of India (The Kanchenjunga)* [19990] 1 Lloyd's L. Rep. 391, *per Goff J.* at p. 397.

covenant between contractors and their subcontractors among themselves.³¹ The justification for the inclusion of such clauses rests primarily in policy considerations. Hosenball suggests that there was a concern that insurance industry would be unable to underwrite the huge risk potential.³² Such covenants also were believed to encourage the participation of smaller entities that would not have to face crippling premiums to cover damage to other participators' space technology. Such covenants also simplified risk allocation between all involved parties. It was intended "to provide broad protection and thus to encourage free enterprise."³³ Some of the justifications fit less well within the current space industry with its wholly private going concerns, with individual persons involved as parties and where the insurance industry has proved itself capable of underwriting such risks.

The Intergovernmental Agreement governing the International Space Station contains broad cross-waiver provisions "in the interest of encouraging participation in the exploration, exploitation, and use of outer space through the Space Station" between contractors and subcontractors,³⁴ though this is not without exceptions. Such as claims arising between a Partner and its own related entities which will be covered by contracts or sub-contracts that will not implicate the other international Partners as well as claims for damages caused by willful misconduct, claims made by a person for bodily injury or death, and intellectual property claims. In relation to damage caused by the ISS or component part arising from individuals' involvement in ISS co-operation, it is only the Partner States that will bear liability. As Farand observes, Art.17 which imposes an obligation to consult on Partner States on

³¹ See for example, NASA, Agreement between the USA represented by the NASA and _____ for Launch and Associated Services, Art.V(3).

³² Hosenball, *supra*, at 122.

³³ Brown, *supra*, at 431.

³⁴ Article 16 of the Agreement among the Government of Canada, the Governments of Member States of the European Space Agency, the Government of Japan, the Government of the Russian Federation and the Government of the United States of America concerning Cooperation on the Civil International Space Station. See Farand, A., Jurisdiction and Liability Issues in Carrying Out Commercial Activities," in Von Der Dunk, Frans and Brus, M.M.T.A. (ed), *The International Space Station: Commercial Utilization from a European Legal Perspective* (Martinus Nijhoff Publishers, Leiden, 2006), p.87, at p.92.

possible defences in the event of a claim “should have no impact whatsoever on the individual participants”.³⁵ ESA has stated that:

In practice, Space Station users will be asked to agree to an interparty waiver of liability as part of their contract with the European Space Agency, stating that each party will not bring claims in arbitration or sue the other party as a result of International Space Station activities. The applicable law for disputes and the detailed procedures in case of arbitration will be decided mutually by the Space Station users and European Space Agency. The contract will specify the country where the Arbitration Tribunal shall sit, normally in the country where the user has his legal seat.³⁶

Partner States are required to implement cross-waivers between themselves and their own subcontractors as the US did in the Cross-Waiver of Liability for Space Station Activities Act³⁷ which extended the scope of these cross-waivers to contractors and subcontractors as related entities of NASA including liability arising under the Liability Convention, though this does not affect the liability of the States internationally to third States. Under the Act, the Contractor agrees to a cross-waiver of liability pursuant to which it waives all claims against any Partner State other than the United States, a related entity of any Partner State³⁸ other than the United States; and the employees of any partner state (which includes the cooperating agency of a partner state, e.g. ESA) or a related entity (other than the US and its related entities) based on damage arising out of Protected Space Operations.³⁹ The waiver applies

³⁵ *Ibid*, p.93. See Art.17 of the IGA.

³⁶ ESA, “International Space Station Legal Framework,” *Human Space Flight* Issue 2 available at <http://www.esa.int/esaHS/ESAH7O0VMOC_iss_2.html> (last updated October 24th, 2008)

³⁷ Passed in 1994 in accordance with the original IGA of 1988.

³⁸ This is defined as “(i) A Partner State's Contractors or subcontractors at any tier; (ii) A Partner State's users or customers at any tier; or (iii) A Contractor or subcontractor of a Partner State's user or customer at any tier.”

³⁹ Defined as “all launch vehicle activities, Space Station activities, and payload activities on Earth, in outer space, or in transit between Earth and outer space performed in furtherance of the Intergovernmental Agreement or performed under this contract. “Protected Space Operations” also

only if the person, entity, or property causing the damage is involved in protected space operations and the person, entity, or property damaged is damaged by virtue of such involvement. It applies to any claims for damage, whatever the legal basis for such claims, including but not limited to delict and tort (including negligence of every degree and kind) and contract. The contractor agrees to extend the waiver of such liability to subcontractors at any tier by requiring them, by contract or otherwise, to agree to waive all claims against States, a related entity of any Partner State other than the United States; and the employees of any partner state or a related entity.

Waivers are also mandatory under the U.S. under the Commercial Space Launch Activities Act 1984 in s.70112(b).⁴⁰ The Secretary of Transportation must make a reciprocal waiver with the licensee or transferee, contractors, subcontractors, and customers of the licensee or transferee, and contractors and subcontractors of the customers, involved in launch or re-entry services under s.70112(b)(2) for the Government, executive agencies of the Government involved in launch services or re-entry services, and contractors and subcontractors involved in launch services or re-entry services. Under this waiver, each party thereto agrees to be responsible for property damage or loss it sustains, or for personal injury to, death of, or property damage or loss sustained by its own employees resulting from an activity carried out under the applicable licence.

The launch, re-entry and/or operation of a space object and a launch or re-entry site is licensed by the Federal Aviation Administration under authority granted to the Secretary for Transportation under the 1984 Act and subsequently delegated to it,

includes all activities related to evolution of the Space Station as provided for in Article 14 of the Intergovernmental Agreement. "Protected Space Operations" excludes activities on Earth which are conducted on return from the Space Station to develop further a payload's product or process except when such development is for Space Station-related activities in implementation of the Intergovernmental Agreement or in performance of this contract. It includes, but is not limited to:

- (i) Research, design, development, test, manufacture, assembly, integration, operation, or use of launch or transfer vehicles, payloads, related support equipment, and facilities and services;
- (ii) All activities related to ground support, test, training, simulation, or guidance and control equipment, and related facilities or services.

⁴⁰ 49 USC Subtitle IX Chapter 701.

however the Associate Administrator for Commercial Space Transportation is the licensing authority. In tandem with the reciprocal waiver requirements are mandatory insurance requirements. The licensee or transferee of the licence must obtain liability insurance or demonstrate financial responsibility in amounts to compensate for the maximum probable loss from claims by a third party for death, bodily injury, or property damage or loss resulting from an activity carried out under the licence and the United States Government against a person for damage or loss to Government property resulting from an activity carried out under the licence. Section 70112(a)(3) caps the total amount of claims relating to the launch or the re-entry for which the licensee or transferee must demonstrate financial responsibility or against which he/she must insure.

3. Liability to the State

Liability to the State is in part regulated by the waivers detailed above. It is further regulated through indemnity provisions and principles of restitution. Indemnification covers two separate situations. The first is where the Government offers to indemnify claims above or outside the scope of liability which must be insured against.⁴¹ The second aspect covers the scope that operators may be required to indemnify the State for its exposure to liability under international law and is considered here as it comes within the scope of the potential liability of operators under national law.

In relation to indemnities by operators, the UK's Outer Space Act provides for the licensee to indemnify the U.K. Government against any claims brought against it in respect of damage or loss arising out of activities carried on by him to which the Act applies. A similar approach is adopted under s.6 of the Swedish Space Activities Act.⁴² Under the Australian Space Activities Act, if a foreign country has presented

⁴¹ See Ch.IV, s.5.

⁴² Section 6 of the Act provides: "If the Swedish State on account of undertakings in international agreements has been liable for damage which has come about as a result of space activities carried on by persons other than the Swedish State, the persons who have carried on the space activity shall reimburse the State what has been disbursed on account of the above-mentioned undertakings, unless special reasons tell against this." See Reifarth, J., "Nationale Weltraum Gesetze in Europa," (1987)36 *Zeitschrift für Luft und Weltraumrecht* 11.

a claim against Australia for compensation for damage in accordance with the Liability Convention or otherwise under international law and Australia becomes liable to any extent to pay compensation, the responsible party for the relevant launch or return is liable to pay the Commonwealth an amount equal to the lesser of either the amount of that compensation or the insured amount for the permit or certificate where applicable. The UK, Swedish and Australian systems have the potential to shift the entire burden on to the operator. In the Republic of Korea, where the Korean government has paid compensation for damage to a foreign State, it may present a claim for indemnification to the launching party.⁴³ However, the application of this indemnity may be limited under Art.3(2). The Belgian law examines the liability of operators to indemnify the State incrementally. Under Art.15(1) of the Belgian law, when Belgium is liable, pursuant under national or international law for reparation, it has “the right to institute a counterclaim against the operator(s)”.⁴⁴ Where the damage is caused to a third party State or foreign nationals, the damage is to be assessed between the Belgian State and the State representing the victim, in accordance with the Convention on International Space Liability or any other clause that may apply. The operator, or the person designated by the latter for that purpose, may participate in the discussions or be a party to the damage assessment procedures between the representatives of the States involved, so as to defend his own interests. Where the damage is caused to Belgian nationals, the damage is to be assessed by three experts, two of whom are to be designated by each of the parties and the third by mutual agreement. This latter amount may be limited by the King unless the operator failed to comply with the conditions attaching to his authorisation. Unlike the UK or Swedish Acts, the Belgian Act allows the State to claim provisionally from the operator pending the definitive payment with the balance due as soon as the State itself pays out.⁴⁵ The availability of recourse against

⁴³ Art. 3(1) of the Space Liability Act 2007.

⁴⁴ The operator for these purposes is the “person that carries out or undertakes to carry out the activities referred to in this law, by ensuring, alone or jointly, the effective control of the space object. The activity carried out by an operator may be carried out pursuant to a specific contract for that purpose”.

⁴⁵ Art.15(4) of the Law on the Activities of Launching, Flight Operations or Guidance of Space Objects 2005.

another State will also not preclude Belgium from seeking an indemnity from the operator.⁴⁶

However, while the additional transitional provisions regarding recovery are an advantage, it is submitted that the qualified right of indemnity evidence in the Netherlands and France is the preferred approach as it ensures that the tax payer does not bear the entire cost but still provides certainty for operators. Under the Dutch Rules, as noted above, the State may also seek redress for its exposure to liability under VII of the Outer Space Treaty or the Liability Convention from the licence-holder or the licence-holder's insurer, but only to the amount for which the rules required cover.⁴⁷ Under Art.14 of the French law of 2008, the State may present a claim for indemnification against the operator where France was held internationally liable for the damage "to the extent that the Government has not already benefited from the insurance or financial guarantees of the operator up to the amount of the compensation." However, if the damage arose as a result of an authorised operation the claim for indemnification is subject to limitations prescribed in the Finance Act. These limitations vary in relation to the stage of the space operation and will not apply where there is intentional fault. However, the French Government will not present a claim for indemnification where the damage arose as a part of an authorised operation and result from acts in state interests.⁴⁸

General restitutionary principles may also avail the State where it is exposed to liability internationally as a result of its nationals' activities in the absence of explicit agreement as to the distribution of risk between the parties. So even in the absence of an agreement, such as in the case of a legal or natural person rendering their State liable as a launching state where the particular launch was not from the State's territory/facility, that State would be able to recover the sums paid out to a third party state from their own nationals before the national courts.

⁴⁶ *Ibid*, Art.15(7).

⁴⁷ Rules Concerning Space Activities and the Establishment of a Registry of Space Objects 1969, s.12.

⁴⁸ Art.14 of the Loi 2008-518.

4. Liability and Third Parties

Liability with regard to third parties refers to the position where one party or several joined parties have engaged in a space activity with resulting damage to a third party who has no marketplace relationship with the tortfeasor/s. The relevant national law may prescribe the liability system applicable to damage caused within the jurisdiction by space objects launched by nationals, usually strict liability; this has been detailed previously.⁴⁹ However, in the absence of such a national law, for example, as arises in Ireland, the primary actions to third parties on earth from space activities that have caused them injury or loss or violated their rights are grounded in the law of torts.⁵⁰ Those that are specifically property-related are of the most interest: trespass, nuisance and arising under the rule in *Rylands v Fletcher*. Vicarious liability will render an employer liable for the acts of its employees carried out in the course of their employment.⁵¹ While tort law provides one means of vindicating property rights, direct recovery where horizontal rights protection is available within a system may also avail a plaintiff. The right to property/unlawful taking and the right to peaceable enjoyment are considered with the tort of trespass below as the two are linked together. Equally, tort law will serve to protect and vindicate the interests of those engaged in space activities as against third parties, such as trespassers on private space facilities and also in relation to intellectual property, for instance conversion or passing off. Statutory protection of intellectual property may also be availed of where it arises.⁵² Negligence may also be relied upon in the case of bilateral accidents between strangers in outer space.

4.1 Trespass and Property Rights

⁴⁹ See Ch.III, s.4.

⁵⁰ See Martin, "Legal Ramifications of the Uncontrolled Return of Space Objects to Earth," (1980) 45 *J. Air & Sp. L.* 457 and Bender, James, *Space Transport Liability: National and International Aspects* (Martinus Nijhoff, London, 1995), pp.129 *et seq.*

⁵¹ See for example *Alaskan Village v. Smalley*, 706 P2d 945 (Alaskan Supreme Court) and statute HB 214 (Alaska).

⁵² Considered in Ch.II, s.2.2.

There are two particular aspects of trespass that fall to be considered, first whether space activities may give rise to a trespass of the airspace of a landowner and secondly, the possibility of raising trespass where space debris enters/ lands upon/crashes to a landowner's property. On the first aspect, the original common law position of *cuius est solum, eius est usque ad caelum et ad inferos*, ('whosoever has the soil, also owns to the heavens above and to the hells beneath'),⁵³ with the emergence of the aviation industry, was rightly rejected as having 'no place in the modern world'.⁵⁴ As observed by Seare *et al.*:

The principle derived undoubtedly from a circumstance, or, rather from the absence of a circumstance, the possibility of the utilization of space.⁵⁵

Thus there is no claim arising in trespass solely arising from the presence of a space object in orbit. However, as the landowner is not devoid of any interest in the superadjacent airspace above his or her land, it is possible that a violation can arise as a result of certain space activities, such as spaceflight. Activities that arise in outer space would clearly fall outside the scope as they are beyond the state's own territory, but the *Causby* approach may apply to those related space activities that in fact occur in air space (though through the application of the functionalist theory are subject to the law of outer space). The position with regard to the in-air activities of aircraft sheds some light on the potential for such a claim with regard to airspace. In the leading case of *United States v Causby*,⁵⁶ the U.S. Supreme Court assessed the balance to be struck between the government's interest in the free use of airspace for

⁵³ As first applied in *Bury v Pope* Cro. Eliz 18, 78 Eng Rep. 375 (Ex. 1587). See Blackstone's *Commentaries on the Laws of England*, Ch.2., at 19; Cahoon "Law Altitude Airspace: A Property Rights No-Man's Land", (1990) *J Air Law & Com* 157 at 161. But see *People of Colorado v Emmert* 597 P.2d 1025 (1979) and *Bernstein of Lea v Skyview* [1978] 1 QB 479. On the origin of the maxim see Klein, *Cujus Est Ejus Est... Quousque Tandem?* (1959) 26 *J. Air Law & Commerce* 237 and Wright, Robert R., *The Law of Airspace* (Bobbs-Merill Co. Inc., New York, 1968), ch.2, pp.11-30.

⁵⁴ *U.S. v Causby* 328 US 256 (1946), at p.260.

⁵⁵ Seare, Modeste; Trans, Vásquez and Malley, Elaine, *Cosmic International Law* (Wayne State University Press, 1965), p.28.

⁵⁶ (1946) 328 US 256. See also *Griggs v. Allegheny County* 369 US 84 (1962); *Matson v. US* 171 F. Supp 283 (Ct. Cl. 1954); *Aaron v. US* 311 F. 2d 798 (Ct Cl 1963); *A.J. Hodges Indus. Inc. v. US* 355 F.2d 592 (Ct Cl 1966); *Lacey v. US* 595 F 2d 614 (Ct. Cl 1979).

the passage of aircraft and the landowner's interest in the use and enjoyment of his or her property and in doing so concluded that a landowner has a reasonable, although not absolute, interest in his/her superadjacent airspace.⁵⁷

The noise of heavy bombers and small fighter planes from a nearby military airbase overflying the plaintiff's property had caused the plaintiff's chickens to panic and fly into the wall of their coops. At the time of the action, the plaintiff had lost approximately 150 chickens and the land could no longer be used for chicken farming. The Court also found that the owner's rest at night had been disturbed. The plaintiff claimed that the overflights amounted to the taking of an easement under the Fifth Amendment. The Court rejected outright the application of the *usque ad coelum* rule as it held that navigable airspace had been placed in the public domain by Congress. Private claims to airspace would seriously interfere with control and development of air routes. The guide, for determining where the limit of that public domain lay, was the minimum altitude for safe flight.⁵⁸ However, the Government conceded that where overflights rendered property uninhabitable, a taking would have occurred. In any case, the overflights in the case had been below the minimum safety level. The Court held:

⁵⁷ Id at 264.

⁵⁸ This was set at 500 feet at the time. Subsequently, the Federal Aviation Act 1958 expanded the limits of navigable airspace to flights below the 500 feet level where necessary for take off and landing and this was subsequently examined in *Griggs* where the Court held that 'the path of the glide or flight for landing or taking off' was not the downward reach of the 'navigable airspace'. The limit remained the minimum altitude of safe flight as had been included in Congress' definition of airspace. It was originally construed as a bright line rule: *Aaron v. US* 311 F.2d 798 (Ct. Cl. 3) at p.801. But in *Branning v. US* 654 F. 2d 88 (Ct Cl 1981), the Court held that flights over 500 feet (independent of landing or taking off) could constitute a taking where "peculiarly burdensome". See also *Argent v. US* 127 F 3d 1277 (Fed Cir 1997). See King, "The Fifth Amendment Takings Implications of Air Force Aircraft Overflights and the Air Installation Compatible Use Programme" (1997) 43 *Air Force Law Rev* 197 at p.201-204. In Ireland, Rule 3 General Flight Rules in the Irish Aviation Authority (Rules of the Air) Order 2001 which provides that aircraft are not to be flown at altitudes of less than 450m/1,500feet above ground or water and not less than 300m/1000feet above the highest obstacle within a 600m radius of the aircraft over congested areas, towns or cities.

Flights over private land are not a taking unless they are so low and so frequent as to be a direct and immediate interference⁵⁹ with the enjoyment and use of land.⁶⁰

It accepted that low overflights amounting to continuous invasions of the superadjacent airspace could affect the use of the surface. The character of this invasion and not the amount of the resulting damage, providing the damage was substantial, was the definitive factor in determining whether a taking had occurred. Here, the plaintiff had shown a diminution in the value of his property caused by the overflights. This constituted a servitude that amounted to the taking of an easement. The comment of the Court above and its subsequent comments in *Griggs v Allegheny County*⁶¹ have been interpreted as setting out the four requirements to determine whether an overflight taking has occurred, viz:

1. a flight directly over the claimant's land;
2. flights which were low and frequent;
3. the flights directly and immediately interfered with the claimant's use and enjoyment of land and
4. the interference with the use and enjoyment of land was substantial.⁶²

Thus two overflights a day was insufficient.⁶³ The claimant must still show a compensable property right under the Fifth Amendment.⁶⁴ The acceptance of the minimum altitude of safe flight as the basic linear determinant for demonstrating an invasion is admittedly only one method of delineating the public domain of navigable airspace from private airspace. An exception to the minimum safe level of

⁵⁹ See *Speir v. US* 485 F.2d 643 (1973) and *Adaman Mutual Water Co. et al. v. United States* (1958) (U.S. Ct. Claims; 143 Ct.Cl. 921, 181 F.Supp. 658).

⁶⁰ *United States v. Causby* (1946) 328 US 256, p.264.

⁶¹ 369 US 84 (1962).

⁶² See King, *supra*, p. 206. See *Brown v. US* 73 F.3d 1100 (Fed. Cir 1996); *Alevizos v. Metropolitan Airports Commission* [Alevizos I], Minn. 1974 298 Minn. 471, 216 N.W.2d 651 and *Jensen v. US* 305 F. 2d 444 (Ct. Cl. 1962) (700 flights per day was sufficient).

⁶³ *Aaron v. US* 311 F.2d 798 (Ct. Cl. 3).

⁶⁴ *M&J Coal Co. v United States* 30 Fed Cl. 360 (1994).

flight threshold carved out in *Thornburg v. Port of Portland*⁶⁵ and *Martin v. Port of Seattle*⁶⁶ addresses this. In those cases, the Supreme Courts of Oregon and Washington respectively found that where the flights interfered with the practical enjoyment of land and where there is a diminution of the property value, an action by a property owner for compensation against the government entity responsible could succeed, even where the flight took place over the threshold.⁶⁷ Applied to space activities, it is clear that any *Causby* based claims would be quite circumscribed by the four *Griggs* parameters. VTOVL crafts such as that developed by Armadillo Aerospace, would mean that claims would not meet the first limb.⁶⁸ Furthermore, the ‘low and frequent’ excludes taking off and landing under the safety threshold and applied analogically to airspace excludes launching and landing, including horizontal landing. The issue is confined to actual flight. This may need to be modified for space objects as, save for when in orbit, their time in airspace may be categorised as launching, descent or landing. The last two elements of the test pose less difficulty and may be met by pointing to noise or vibration causing material damage to a property by the space vehicle. It provides an alternate route to an argument grounded in nuisance.

A separate rights-based argument to recover damage arising from noise and vibration from space activities (including the activities of space ports, such as vehicle testing) may be also made on the ground that there has been a violation of the right to the peaceable enjoyment of property⁶⁹. Such an approach overcomes some of the difficulties of posed by the *Griggs* criteria. There is no requirement for overflight. Noise and vibration from a space port or other launch site may be adjacent or abut a plaintiff’s land. It may be possible to try and argue where injury had resulted from

⁶⁵ 233 Or 178 (SCt Or, 1962).

⁶⁶ 64 Wash. 2d 309 (SCt WA, 1964). See also *Jackson v. Metropolitan Knoxville Airport Authority*, Tenn., 1996 922 S.W.2d 860.

⁶⁷ See Soenksen, M.J., “Airports: Full of Sound and Fury and Conflicting Legal Views”, (1982) 12 *Transportation Law Journal* 325 at p.335.

⁶⁸ See by analogy *Batten v. US* 306 F. 2d 580 (10th Cir, 1962); *Freeman v. US* 167 F Supp 541 (WD Oka 1958); *Pope v. US* 173 F Supp 36 (ND Tex 1959).

⁶⁹ For example: *Hero Lands Company v. United States* (1983) (US Ct. Claims, 554 F. Supp. 1262). See also *Powell and Raynor v United Kingdom* (1990) 12 EHRR 345.

the noise and vibration of space activities, and causation could be shown, that the state or facility operator had violated the plaintiff's right to bodily integrity.⁷⁰ But as no personal right is unlimited such a claim may be faced with weighty countervailing considerations such as the common good.⁷¹ Nor is it likely that an injunction would be granted even where the evidentiary difficulties for the demonstrated proofs are surmounted.⁷² However, compensation for a taking may be made.

On the second issue of recovery for trespass to land, this may arise where an object or debris lands/crashes onto property. As Blackstone states in his *Commentaries*: "whenever an act is directly and immediately injurious to the person or property of another, and therefore necessarily accompanied with some force, an action in trespass *vi et armis* will lie". Recovery is permitted in such circumstances as "every individual is entitled to the undisturbed possession and lawful enjoyment of his own property".⁷³ Strict liability will apply. However, it is subject to the exception as outlined by Earl J.:

Most of the rights of property as well as of person, in the social state, are not absolute but relative, and they must be so arranged and modified, not unnecessarily infringing upon natural rights as upon the whole to promote the general welfare.⁷⁴

Such policy arguments may be of greater use where injunctive relief rather than compensatory damages are sought.

⁷⁰ *Ryan v. AG* [1965] IR 294, *Mc Gee v. Ireland* [1973] IESC 2; [1974] IR 284.

⁷¹ For instance, Article 40.3.1° of the Irish Constitution requires the State to defend and vindicate the personal rights of the citizen but this is only 'as far as practicable'. Further, Article 43.2.21° permits the State to "delimit by law the exercise of [property rights] with a view to reconciling their exercise with the exigencies of the common good". See *Buckley v AG* [1950] IR 67; *Murray v. Ireland* [1991] ILRM 466.

⁷² *Brooke v. Patterson* 159 Fla 263 (1947); *Loma Portal Civil Club v. American Airlines Inc.* 61 Cal. 2d 582; 394 P. 2d 548 (1964) and *Virginians for Dulles v. Volpe* 344 F. Supp. 573 (ED Va. 1974). But see the exception in *Anderson v. Souza* (1952) 38 Cal.2d 825, 243 P.2d 497.

⁷³ *Hay v The Cohoes Company* 2 N.Y. 159 (1849) per Gardner J.

⁷⁴ *Losee v Buchanan* (1873) 51 NY 476.

4.2 Nuisance

Nuisance contemplates “an unreasonable interference with, disturbance of, or annoyance to another person in the exercise of his rights”.⁷⁵ The test is “whether the interference is beyond what an objectively reasonable person should have to put up with in the circumstances of the case”.⁷⁶ The law is flexible in Ireland regarding the interest in land that a plaintiff in nuisance may hold; an occupier can succeed.⁷⁷ Damage must be shown and must be reasonably foreseeable. The creators of the nuisance are liable to be sued as well as those who have permitted its continuance; in this regard both the operators of a spaceport as well as commercial spaceflight entities may be held accountable. While single instances may amount to a nuisance, it is difficult to show this to be unreasonable; a series of incidences over a period of time is more commonly pleaded. While actual damage caused to property will give the plaintiff a much stronger chance of winning, where no such damage has occurred, such as in relation to noise, dust clouds, vibrations etc,⁷⁸ a balancing test will be used that takes account of the duration and extent of the nuisance and the character of the locality.⁷⁹ In this regard, permits for space port activity, although they will not provide a defence *per se*, they will clearly show a change in the character of the area to one that engages in commercial spaceflight and this may help to defeat a nuisance claim.⁸⁰ Secondly, the defence of statutory authority may be available to a particular

⁷⁵ *Connolly v South of Ireland Asphalt Co* [1977] I.R. 99, per O’Higgins CJ.

⁷⁶ *Halpin and Others v. Tara Mines Limited*, Unreported, High Court, 16th February 1976; *Sheeran v. Meehan*, Unreported, High Court, 6th February 2003.

⁷⁷ *Hanrahan v. Merck Sharp and Dohme (Ireland) Ltd.* [1988] IESC 1; [1988] I.L.R.M. 629 (5th July, 1988); *Molumby v. Kearns* [1999] IEHC 86 (19th January, 1999). Contrast the English position in *Hunter v Canary Wharf Ltd* [1997] AC 655; [1997] 2 All ER 426.

⁷⁸ No comparison has been drawn to aircraft sourced nuisance as such nuisance actions are severely circumscribed by s.55 of the Air Navigation and Transport Act 1988 (Ireland) and s.76 of the Civil Aviation Act 1982 (UK). See generally O’Brien, Z.N., “Civil Subsonic Jet Aeroplane Noise: It’s Impact, Regulation and Remedies,” (2006) *I.S.L.R.* 156.

⁷⁹ *O’Kane v Campbell* [1985] IR 115; *Molumby v. Kearns* [1999] IEHC 86.

⁸⁰ *Gillingham Borough Council v. Medway (Chatham) Dock Co. Ltd* [1993] QB 343; *Wheeler v. JJ Saunders Ltd* [1996] Ch.19. See Kimber, Cliona, “Civil Liability for Environmental Damage,” Paper for the Irish Environmental Law Association Meeting, 29th January 2002.

defendant where the construction or operation of the spaceport is provided for by legislative act⁸¹ although the defendant must show that it carried out its required functions without negligence.⁸²

4.3 The Rule in *Rylands v Fletcher*

The rule as formulated by Blackburn J. is “that the person who, for his own purposes, brings on his land and collects and keeps there anything likely to do mischief if it escapes, must keep it in at his peril; and if he does not do so, is *primâ facie* answerable for all the damage which is the natural consequence of its escape.”⁸³ The tort has since undergone significant reform in several common law jurisdictions and has been considered variously as a subset of nuisance⁸⁴ and a species of negligence.⁸⁵ The common factor is however the application of strict liability. In Ireland, strict liability applies though the tort is still distinct from both nuisance and negligence and the same is the case in Australia although it is under the subset of negligence. The non-binding persuasive s.520 of the Second Restatement of Torts applies the same theory for ultra-hazardous activities.⁸⁶ The remaining dominant elements of the tort require some kind of an accumulation on another’s land that amounts to an unusual and dangerous activity on land,⁸⁷ an escape⁸⁸ of the accumulation with foreseeable⁸⁹ harm as the result. The second element of non-natural user would at a first glance

⁸¹ *Allen v. Gulf Oil Refinery* [1981] A.C. 1001; *SuperQuinn Ltd v. Bray Urban District Council*, Unreported, High Court, 18 February 1998.

⁸² *Kelly v. Dublin County Council* Unreported, High Court, 21st February 1986.

⁸³ (1866) L.R. 1 Ex. 265 at p. 278, *aff’d* (1868) L.R. 3 H.L. 330; [1868] UKHL 1.

⁸⁴ *Transco v Stockport MBC* [2003] 3 WLR 1467. See John, “The Merits of *Rylands v Fletcher*,” (2004) 24 *Oxford Jnl of Legal Studies* 643, Canny, Martin, “*Rylands v Fletcher* limps on: *Transco plc. v Stockport M.B.C.* in the House of Lords,” (2004) 11(4) *IPELJ* 158 and Nolan, “The Distinctiveness of *Rylands v Fletcher*,” (2005) 121 *LQR* 421.

⁸⁵ *Burnie Port Authority v General Jones Pty Limited* (1994) 120 ALR 42.

⁸⁶ See Ch.III, s.2.3.1.

⁸⁷ This is also described as non-natural user. See Newark, “Non-natural user and *Rylands v Fletcher*” (1961) 24 *M.L.R.* 557.

⁸⁸ *Read v Lyons & Co. Ltd.* [1947] A.C.156.

⁸⁹ *Cambridge Water Co. v Eastern Counties Leather plc.* [1994] 2 A.C. 264.

appear to encompass space activities. However, in *Rickards v Lothian*, the Court held that:

[i]t must be some special use bringing with it increased danger to others, and must not merely be the ordinary use of the land or such a use as is proper for the general benefit of the community.⁹⁰

It is possible that spaceports and launching activities may fall within the second category. The issue of non-natural user is considered elsewhere.⁹¹ The burden of risk actualising will be placed on the defendant where the elements are proved regardless of whether the plaintiff is engaged in an enterprise of lesser economic significance. As was stated in *Atlas Chemical Industries Inc. v Anderson*⁹²

To allow industry to inflict injury to the property of its neighbors without just compensation amounts to inverse condemnation which is not permitted under our law. We know of no acceptable rule of jurisprudence which permits those engaged in important and desirable enterprises to injure with impunity those who are engaged in enterprises of lesser economic significance. The costs of injuries...must be internalized by industry as a cost of production and borne by consumers or shareholders, or both, and not by the injured individual.

It remains to be seen if *Rylands* could be successfully applied to damage caused by space objects. It is likely such damage would fall within strict liability where it injures a third party in the surface within the jurisdiction.⁹³

⁹⁰ [1913] A.C. 263, at p.280.

⁹¹ See Ch.III, s.2.3.1.1.

⁹² 514 SW 2d 309 (Tex Civ App 1974) at p. 315.

⁹³ See Charlesworth and Percy on Negligence, 11th ed., (Sweet and Maxwell, London, 2006), para.12.211.

4.4 Negligence

Following the discussion in Chapter III, a negligence based theory is likely to apply to space damage within outer space. It should also be applied to bilateral accidents where the risk that actualizes does not run with the activity, for instance where two space objects collide on a runway (in the case of HTOHL) or topple onto one another on a launch platform (in the case of VTOHL). Negligence requires proof of the existence of a duty of care which has been breached causing foreseeable damage to the plaintiff. The burden of proof rests on the plaintiff except where *res ipsa loquitur*⁹⁴ is pleaded. The doctrine which first originated in England has the beneficial effect of swapping the evidentiary burden of proof to the defendant. The doctrine has been carefully circumscribed by the Irish judiciary where the simple argument that it should be applied where the defendant was in a better position to know the risks has not been sufficient: *Hanrahan v Merck, Sharpe and Dohme*. It has however been applied to aircrafts in England. In *Fosbroke- Hobbs* by Goddard J. who stated:

It was argued that I ought not to apply [*res ipsa loquitur*] to an aeroplane, a comparatively new means of locomotion, and one necessarily exposed to the many risks which must be encountered in flying through the air, but I cannot see that this is any reason for excluding it.⁹⁵

⁹⁴ See McMahon and Binchy, *supra*, paras 9.15-9.40, pp.187 *et seq.* and Lewis, "A Ramble with *Res Ipsa Loquitur*," 11 *Camb L. J.* 74.

⁹⁵ *Fosbroke-Hobbs v. Airwork Ltd. And British American Airways Ltd.* [1937] 1 All ER 108, [1938] USAv.R. 194, citing *Carpue v. London & Brighton Railway Company*, (1844) 5 Q.B. 747. See the similar comments of the Court in *United States v Kesinger* 190 F. Supp. 529 (10th Cir. 1951). The doctrine has been applied in the US: Harper *et al*, *The Law of Torts*, Vol.3 §14.13 p.292 *et seq.* See McLarty, "Res Ipsa Loquitur in Air Line Passenger Litigation," (1951) 37 *Va. L. Rev.* 55, Goldin, "Res Ipsa Loquitur in Aviation Law," (1945) 18 *So. Calif. L. Rev.* 15; O'Connor, "Res Ipsa Loquitur in the Air," (1947) 22 *Ind. L.J.* 221; *In re Aircraft Disaster* 635 F.2d 67 (2d Cir. 1980); *Citrola v. Eastern Airlines, Inc* 264 F.2d 815 (2d Cir. 1959); *Hunziker v Scheidemantle* 543 F. 2d 893 (7th Cir, 1967); *Widmyer v. Southeast Skyways Inc.*, 584 p. 2d 1 (Alaska 1978); *Southeastern Aviation Inc. v. Hurd* 209 Tenn 639, 355 S.W. 2d 436 (1962); *Capital Airlines inc. v. Barger* 47 Tenn. App. 636, 341 S.W. 2d 579 (1962); *Des Marias v Beckman* 198 F. 2d 550 (9th Cir.1952); *Haasman v Pacific Air Express* 100 F. Supp. 1 (Alaska 1951), 198 F. 2d 550 (9th Cir. 1952). The doctrine has been applied under the FTCA *D'Anna v U.S.* 181 F. 2d 335 (4th Cir. 1950); *Swanson v U.S* 229 F. Supp. 217 (N.D.

Res ipsa has the potential to apply to space objects, even in a moderately early stage of their private use in the space adventure industry but precedent on rocket firing indicates that it may not in fact be applied. In *Pigott v U.S.*,⁹⁶ the plaintiffs' alleged damage was caused by the firing of the Saturn S-IC rocket at the N.A.S.A.'s Mississippi Test Facility. The Court agreed that the doctrine of *res ipsa loquitur* had no application to the activities. Therefore where an equivalent propulsion system is used to travel outside orbit, the precedent arguably applies albeit the rocketry was on a smaller scale.

4.4.1 Vicarious Liability for Negligence of Servants or Employees

In maritime law, a ship-owner may be liable as the employer⁹⁷ for the damage done by his/her vessel or by his/her employees in the scope of their employment.⁹⁸ The Supreme Court of Canada in *Horsley v. McLaren*⁹⁹ that such a relationship existed between a captain of a ship and his passengers and as such a duty arose on the captain to take all reasonable steps to rescue a passenger. In *Fosbroke-Hobbs*, Goddard J. stated:

[The deceased] had a right to expect that the plane would be fit and proper for the journey, and that the pilot would navigate it carefully. If the pilot was negligent, he, as the person to whom the deceased entrusted his safety, was guilty of a breach of duty for which his employers are *prima*

Cal. 1964). Contrast *Cohn v. United Air Lines Transportation Corp.* 17 F. Sup 865 (D. Wyo 1937).

⁹⁶ 451 F.2d 574; 1971 U.S. App. LEXIS 7612.

⁹⁷ The ship-owner may also be strictly liable in his/her own right for certain types of damage: see Harbours, Docks and Piers Clauses Act 1847(UK), s.74 and the Zetland County Council Act 1974 (UK), *River Wear Commissioners v Adamson* (1877) 2 App Cas 743, *The Mostyn* [1928] A.C. 57 and *BP Exploration Operating Co. Ltd. v. Chevron Transport (Scotland)* [2001] UKHL 50.

⁹⁸ See *BP Exploration Operating Co. Ltd. v. Chevron Transport (Scotland)* [2001] UKHL 50.

⁹⁹ [1972] Sup. Ct 441; (1972) 22 DLR (3d) 545 *aff'g* [1970] 2 Ont 487, *rev'g* [1969] 2 Ont 137. See Quinton R., "Liability of Search and Rescuers" (Major Paper, University of Victoria, 1989) available at <<http://www.sarbc.org/liab5.html>> and Binchy, William, "The Good Samaritan at the Crossroads: A Canadian Signpost" (1974) 25(2) *NILQ* 147.

facie answerable, and, in my judgment, no one else is...they are liable unless they can escape owing to the conditions incorporated in the charter and on which they rely.

Under Article 30 of the Montreal Convention, in an action taken against a servant or employee acting in the course of their employment, the limits of the convention can apply. Article 45 of COTIF provides for liability for acts for servants and employees. But goes on to provide that if “such servants and other persons, at the request of a passenger, render services which the railway itself is under no obligation to render, they shall be deemed to be acting on behalf of the passenger to whom the services are rendered”. Applying the principle to space activities will render an operator liable for the actions of its servants or employees taken in the course of his/her duties.

5. Inter-Party Liability in Contract and Tort

Liability in contract is regulated in the US by waivers and insurance. As set out above, contractors must execute cross-waivers of liability with respect to each other. The issue as to whether these waivers exclude liability in both contract and tort, which has been the subject of litigation, will be considered. A further aspect to consider is the position where the parties to the contract are not in equal bargaining positions, for instance in the case of a space tourist and the carrier. The definition of space tourist and spaceflight participant will be compared and contrasted. Recent law in Virginia, Florida and New Mexico have addressed the issue of carrier liability.

5.1 Inter-Party Liability under U.S. Federal Law

Under the Commercial Space Launch Activities Act 1984 in s.70112(b),¹⁰⁰ a launch or re-entry license issued or transferred must contain a provision requiring the licensee or transferee to make a reciprocal waiver of claims with “its contractors, subcontractors, and customers, and contractors and subcontractors of the customers, involved in launch or re-entry services under which each party to the waiver agrees

¹⁰⁰ 49 USC Subtitle IX Chapter 701.

to be responsible for property damage or loss it sustains, or for personal injury to, death of, or property damage or loss sustained by its own employees resulting from an activity carried out under the applicable license.” Originally, waivers in launch contracts were not held to exclude liability in tort. In *Lexington Insurance v. McDonnell Douglas*¹⁰¹ six insurance companies sued the manufacturer and subcontractors in subrogation actions to recover the money paid to the owners where a defect in a satellite motor resulted in the inability of the satellite to perform its telecommunications functions. They argued that the defendants had been negligent in the design, manufacturing and testing of the exit cones of the satellite and for the failure to warn of the risks to the owners. The contract with McDonnell Douglas contained an exclusion clause for negligence which also covered the subcontractors. However, the launch occurred prior to the passing of the 1984 Act. Nonetheless, the contract did contain an inter-party waiver of liability which also excluded claims in subrogation. In addition, the communications company, Perumtel, had agreed to take the risk of loss of the satellite in exchange for a lower satellite price. The defendant sought unsuccessfully to argue that the plaintiffs could not recover on the basis that Perumtel had assumed the risk and on account of the interparty waivers. The Court found however, that the specific allocation of risk did not preclude a negligence action under state law. Some years later, after the passing of the 1984 Act, the Courts had the opportunity to reevaluate such arguments.

In *Appalachian Insurance v. McDonnell Douglas*,¹⁰² the trial Court ruled that the contract between Western Union and McDonnell Douglas prevented Appalachian Insurance from suing McDonnell (the contractor), Morton Thicol and Hitco (the subcontractors).¹⁰³ In the Court of Appeal, Appalachian sought to argue that “the

¹⁰¹ No. 481713 (Cal. Super. Ct., Orange Co., May 1990). See Showalter, “In Space, No One Can Hear You Scream ‘Tort!’” (1993) 58 *Journal of Air Law and Commerce* 795, at p. 832 -834, Diederiks Verschoor, *An Introduction to Space Law* 3rd ed. (Kluwer Law International, Alphen aan den Rijn, 2008), at p. 149, (1990) 18 *Journal of Space Law* 41-44, Gorove, Stephen, *Cases on Space Law: Texts and Comments* (University of Mississippi, Journal of Space Law, 1996), p.99.

¹⁰² 214 Cal. App. 3d 1; 262 Cal. Rptr. 716 (Cal. Ct. App. 1989) Showalter, “In Space, No One Can Hear You Scream ‘Tort!’” (1993) 58 *Journal of Air Law and Commerce* 795 at p. 834-836.

¹⁰³ Here the waiver in the contract provided: “7. *Warranties and Indemnities.* [McDonnell Douglas] extends no warranty of any kind, express or implied, including any implied warranty of merchantability or suitability for purpose with respect to the PAM or with respect to services provided

inter-party waiver of liability in the Launch Services Agreement was not intended to preclude lawsuits like the one here, i.e., between a Space Shuttle customer and its own contractors and subcontractors.” On this basis, it submitted that the interparty waivers that were the ‘flow-down’ provisions of the Launch Services Agreement contained in the agreement between Western Union and McDonnell Douglas also did not preclude the suit. The Appeal Court found however that there were “significant differences” between the wording of the Launch Services Agreement with NASA and Western Union and the ‘flow-down’ provision in agreement between Western Union and McDonnell Douglas, the latter clearly precluded the suit before the Court and Appalachian’s argument based on the wording of the Launch Services Agreement was found unpersuasive. The Court also affirmed the trial court’s rejection of Appalachian’s reformation argument as it was not seeking reformation but a new agreement.

by [McDonnell Douglas] hereunder. Except as provided in Article 13, 15, 16, and 17 of this Agreement, under no circumstances will [McDonnell Douglas] be liable to Purchaser under or in connection with this Agreement, under any tort, negligence, strict liability, contract or other legal or equitable theory, for incidental or consequential damages or for Purchaser's cost of effecting cover. Purchaser shall indemnify and hold harmless [McDonnell Douglas], its officers, agents and employees from and against any and all liabilities, damages and losses, including costs and expenses in connection therewith, for death of or injury to any persons whomsoever and for the loss of, damage to or destruction of any property whatsoever, caused by, arising out of or in any way connected with the launch or operation of the PAM, Spacecraft, or Launch Vehicle unless resulting from the sole negligence or willful misconduct of [McDonnell Douglas], its officers, agents and employees.

Purchaser hereby expressly waives and releases any cause of action or right of recovery which Purchaser may have hereafter against [McDonnell Douglas] for any loss or damage to the PAM, Spacecraft or Launch Vehicle, caused by, arising out of or in any way connected with the launch or operation of the PAM, Spacecraft or launch vehicle. Purchaser shall obtain a waiver from any insurance carrier with which the Purchaser carries property insurance covering the PAM, Spacecraft and/or launch vehicle releasing its subrogation rights against [McDonnell Douglas]. Purchaser shall furnish [McDonnell Douglas] will furnish certificates, satisfactory to [McDonnell Douglas], evidencing its compliance with its insurance obligations under this Article 7. The indemnification provisions of this Article 7 shall not apply to liabilities, damages or losses suffered under the conditions set forth in Article 14."

Finally, the Court examined the argument of that the waiver was unenforceable for unconscionability as codified in s. 1670.5 of the Civil Code.¹⁰⁴ The Court accepted that the doctrine contained both procedural and substantive elements¹⁰⁵ with the procedural element focusing on both oppression “arising from an inequality of bargaining power which results in no equal negotiation”¹⁰⁶ and surprise, that is, “the extent to which the supposedly agreed-upon terms of the bargain are hidden in a prolix printed form drafted by the party seeking to enforce the disputed terms.”¹⁰⁷ Appalachian sought unsuccessfully to persuade the Court to adopt its earlier reasoning in *A. & M Produce Co. v. FMC Corp.*:

Of course the mere fact that a contract term is not read or understood by the nondrafting party or that the drafting party occupies a superior bargaining position will not authorize a court to refuse to enforce the contract. Although an argument can be made that contract terms not actively negotiated between the parties fall outside the 'circle of assent' which constitutes the actual agreement, commercial practicalities dictate that unbargained-for terms only be denied enforcement where they are also *substantively* unreasonable. One commentator has pointed out, however, that, '. . . unconscionability turns not only on a "one-sided" result, but also on an absence of "justification" for it[,] which is only to say that substantive unconscionability must be evaluated as of the time the contract was made. The most detailed and specific commentaries observe that a contract is largely an allocation of risks between the parties, and therefore that a contractual term is substantively suspect if it reallocates the risks of the bargain in an objectively unreasonable or unexpected manner. But not all unreasonable risk reallocations are unconscionable; rather,

¹⁰⁴ “If the court as a matter of law finds the contract or any clause of the contract to have been unconscionable at the time it was made the court may . . . enforce the remainder of the contract without the unconscionable clause, or it may so limit the application of any unconscionable clause as to avoid any unconscionable result.” On the use of the doctrine of unconscionability, see O’Brien, Z.N., “Equity and the Space Tourist” [2009] 53 *Proc. Coll. L. Out. Sp.*

¹⁰⁵ Following and applying *H.S. Perlin Co. v. Morse Signal Devices* (1989) 209 Cal.App. 3d 1289, at pp. 1300-1301.

¹⁰⁶ *A. & M Produce Co. v. FMC Corp.* (1982) 135 Cal.App. 3d 473 at p. 486.

¹⁰⁷ *Ibid*

enforceability of the clause is tied to the procedural aspects of unconscionability such that the greater the unfair surprise or inequality of bargaining power, the less unreasonable the risk reallocation which will be tolerated.”¹⁰⁸

Appalachian sought to argue that the procedural element of unconscionability was present as McDonnell Douglas had an absolute monopoly and had used that power to insulate it against liability. However, the Court rejected this argument on the facts. The argument that there was substantive unconscionability as the provision was not consistent with industry practice also failed on the facts. Significantly the Court acknowledged the distinction between unconscionability in a consumer contract for a mass-produced product as in *A&M Produce* and the facts here:

Here, the contract was not a standardized printed form for the sale of a mass-produced product; here the contract was negotiated. It involved specialized services and new technology developed in a "high risk business." Western Union was not an inexperienced buyer who had to rely on McDonnell Douglas's representations; Western Union was a large, sophisticated corporation experienced in launching telecommunications satellites. Western Union was further given periodic progress reports, including reports of two test failures of the Star 48 motor.

In this context, of a highly specialized, risky new technology, it was not commercially unreasonable for the parties to agree Western Union would obtain insurance to protect it against the risk of loss rather than to have McDonnell Douglas warrant performance of the upper stage rocket. As a practical matter, it was a question of whether Western Union wanted to directly pay for insurance by obtaining insurance itself or indirectly pay for insurance by requiring McDonnell Douglas obtain the insurance and give a warranty. It was reasonable for Western Union to agree to obtain its own insurance directly rather than to pay an increased contract price which would include McDonnell Douglas's costs in administering the insurance for Western

¹⁰⁸ *Ibid* at p. 487.

Union's benefit. We do not find any unconscionability existing in articles 7 and 14 of the Western Union and McDonnell Douglas.

This still left open the possibility of arguing that there was unconscionability where a standardized contract for space carriage of persons between the contractor and consumer when the space tourism industry is sufficiently developed.

However, in *Martin Marietta v. Intelsat*¹⁰⁹ the District Court found that to permit tort claims in satellite launch contracts which included an inter-party waiver would clearly undermine congressional policy, evinced by the 1984 Act, which was to encourage private commercial space activity. So the argument by Intelsat that waivers for gross negligence were contrary to public policy was rejected. The history of the 1984 Act showed that all claims in tort arising from the launch were to be excluded by the waivers.¹¹⁰ Liability in tort could only attach where there was an additional duty outside of the launch contract.¹¹¹ Diederiks-Verschoor observes that for the US private commercial launch industry, this was 'very favourable and encouraging' as normally the enforcement of waivers applicable to gross negligence is prohibited.¹¹² The Court accepted that the requirements were necessary where commercial ventures had difficulty affording insurance to guard against tort actions. Intelsat also pointed to the obligation of Martin Marietta to use its 'best efforts' defined in Article 1(2) of the contract as 'diligently working in a good and workman like manner as a reasonable, prudent manufacturer of launch vehicles and provider of launch services' but was unable to prove their contention.¹¹³ Showalter describes the case as a "departure" from NASA policy as seen in *Lexington*.¹¹⁴ However the Court also noted that it deferred to the language of the contract as both parties were equally sophisticated in the allocation of risk. There was no 'vulnerable party' to be found and so the argument for negligent misrepresentation after the signing of the contract was rejected. It is still possible that the Courts may have been open to allowing tort actions where a vulnerable party such as a consumer existed, however, with the

¹⁰⁹ 763 F. Supp. 1327 (D. Md. 1991), *aff'd* in part, *rev'd* in part, 978 F.2d 140 (4th Cir. 1992).

¹¹⁰ *Ibid* at p.1333-4.

¹¹¹ *Ibid* at p. 1331.

¹¹² *An Introduction to Space Law, supra*, p.156.

¹¹³ On 'best efforts' in space-related judgments, see Diederiks-Verschoor, *supra*, pp.157-8.

¹¹⁴ Showalter, *op cit*, at p. 837.

passing of the Commercial Space Act 2003 which extended the requirement of reciprocal waivers of claims to be executed between crew and other space flight participants and the licensees, permittees and Federal Government, congressional intent would appear to have the same objectives in mind with regard to space flight participants. A shift in risk allocation from the space flight participants to the carrier, would mirror the shift in risk allocation from the buyer to the manufacturer/launch provider evidenced in *AT&T v Martin Marietta*.¹¹⁵

5.2 *Waivers between Parties of Unequal Bargaining Power*

In relation to waivers between parties of unequal bargaining power, the specific situation envisaged is that of space tourists and their carriers. Currently, space tourism is restricted to allocentric millionaires but when the industry moves beyond the pioneer phase in the foreseeable future, it is more likely than not that the use of standard-form contracts will be common practice. The possibility of raising unconscionability in these circumstances is noted above. Further protection should be required of such persons as consumers of a service although the use of the phrase ‘spaceflight participant’ used in US law subsumes both consumers and non-consumers alike. The definition of a space tourist and the law at both federal and national level are considered below.

5.2.1 *Definition of a ‘Space Tourist’*

A space tourist is defined as someone who tours or travels into, to, or through space or to celestial bodies for pleasure and/or recreation.¹¹⁶ Tourists are not mentioned in

¹¹⁵ See (1995) 23 *Journal of Space Law* 177 and Diederiks-Verschoor, *supra*, pp.154-155.

¹¹⁶ See generally O’Brien Z.N., “Consumer Protection and the Limitation of Liability in the National Regulation of the Space Industry,” [2005] 49 *Proc. Coll. L. Out. Sp.* 229. On space tourism generally see, O’Brien, Z.N., “Fly Me to the Moon But Is My Carrier Liable If I An Accident?” [2006] 5 *Journal of Postgraduate Research* 20, Solomon, Lewis D., *The Privatization of Space Exploration – Business, Technology Law and Policy* (Transaction Publishers, London, 2008), Van Pelt, Michael,

the *corpus iuris spatialis*. In the Outer Space Treaty 1967,¹¹⁷ the term ‘astronaut’ is used, but not defined, although they are considered as ‘envoys of mankind’.¹¹⁸ The Rescue and Return Agreement uses both ‘astronaut’ and the phrase ‘personnel of a spacecraft’.¹¹⁹ Tourism is not mentioned either, but as a ‘use’ of space, it is permissible under Art.I of the Outer Space Treaty of 1967. The term ‘space tourist’ is not used in US federal law nor in state law where ‘space flight participant’ is the preferred term. A “space flight participant” is defined as “an individual, who is not crew, carried within a launch vehicle or re-entry vehicle” under the Commercial Space Launch Amendment Act 2004.¹²⁰ This definition has been adopted at the state level in Virginia’s Spaceflight Liabilities and Immunities Act,¹²¹ Florida’s Informed Consent to Spaceflight Act¹²² and New Mexico’s Proposed Space Flight Liability and Immunity Act.¹²³

5.2.2 *The Space Tourist as a Consumer*¹²⁴

The use of ‘space tourist’ renders it easier to apply consumer law both as a consumer of services and as a tourist. The use of ‘spaceflight participant’ with its emphasis on

Space Tourism – Adventures in Orbit and Beyond (Copernicus, New York, 2005) and Seedhouse, Erik, *Tourists in Space* (Springer, Chichester, 2008).

¹¹⁷ Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies UNTS Vol. 610, p. 205: ILM Vol. VI, p. 386.

¹¹⁸ Article V of the Outer Space Treaty 1967.

¹¹⁹ Articles 1-5 Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space 19 UST 7570; 672 UNTS 119; 7 ILM 149 (1968).

¹²⁰ Amending the Commercial Space Launch Act 1984, 49 USC §§ 70101-70119. See generally Costello, Kevin, “The Commercial Space Launch Act Amendments and the Launch Industry Insurance Reform (1991) 14 *Suffolk Transnational Law Journal* 492 and Yelton Kim G., Note: “Evolution, Organization and Implementation of the Commercial Space Launch Act and Amendments of 1988,” (1989) 14 *Journal of Law and Technology* 11 and Note, “Commercialisation of Space: Commercial Space Launch Amendments Act 2004, (2004) 17(2) *Harvard Journal of Law and Technology* 619.

¹²¹ Ch.3 Code of Virginia 8.01-227.8-10.

¹²² §331.501 *et seq* of the Florida Statutes.

¹²³ Senate Bill 37, 2009.

¹²⁴ See generally, O’Brien, Z.N., “Consumer Law and Space Tourism,” Paper presented at the Society of Legal Scholars Centenary Conference, Keele, 7th-10th September 2009.

the crew/non-crew distinction does not immediately appear to come within the scope of a definition of a tourist. In the case of the latter, each factual matrix would have to be examined on its own merits. In short, all space tourists would be 'spaceflight participants' but not all 'spaceflight participants' are necessarily 'space tourists'. For example, Dennis Tito,¹²⁵ is an example of a space tourist. He paid an estimated \$20m for his seat on the Soyuz and stay at the International Space Station. He would also be considered 'spaceflight participant' had he fallen under the purview of the American legislation. However, in 1990 Toyohiro Akiyama, a Japanese reporter, became one of the first civilians in space, his employer (Tokyo Broadcasting System) paid for his ticket (\$12m) and he was technically operating as an employee.¹²⁶ While he could in hindsight come within the definition of 'space flight participant' he could not be viewed as a 'space tourist'. Mark Shuttleworth¹²⁷ conducted experimental research and could also be viewed as a participant rather than a tourist.¹²⁸ Similarly Greg Olson considered himself a private researcher rather than a tourist.¹²⁹ Indeed, Anousheh Ansari and Charles Simonyi may also be viewed more correctly as spaceflight participants than space tourists for the same reason.¹³⁰ Nonetheless, a 'spaceflight participant' is still a user of a service and may therefore come within the simplest understanding of a consumer. National law provides little clarity because of this didactic definitional issue.

Under the original Sale of Goods Act 1893 and under the current Sale of Goods and Supply of Services Act 1980, the same meaning is applied to 'consumer'. A party to a contract is said to deal as consumer in relation to another party if (a) he neither makes the contract in the course of a business nor holds himself out as doing so, and

¹²⁵ See Tyler, Patrick, E., "Space Tourist, Back from 'Paradise' Lands on Steppes" *The New York Times*, May 7th 2001, sect. A p.3.

¹²⁶ Linksköld, A., "Space Tourism and its Effects on Space Commercialization" (Masters of Space Studies, ISU), available at <
http://www.spacefuture.com/archive/space_tourism_and_its_effects_on_space_commercialization.shtml>

¹²⁷ See Leary, Warren, E., "Line Forms to be the Next Space Tourist, *The New York Times*, April 28th, 2002, Sect. 1 p. 28.

¹²⁸ See Seedhouse, *supra*, p.288.

¹²⁹ *Ibid*, p.288-289.

¹³⁰ *Ibid*, p.289.

(b) the other party does make the contract in the course of a business, and (c) the goods or services supplied under or in pursuance of the contract are of a type ordinarily supplied for private use or consumption.¹³¹ The difficulty in applying this definition to space tourists lies in the third limb of this definition. It is unclear whether a broad approach would be taken to the third limb resulting in a finding that space tourism is ordinarily supplied for the use of private individuals or if a narrower approach would result following from the view that participancy in a spaceflight is not a service ordinarily supplied for private consumption. The Community law approach provides somewhat more illumination as its definition omits this third limb and states that a 'consumer' is "any natural person who, in contracts...., is acting for purposes which are outside his trade, business or profession".¹³² This definition is currently found in several different directives,¹³³ though it is also found in the Proposed Directive on Consumer Rights.¹³⁴ The wider definition would embrace the concept of the space tourist and may encompass the broader term of 'spaceflight participant'. In the case of the latter, where the spaceflight participant's research endeavours are *not* outside of his or her trade, business or profession, they will not be 'consumers'. For example, a scientist engaged in private spaceflight for the purpose of experimentation for the advancement of his or her professional work could not be said to be a consumer on this test. Where a person travelled to space for the purpose of conducting experimental research but this was not for a purpose related to their trade or business or profession, such a person may be considered a consumer. 'Services contract' which means any contract other than a sales contract whereby a service is provided by the trader to the consumer, clearly is also wide enough to embrace commercial spaceflight.

¹³¹ Sale of Goods and Supply of Services Act 1980, s.3(1).

¹³² See Ch.VI s.4 for a case study of EC consumer law.

¹³³ See Council Directive 93/13/EEC of 5 April 1993 on unfair terms in consumer contracts, Art. 2(b) OJ L 95/29-34; Directive 85/577/EEC on contracts negotiated away from business premises; Directive 97/7/EC on distance contracts and Directive 1999/44/EC on consumer sales and guarantees and Directive 2005/29/EC concerning unfair business-to-consumer commercial practices in the internal market.

¹³⁴ See the Proposed Directive on Consumer Rights 2008/0196 (COD).

While all space tourists can be classified as spaceflight participants, private researchers and scientists who pass to or through space for purposes other than recreation are more correctly viewed as spaceflight participants rather than as tourists. The use of the latter, wider term would therefore seem preferable in the general regulation of private manned commercial spaceflight. However, use of the term may mask the distinction that may be drawn in legal terms among those that are space tourists engendering a higher level of protection as consumers of a service generally and as a consumer of a package holiday specifically, those spaceflight participants that are not consumers of a package but may still be viewed as consumers generally nonetheless and those spaceflight participants that cannot be viewed either as consumers or as tourists. The significance of this distinction is particularly pertinent considering the trend towards the mandatory inclusion of waivers in all contracts between spaceflight entities and spaceflight participants. This leaves open the possibility of applying consumer law to have such clauses excluded as unfair for consumers where Community law is the applicable law.¹³⁵ Furthermore, Art.5 of the Package Holidays Directive, where applicable, may expose a space tour operator to liability, including that for non-material damage.

*5.3 Waivers, Spaceflight Participants and Licensees/Permittees*¹³⁶

The Commercial Space Launch Amendment Act of 2004¹³⁷ which is the US response to space tourism at federal level recognizes that the commercial spaceflight industry is distinct from the aviation industry and vests its regulation in a single body. It takes some account of consumer vulnerability. It inserts a new clause stating that “the goal of safely opening space to the American people ... should guide Federal space investments, policies, and regulations.” It provides for extensive pre-contractual disclosure requirements on both the Secretary and the holder of the license or permit.

¹³⁵ See Chapter IV for further information.

¹³⁶ See generally O'Brien, Z.N., “To Boldly Go? Private Contracts for the Carriage of Persons in Space, Exclusion Clauses and Inter-Party Waivers of Tortious Liability” (2007) 29 *Dublin University Law Journal* 341.

¹³⁷ See Note, “Commercialisation of Space: Commercial Space Launch Amendments Act 2004,” (2004) 17(2) *Harvard Journal of Law and Technology* 619.

It requires the holder of the licence or permit to inform the space flight participant in writing about the risks of the launch and re-entry, including the safety record of the launch or re-entry vehicle type. In addition, the Secretary has an obligation to disclose in writing any relevant information related to risk or probable loss during each phase of flight gathered by him/her. The holder of the licence or permit must inform the space flight participant in writing, prior to receiving any compensation from that space flight participant or (in the case of a space flight participant not providing compensation) otherwise concluding any agreement to fly that space flight participant, that the United States Government has not certified the launch vehicle as safe for carrying crew or space flight participants.

The space flight participant must provide written informed consent¹³⁸ to participate in launch and re-entry and written certification of compliance with any regulations promulgated by the Secretary. However, the passengers may have to undergo “an appropriate physical examination prior to a launch or re-entry”¹³⁹ and meet “reasonable requirements... including medical and training requirements”¹⁴⁰ where the Secretary of Transportation has provided for such by regulations.¹⁴¹ The regulations, entitled Human Spaceflight Requirements for Crew and Spaceflight Participants, were adopted by the AST in December 2006. The Act precludes the formulation by the AST from adopting vehicle safety regulations until 2012. The combination of the waiver requirements and this Act brings private space carriage for persons, with regard to the Federal Government, outside of the theory of liability and within the theory of insurance.¹⁴² However, the CLSAA does not remove the

¹³⁸ See Knutson, Tracey L., “What is ‘Informed Consent’ for Space-Flight Participants in the Soon-to-Launch Space Tourism Industry?” (2007) 33 *J. Space L.* 105 and AST, *Study on Informed Consent for Spaceflight Participants* (AST, 2008) APT-CFA-230-0001-02F.

¹³⁹ See Seedhouse, *supra*, pp.109-138

¹⁴⁰ See Seedhouse, *supra*, pp.47-80.

¹⁴¹ Simberg, *Permission to Fly*, Fox News, Oct 15 2003, quoted at Note, *supra*, p.619

¹⁴² See International Space Brokers Ltd., *Risk and Legal Liability in Commercial Space Launches*, Memorandum submitted to the Select Committee on Trade and Industry of the House of Commons, Appendix 3 in the Minutes of Evidence of the Trade and Industry Tenth Report, 2000 available at <http://www.parliament.the-stationery-office.co.uk/pa/cm199900/cmselect/cmtrdind/335/335ap04.htm>

mandatory waivers provided for in the Commercial Space Launch Act of 1984¹⁴³. The waiver will remove not only all prospects of suing in contract but also in tort, and even if a case could be made out in tort on the basis of an independent duty, it may be subject to a defence of *volenti non fit injuria* – a defence not insignificantly strengthened by the requirement for a written informed consent under the CSLAA. The result is in clear contrast to all other contracts of carriage for persons at an international level. Even where carriers have been permitted to limit their liability at a national level this has been allowed usually within a legislative scheme that permits liability up to a fixed financial limit, as the Railways and Canal Act 1854. This has been subject to criticism.¹⁴⁴ The prime argument of having such waivers is that between parties in a high risk venture such as a satellite launch and the high risk associated with such an activity, it would suppress industry if tortious liability was admitted. However, in the prospective climate whereby individual persons will be engaging in these activities, it would be surely more likely to suppress the development of the space tourism industry by insisting upon such extensive cross-waivers. But the CSLAA does not require the execution of waivers between carriers specifically and the spaceflight participants. So while the waiver may hold between both Government and manufacturers, adherence to the federal law will not necessarily exclude liability between the carrier and the participant, unless the carrier falls within one of the other categories, i.e. where the carrier is the licensee or permittee. US States have attempted to fill this void.

5.3.1 Virginia's Spaceflight Liabilities and Immunities Act 2007

Virginia was the first state to create a framework to deal with space tourist liability with the intention of bolstering the prospects of its spaceport industry.¹⁴⁵ Florida

¹⁴³ The Commercial Space Launch Act 1984 (US), s.70112(b). In Australia, waivers may be made mandatory under section 65 of the Space Activities Act 1998.

¹⁴⁴ Kaiser and Mejía-Kaiser, "Space Passenger Liability," (2004) 47 *Proc. Coll. L. Out. Sp.* 25.

¹⁴⁵ FAA/AST, *State Support for Commercial Space Activities* (FAA/AST, 2009), p.23 *et seq.*

Virginia's Zero Gravity Zero Tax Act 2008 also means that income from the sale of launch services to spaceflight participants or services intended to provide individuals launch training are exempt from paying income tax.

followed suit shortly after and New Mexico has tabled a bill this year to the same end. Virginia's Spaceflight Liabilities and Immunities Act¹⁴⁶ will be effective for six years from July 1st 2007 and proposes that space flight participants sign a warning excluding liability. The minimum warning provided in the Act is:

WARNING AND ACKNOWLEDGEMENT: I understand and acknowledge that, under Virginia law, there is no civil liability for bodily injury, including death, emotional injury, or property damage sustained by a participant in spaceflight activities provided by a spaceflight entity if such injury or damage results from the risks of the spaceflight activity.... I understand and acknowledge that I am participating in spaceflight activities at my own risk. I have been given the opportunity to consult with an attorney before signing this statement.¹⁴⁷

The definitions in the Act mirror those set down in federal law.¹⁴⁸ A participant is therefore "an individual, who is not crew, carried within a launch vehicle or re-entry vehicle" while spaceflight activities include activities involved in the preparation of a launch/re-entry vehicle and payload, crew (including crew training), or spaceflight participant, if any, for launch/re-entry and the conduct of a launch/re-entry. This is wider than earlier drafts which were limited to suborbital flight. A 'spaceflight entity' for these purposes is "any public or private entity holding, either directly or through a corporate subsidiary or parent, a license, permit, or other authorization issued by the Federal Aviation Administration [FAA] pursuant to the Federal Space Launch Amendments Act" and includes "any manufacturer or supplier of components, services, or vehicles that have been reviewed by the US FAA as part of issuing such a license, permit, or authorization". Therefore the protection of the waiver extends beyond the carrier but also to manufacturers and suppliers. Significantly, there is no exclusion or limit of liability of a spaceflight entity if the spaceflight entity "commits an act or omission that constitutes gross negligence

¹⁴⁶Ch.3 Code of Virginia 8.01-227.8-10.

¹⁴⁷§ 8.01-227.10 B.

¹⁴⁸See 49 U.S.C. § 70102 and §8.01-227.8 of the Virginia Code .

evidencing wilful or wanton disregard for the safety of the participant, and that act or omission proximately causes a participant injury or intentionally causes a participant injury”. Other than where these exceptions arise a spaceflight entity will not be liable for injury to or death of a participant resulting from the inherent risks of spaceflight launch activities where the warning above has been distributed and signed. No participant or participant's representative is “authorized to maintain an action against or recover from a spaceflight entity for a participant injury that resulted from the risks of spaceflight activities.”¹⁴⁹ These provisions are explicitly stated to be in addition to any other limitations provided by law.¹⁵⁰

5.3.2 Florida's Informed Consent to Spaceflight Act¹⁵¹

Florida's efforts were modelled on the Virginian Act. It was effective from October 1st, 2008 and expires October 2nd, 2018.¹⁵² The Act applies to sub-orbital flights only and also utilises the federal definitions of spaceflight participant and spaceflight activities.¹⁵³ Only such spaceflight entities that hold a licence from the Federal Aviation Authority may avail of the release of liability provided for by the Act. It precludes liability for injury to or death of a participant resulting from the inherent risks of spaceflight activities.¹⁵⁴ The Act also provides a minimum statutory warning to be included:

WARNING: Under Florida Law there is no liability for an injury to or death of a participant in a spaceflight activity provided by a spaceflight entity if such injury or death results from the inherent risks of the spaceflight activity. Inherent risks of spaceflight activity include, among others, risks of injury to land, equipment, persons and animals, as well as the potential for you to act in a negligent manner that may

¹⁴⁹ § 8.01-227.9(A).

¹⁵⁰ § 8.01-227.9(C).

¹⁵¹ §331.501 *et seq.* of the Florida Statutes. See FAA/AST, *State Support for Commercial Space Activities* (FAA/AST, 2009), p. 14 *et seq.*

¹⁵² §331.502.

¹⁵³ §331.501(1)(a)-(c).

¹⁵⁴ §331.501(2)(a).

contribute to your injury or death. You are assuming the risk of participating in this spaceflight activity.¹⁵⁵

Failure to comply with the warning statement requirements will prevent a spaceflight entity from invoking the privileges of immunity provided by the Act.¹⁵⁶ However, the Act does not prevent or limit the liability of a spaceflight entity for injury, damage or death caused to a spaceflight participant if the spaceflight entity commits an act or omission that constitutes gross negligence or wilful or wanton disregard for the safety of the participant¹⁵⁷ or has actual knowledge or reasonably should have known of a dangerous condition on the land or in the facilities¹⁵⁸ or equipment used in the spaceflight activities. The Act will not preclude recovery for intentional injuries the participant.¹⁵⁹

5.3.3 New Mexico's Spaceflight Informed Consent Act

New Mexico introduced a bill in 2009 which was signed into law in February 2010.¹⁶⁰ It provides for the same definitions of spaceflight participant and activities as found in federal law¹⁶¹ and a similar definition of spaceflight entities as found in Virginia's Act.¹⁶² It also provides a minimum statutory warning in the following terms:

WARNING AND ACKNOWLEDGMENT

I understand and acknowledge that under New Mexico law, there is no liability for injury to or death sustained by a participant in a space flight activity provided by a space flight entity if the injury or death

¹⁵⁵ § 331.501(3)(b).

¹⁵⁶ § 331.501(3)(c).

¹⁵⁷ § 331.501(2)(b)(1).

¹⁵⁸ § 331.501(2)(b)(2).

¹⁵⁹ § 331.501(2)(b)(3).

¹⁶⁰ SB 9, 2010.

¹⁶¹ SB 9, section 2(a) and (b).

¹⁶² SB 9, section 3(c).

results from the inherent risks of the space flight activity. Injuries caused by the inherent risks of space flight activities may include, among others, death, bodily injury, emotional injury or property damage. I assume all risk of participating in this space flight activity.¹⁶³

As with the other state laws, a failure to comply with the requirements concerning the warning statement will prevent a space flight entity from invoking the privileges of immunity of the Act.¹⁶⁴ Also, like the Virginian and Florida measures, the Act will neither prevent nor limit the liability of a space flight entity for injury if the space flight entity where it commits an act or omission that constitutes gross negligence evidencing willful or wanton disregard for the safety of a participant¹⁶⁵ or intentionally causes a participant injury.¹⁶⁶ Originally the draft did not provide for actual or constructive knowledge of danger condition precluding immunity unlike the Florida statute. The final act does however.¹⁶⁷

5.3.4 *Waivers in Irish Law*¹⁶⁸

The defence of *volenti non fit injuria* is, in the wake of the enactment of s.34(1)(b) of the Civil Liability Act 1961,¹⁶⁹ now properly described as “the defence that the plaintiff before the act complained of agreed to waive his legal rights in respect of

¹⁶³ SB 9, section 4(a).

¹⁶⁴ SB 9, section 4(b).

¹⁶⁵ SB 9, section 3(b)(1).

¹⁶⁶ SB 9, section 3(b)(3).

¹⁶⁷ SB 9, section 3(b)(2).

¹⁶⁸ See McMahon and Binchy, *The Law of Torts in Ireland*, 3rd ed., (Butterworths, Dublin, 2000), at pp.577-584.

¹⁶⁹ This provides: This subsection ... shall not operate to defeat any defence arising under a contract or the defence that the plaintiff before the act complained of agreed to waive his legal rights in respect of it, whether or not for value; but subject as aforesaid to the provisions of this subsection shall apply notwithstanding that the defendant apart from this subsection may have a defence of voluntary assumption of risk.

it.”¹⁷⁰ The current position was summarised by McMahon and Binchy in the following terms:

The defence of *volenti* is gone, but a defendant can escape any liability in two cases (a) where he shows that by contract he is not liable, or (b) where he shows that the plaintiff before the act agreed to waive his legal rights in respect of it. In either case, the burden of establishing the defence falls on the defendant¹⁷¹

Contra preferentum applies to the interpretation of waivers. It is submitted that any declaration in accordance with the requirements of the CLSA 1984 will be sufficient to meet this first hurdle and show that the plaintiff did in fact communicate the waiver to the defendant. However, mere notice as to the risks may not be sufficient in and of itself to establish a waiver. So in *McComiskey v McDermott*¹⁷² a notice in the car which was there when the defendant purchased it (to the plaintiff’s knowledge) and which was not adopted by the defendant was not sufficient. On this basis, where there been compliance with the pre-contractual disclosure requirements of the CLSAA 2004 and a written informed consent furnished by the space flight participant, such would provide adequate and sufficient notice in order to establish a defence even in Irish law. This is notwithstanding the fact that space activities are still considered ultra-hazardous activities.¹⁷³ Although in *Ryan v Ireland*¹⁷⁴ where a soldier sued the state for injury sustained while stationed in the Lebanon on a U.N: peacekeeping mission that arose from a failure to have proper sand embankments surrounding the encampment, the Court acknowledged that the plaintiff had accepted the risk of injury inherent in the possibility of armed conflict, this did not mean that

¹⁷⁰ *O’Hanlon v ESB* [1969] I.R. 75 at p.90 *per* Walsh J.

¹⁷¹ *The Law of Torts* at p. 577.

¹⁷² [1974] I.R. 75.

¹⁷³ See *Berg v. Reaction Motors Div.*, (1962) 37 N.J. 396, 181 A.2d 487 and *Smith v Lockheed Propulsion Co.* (Cal. Ct of Appeal, 4th Dist. 2d., January 17th 1967 Tamura J.) – rocket motor testing found in both cases to constitute ultra-hazardous activity - *cf* *Pigott v Boeing Co.* (1970) Miss 240 So. 2d. 63. See also Dunstan, James, E., “Is Launching a Rocket Still and Ultra-Hazardous Activity? Towards a Negligence Theory for Launch Activities”, (1993) 9 *Space Manufacturing the High Frontier: Accession, Development & Utilisation* 226.

¹⁷⁴ [1989] I.R. 177.

the plaintiff had accepted the risk of injury arising from unnecessary exposure to danger. Similarly in *Baldwin v Foy and Forrest Way Riding Holidays Ltd.*,¹⁷⁵ Laffoy J. found that the defendants were negligent in permitting the plaintiff, a novice horsewoman to ride cross-country adjacent to a bog on a four year old horse. The woman was thrown from the horse during a hailstorm and succeeded in her action, notwithstanding the presence of a couple of disclaimer notices around the area one of which stated that riding was a “risk sport” and that “animals can be unpredictable”. Laffoy J. found however, that the notices, which were headed “Association of Irish Riding Establishments”, could not be seen to be a disclaimer from the defendant. She also observed that:

To state that horse riding and jumping is a risky sport...is to state the obvious. The Plaintiff in participating in this sport accepted the normal hazards and dangers inherent in it. The question I have to determine is whether the Defendants exposed the Plaintiff to risk of injury which was reasonably foreseeable but which is not normally inherent [in the activity].

However, she noted that “it [was] not possible to draw an inference from the evidence that the Plaintiff agreed to waive any right of action she might have in respect of negligence on the part of the Defendants.” So participation in an activity carrying risks known to the plaintiff is not, in itself, sufficient to infer a waiver of a risk of injury that is reasonably foreseeable but not normally inherent in the activity. This is in contrast to *Hulsey v. Elsinore Parachute Center*,¹⁷⁶ where an injured skydiving student argued that his signed release of liability was invalid because skydiving was ultrahazardous. Evidence was presented of the existence of a United States Parachute Association which approved the course of study at issue and certified instructors. While concluding that skydiving was not an uncommon sport, the court noted that if parachutists tended to drop out of control and landed in unwanted places causing harm, the sport may be considered ultrahazardous.¹⁷⁷ Significantly, the court stated that the risk was assumed by those who chose to

¹⁷⁵ [1997] IEHC 111.

¹⁷⁶ 168 Cal. App. 3d 333; 214 Cal. Rptr. 194; 1985 Cal. App. LEXIS 2098; CCH Prod. Liab. Rep. P10,581.

¹⁷⁷ *id.*, at pp. 345-346

engage in the activity, and that such risk of harm could be eliminated by the exercise of due care. McMahon and Binchy observe that the difficulty with s.31(b) is that “a free choice to undertake a risk created by the defendants negligence must be ignored and the plaintiff allowed to recover in full, if that choice does not implicate the plaintiff with contributory negligence”.¹⁷⁸ This may be seen to benefit a space tourist who has signed an informed consent to the risks of launch etc. in that it may not exclude other liability – such as trespass to the person while onboard the space object. However, in the case of private spaceflight, where there is an express agreement to the waiver of all tortious liability, rather than particular risks associated with launch, re-entry and operation, (and therefore no need to find an inferred waiver from the facts), this may not be of very great value to a plaintiff. In addition, a great many risks that may materialise may be considered to be “normally inherent” in space flight as an ultra-hazardous activity again limiting the benefit that can be derived from this.

5.3.5 Freedom to Contract and Exclusion Clauses

The protection of tourists as consumers of a service¹⁷⁹ (viz. space transportation) is in clear conflict with the mandatory requirements of waiver and cross-waivers of domestic law¹⁸⁰ and would be in conflict with exclusion clauses in contracts for carriage. The position with regard to exclusion clauses generally is examined below, including their definition and purpose and the applicable law on defeating exclusion clauses. The consideration of exclusion clauses in standard form consumer contracts under the Unfair Terms Directive is examined in Ch.VI.¹⁸¹ The objective of this discussion is to consider whether in construing the waivers set out above as exclusion clauses, the possibility of defeating them under consumer law arises. In Ch.VI, it is accepted that where the contract is found to come within the scope of the Directive, it

¹⁷⁸ *The Law of Torts*, at p. 580.

¹⁷⁹ See *Luissi and Carbne v Ministero del Tesoro* (Joined Cases 286/82 and 26/83) [1984] ECR II-66 7, para.16.

¹⁸⁰ For example, the Commercial Space Launch Activities Act 1988, US Code Title 49 ch. 701, s.70112(b).

¹⁸¹ See Ch.VI, s.2.7.

can be held to be unfair. However, the scope of the directive is limited to terms that are not individually negotiated. The position with regard to exclusion clauses outside of the Directive, in common law and particularly with regard to non-standard form contracts is considered below.

5.3.6 Exclusion Clauses Generally¹⁸²

These are defined as “a contractual term by which one party attempts to cut down either the scope of his contractual duties or to regulate the other party’s right to damages or other possible remedies for breaches of contract.”¹⁸³ The focus will be had to those exclusion clauses that are substantive rather than procedural in effect¹⁸⁴ which attempt to exclude liability for death or injury caused by the launch, re-entry or operation of a space object and for other torts committed onboard a space object, rather than an exclusion clause that restricts liability for non-performance of the core contractual obligations. Exclusion clauses have a long history in relation to contracts for carriage.¹⁸⁵ Limitations on the liability for common carriers¹⁸⁶ were accepted by Legislatures¹⁸⁷ and eventually their validity was accepted by the Courts.¹⁸⁸ Limitations on exclusion clauses are provided for in other international conventions relating to the carriage of persons and their luggage although within a framework

¹⁸² See generally McDermott, *Contract Law* (Lexis-Nexis Butterworths, Dublin, 2001), ch.10.

¹⁸³ Clark, Robert, *Contract Law in Ireland*, 5th ed. (Sweet and Maxwell, Dublin, 2005), at p. 166. See also, Yates and Hawkins, *Standard Business Contracts: Exclusions and Related Duties* (Sweet and Maxwell, London, 1986) who define an exclusion clause at para. 1A(2) as “Any clause in a contract or term in a notice that purports to restrict, exclude or modify a liability, duty or remedy that would otherwise arise from a legally recognised relationship between the parties.”

¹⁸⁴ See Coote, *Exception Clauses* (Sweet and Maxwell, London, 1964), pp.3-14, McDermott, *supra*, atp.418-420 and Friel, *The Law of Contract*, 2nd ed., (Round Hall, Sweet and Maxwell, Dublin, 2000), at pp. 197-8.

¹⁸⁵ See Coote, *Exception Clauses*, at pp.21-24.

¹⁸⁶ Providers of commercial satellite services have been viewed by the Courts as common carriers, e.g. COMSAT: See *Alpha Lyracom Space Communications Ltd. v Communications Satellite Corp.* 946 F. 2d. 168 at 176 (2d Cir. 1991).

¹⁸⁷ Carriers Act 1830; the Canal Carriers Act 1845 (UK); The Carriers Act 1865 (India); Common Carriers Act 1902 (Australia; repealed 2002).

¹⁸⁸ *Hinton v Dibbin* (1842) 2 Q.B. 646; *Peek v North Staffs Railway* (1862-63) 10 H.L.C. 473.

imposing liability up to a particular amount. Both the Warsaw and Montreal Conventions limit the ability of the carrier to exclude such liability as arises under the Convention for death or personal injury arising from accidents, for delay or for damage to baggage in relation to international contracts for carriage by air.¹⁸⁹ Although, the latter allows for unlimited liability, where the carrier is at fault. Similarly, the Athens Convention relating to the Carriage of Passengers and their Luggage by Sea 1974 limits the scope of exclusion clauses¹⁹⁰ as do the Uniform Rules concerning the Contract for International Carriage of Passengers and their Luggage by Rail (CIV)¹⁹¹.

Exclusion clauses are frequently used in standard form contracts i.e. a contract whose terms “have not been the subject of negotiation between the parties to it or approved by any organisation representing the interests of the weaker party.”¹⁹²

¹⁸⁹ Article 23 of the Convention for the Unification of Certain Rules Relating to International Carriage by Air 1929 (the Warsaw Convention) and Article 26 of the Convention for the Unification of Certain Rules for International carriage by Air 1999 (The Montreal Convention) both provide: “Any provision tending to relieve the carrier of liability or to fix a lower limit than that which is laid down in this Convention shall be null and void, but the nullity of any such provision does not involve the nullity of the whole contract, which shall remain subject to the provisions of this Convention.”

¹⁹⁰ Article 18 of PAL provides: “Any contractual provision concluded before the occurrence of the incident which has caused the death of or personal injury to a passenger or the loss of or damage to his luggage, purporting to relieve the carrier of his liability towards the passenger or to prescribe a lower limit of liability than that fixed in this Convention except as provided in paragraph 4 of Article 8, and any such provision purporting to shift the burden of proof which rests on the carrier, or having the effect of restricting the option specified in paragraph 1 of Article 17, shall be null and void, but the nullity of that provision shall not render void the contract of carriage which shall remain subject to the provisions of this Convention.”

¹⁹¹ Article 32 of CIV provides: “Any contractual provision concluded before the occurrence of the incident which has caused the death of or personal injury to a passenger or the loss of or damage to his luggage, purporting to relieve the carrier of his liability towards the passenger or to prescribe a lower limit of liability than that fixed in this Convention except as provided in paragraph 4 of Article 8, and any such provision purporting to shift the burden of proof which rests on the carrier, or having the effect of restricting the option specified in paragraph 1 of Article 17, shall be null and void, but the nullity of that provision shall not render void the contract of carriage which shall remain subject to the provisions of this Convention.”

¹⁹² *A. Schroeder Music Publishing Co. Ltd.* [1974] 1 W.L.R. 1308, at p. 1316. See *Marston Excelsior Ltd v Arbuckle Smith and Company Ltd.* [1971] 1 Lloyd’s Rep. 70, at p.95 and *Ailsa Craig Fishing*

These can be legitimate between businessmen negotiating at arm's length, where the potential for an economic imbalance between the parties is reduced.¹⁹³ However, in the case of consumer, it is accepted that additional protection is required. In Ireland and the European Union, the Unfair Terms Directive has affected the use of the exclusion clauses greatly. Where they are found to be unfair terms they will not be held binding upon the consumer. This is of significance for a space carriage consumer where the contract will invariably contain a clause attempting to limit or exclude liability. As the Directive covers standard form contracts, the position under non-standard form contracts falls outside its scope.

5.3.7 Exclusion Clauses in Non-Standard Form Contracts

Most space carriage contracts are currently individually negotiated by the parties. As such it is necessary to consider the common law position with regard to exclusion clauses to ascertain whether it would operate so as to nullify such a clause in favour of a space consumer. An exception clause must both be incorporated into the contract¹⁹⁴ and must cover both the breach and the damage or loss that resulted as a consequence. In *Parker v SE Railway*,¹⁹⁵ the English Court of Appeal set down a number of questions that the courts should ask in order to ascertain if the exclusion clause is incorporated:

If the person receiving the ticket did not see or know that there was any writing on the ticket, he is not bound by the conditions;

If he knew there was writing, and knew or believed that the writing contained conditions, then he is bound by the conditions;

If he knew there was writing on the ticket, but did not know or believe that the writing contained conditions, nevertheless he would be bound, if the delivering of the ticket to him in such a manner that he could see

Co. Ltd v Malvern Fishing Co. Ltd. [1983] 1 W.L.R. 964, at p.966. See generally, Treitel, *The Law of Contract*, 10th ed., (Sweet and Maxwell, London), at p. 196 and Yates and Hawkins, *supra*.

¹⁹³ See *The Maratha Envoy* [1978] A.C. 11, *White Cross Equipment Ltd. v. Farrell* (1983) 2 T.L.R. 21. See Yates and Hawkins, para. 2G(4).

¹⁹⁴ See Friel, *The Law of Contract*, 2nd ed, Round Hall, Sweet and Maxwell, Dublin, 2000, ch. 15

¹⁹⁵ (1877) 2 C.P.D. 416 at p.424.

there was writing upon it, was *reasonable notice* that the writing contained conditions.¹⁹⁶

As Clarke notes, this reasonableness test marked an improvement on previous case law.¹⁹⁷ The *Parker* approach was later applied by the House of Lords.¹⁹⁸ Following *L'Estrange v Graucob*,¹⁹⁹ where a contract has been signed,²⁰⁰ the clause will be found to be incorporated, even if the contract was not read, as Scrutton L.J. stated:

When a document containing contractual terms is signed, then, in the absence of fraud, or, I will add, misrepresentation, the party signing it is bound, and it is wholly immaterial whether he has read the document or not.²⁰¹

A plaintiff may also rely on *non est factum* where the doctrine is applicable.²⁰² The consequences of the application of the case have been described as “horrific”²⁰³ but it has not been challenged in this jurisdiction. It is irrelevant if the plaintiff is illiterate.²⁰⁴ *L'Estrange* was applied in *Curtis v Chemical Cleaning Co*²⁰⁵ where misrepresentation was found to have occurred. The exception clause may only be

¹⁹⁶ *Per* Mellish J at p. 423. Emphasis added. See also *Ryan v Great Southern and Western Railway* 32 I.L.T.R. 108 *cf* *Earl v Great Southern Railway* [1940] I.R. 414 and *Shea v Great Southern Railway* [1944] Ir. Jur. Rep. 26.

¹⁹⁷ Like *Johnson v Great Southern and Western Railway* (1874) I.R. 9 C.L.108.

¹⁹⁸ *Richardson Spence & Co. v Rowntree* [1894] A.C. 298 applied in *Ryan v Great Southern and Western Railway* (1898) 32 I.L.T.R. 108.

¹⁹⁹ [1934] 2 K.B. 394.

²⁰⁰ See also *Duffy v Great Northern Railway* (1878) 4 L.R. (Ir.) 178 *cf* *Tilden Rent-A-Car v Clendenning* (1978) 83 D.L.R. (3d) 400. See also the comments of Clark, *supra*, at pp.174-5 and Friel, *supra*, p.201, fn.13.

²⁰¹ See also *Parker v SE Railway* where Mellish J's judgment (read by Bramwell L.J.) stated similarly at p. 420: “In an ordinary case, where an action is brought on a written agreement which is signed by the defendant, the agreement is proved by proving his signature, and, in the absence of fraud, it is wholly immaterial that he has not read the agreement and does not know its contents.”

²⁰² *Bank of Ireland v McManamy* [1916] 2 I.R. 161. See Mc Dermott p. 584 et seq.

²⁰³ Clark, *op cit*, p. 174, citing *Delaney v Cascade River Holdings Ltd.*, [1983] 44 B.C.L.R. 24.

²⁰⁴ *Thompson v LMS Railway* [1930] 1 KB 41.

²⁰⁵ [1951] 1 K.B. 805.

incorporated before the signing of the contract however.²⁰⁶ A condition may also be incorporated by a course of dealing²⁰⁷ although in the case of isolated dealings, incorporation can occur where both parties are of equal bargaining power and are operating on terms that were used habitually within the industry.²⁰⁸ Although given the current anticipated cost of a private spaceflight and the lack of equal bargaining power between the parties, it would seem unlikely in the near future that incorporation by virtue of a course of dealings will feature to any great extent. Since the *Parker* test was enunciated, the need to protect consumers has altered the application of the principle.²⁰⁹ As Clarke observes “[t]he courts are less inclined to find a limiting clause has been incorporated of the transaction involves a large business and an individual consumer”.²¹⁰ The rules as applicable in Ireland at present suggest that where the contract is signed it will be binding still. If it is not signed, the terms will be binding if the consumer has actual notice of the term of exclusion. Where the consumer is not actually aware of the term, the other party should take reasonable steps to bring the term to the attention of the consumer.²¹¹ Reasonable notice requires that the contractual term be fairly brought to the attention of the contracting party.²¹² A condition which is prominently set out or referred to on the

²⁰⁶ *Sproule v Triumph Cycle Co.* [1927] N.I. 83; *Chappleton v Bray U.D.C.* [1940] 1 K.B. 531; *Olley v Marlborough Court Hotel* [1949] 1 K.B. 532; *Thornton v Shoe Lane Parking* [1971] 1 All E.R. 686; *Slattery v C.I.E.* (1972) *Ir. Jur. Rep.* 21; *cf Brady v Aer Rianta* and *O’Beirne v Aer Rianta* (notice displayed at entrance to car park) cited by Clark, *op cit*, p. 171 fn.24.

²⁰⁷ *Spurling v Bradshaw* [1956] 1 W.L.R. 461; *Circle Freight International v Medeast Gulf Exports* [1988] 2 Lloyd’s Law Rep. 427; *British Crane Hire Corporation v Ipswich Plant Hire* [1975] Q.B. 303; *Miley v McKechnie* (1949) 84 I.L.T.R. 89 and *Lynch Roofing Systems (Ballaghaderten) Ltd v Christopher Bennett and Son (Construction) Ltd.* [1999] 2 I.R. 450.

²⁰⁸ *British Crane Hire Corporation v Ipswich Plant Hire* [1975] Q.B. 303; *Lynch Roofing Systems (Ballaghaderten) Ltd v Christopher Bennett and Son (Construction) Ltd.* [1999] 2 I.R. 450.

²⁰⁹ See *Hollingsworth v Southern Ferries Ltd.* [1977] 2 Lloyd’s Rep 70, at p. 78 *per* Deputy Judge Micheal Ogden Q.C.

²¹⁰ Clark, *op cit*, at p.177 citing *Hollier v Rambler Motors* [1972] 2 Q.B. 71.

²¹¹ *Carroll v An Post, National Lottery* [1996] 1 I.R. 443.

²¹² See generally *Interfoto Picture Library Ltd. v Stilletto Visual Programme Ltd.* [1988] 1 All E.R. 34 and *Carroll v An Post National Lottery Co.* [1996] 1 I.R. 443.

face of the document will usually satisfy this test.²¹³ The condition should be drafted in “clear and explicit” language²¹⁴ and will be interpreted restrictively in accordance with the *contra proferentem* rule.²¹⁵

As noted above the exclusion clause, even where it is incorporated, it must also be found to cover the events that occurred. Denning J. also required that where consumers are concerned and there is an inequality of bargaining power, it may be necessary to show that the clause limiting liability is just and reasonable in the circumstances, however, the decision was not widely accepted.²¹⁶ The high degree of specialisation of the service to be provided may be taken into account in this regard.²¹⁷

At common law, two presumptions developed to deal with the question of whether an exclusion clause in a contract is intended to exclude liability in tort; these have now evolved into the three guidelines set out by Lord Morton in *Canada Steamships*. The first was “that *prima facie* an exception clause does not exclude liability (whether in contract or in tort) for an independent act unconnected with the performance of the contract”.²¹⁸ The justification for this is that the Courts find it

²¹³ *Amiri Flight Authority v BAE Systems plc* [2003] 1 Lloyd’s Rep. 50; [2003] 2 Lloyd’s Rep. 767 (C.A. rev’g on another point); *O’Connor v First National Building Society* [1991] 1 L.R.M. 278 *cf* *Thompson v LM & S Rly* [1930] 1 K.B. 41.

²¹⁴ *McNally v Lancs & New York Railway* (1880) 8 L.R. (Ir.) 81, at p.92 *per* O’Hagan L.J. See also *Alderslade v. Hendon Laundry Ld.* [1945] K.B. 189.

²¹⁵ *Sproule v Triumph Cycle Co.* [1927] N.I. 83; *Wallis, Son and Wells v Pratt and Haynes* [1910] K.B. 1003; *Andrews v Singer* [1934] 1 K.B. 17, *Ailsa Craig Co. Ltd. v Malvern Fishing Co.* [1983] 1 All E.R. 101 at p.105, *Canada SS Lines v R.* [1952] A.C. 192, *Smith v UMB Chrysler (Scotland)* 1978 S.C. 1 H.L., *Mc Nally v Lancashire & York Rly* (1880) 8 L.R. (Ir.) 81, *Hollier v Rambler Motors* [1972] 1 All E.R. 399. See *Mc Dermott*, paras 10.07-10.14.

²¹⁶ *Levison v Patent Steam Carpet Cleaning Co.* [1978] Q.B. 68. See also *Peek v North Staffordshire Railway Company* 11 E.R. 1109. See *McKendrick, E., Contract Law*, 6th ed., (Palgrave, McMillan, Basingstoke, 2005), at p.227.

²¹⁷ *St. Alban’s Council v International Computers* [1995] F.S.R. 686, *Overseas Medical Supplies Ltd. v Orient Transport Services Ltd.* [1999] 1 All E.R. (Comm) 981.

²¹⁸ *Coote, op cit*, p. 33. See also *Elder Dempster v Paterson Zochonis* [1924] A.C. 522, at p. 564 -565 (H.L.); *White v Warwick* [1953] 1 W.L.R. 1285 (C.A.); *Rutter v Palmer* [1922] 2 K.B. 87, 93 (CA);

inherently improbable that the one party intends to absolve the other from negligence and so the Courts must be able to find unambiguous intention to do so.²¹⁹ The presumption may be rebutted where the terms of the exclusion clause are found to be “sufficiently wide”.²²⁰ Synonyms for negligence²²¹ such as “neglect or default”²²² will suffice although McKendrick rightly submits that the use of negligence expressly is the safest course.²²³ The terms ‘at owner’s risk’ were sufficiently wide to exclude damage caused by negligence²²⁴ but not to exclude liability for deliberate acts²²⁵ nor fraudulent misrepresentation.²²⁶ In *Taubman v Pacific SN Co.*²²⁷ a contractual clause excluding liability “under any circumstances” was not found to be wide enough to exclude a personal tort by the ship-owner and in *Hollier v Rambler Motors*²²⁸ a term excluding liability for damage to motor vehicles caused by fire was interpreted by the Courts as not extending to exclude liability for damage caused by a negligently started fire. *Taylor v Manchester, Sheffield and Lincolnshire Railway Co.*²²⁹ went somewhat further; there the Court found that a person who was lawfully on the premises of a railway could maintain an action for personal injury if caused by the active negligence of the defendant regardless of the existence of a contract between the parties.

This would appear to go against the case law surrounding s.70112(b) (examined below), although it is possible that a different approach may be adopted in cases

Chartered Bank of India v Netherlands India S.N. Co. (1883) 10 Q.B.D. 521 and *J. Nunes Diamonds v. Dom. Elec. Protection Co.* [1972] S.C.R. 769, at pp.777-8.

²¹⁹ *Gillespie Brothers & Co. v Roy Bowles Transport Ltd.* [1973] 1 All ER 193, at p. 204 per Buckley L.J.

²²⁰ *Hinton v Dibbin* 114 E.R. 253. See also *Farr v Admiralty* [1953] 1 W.L.R. 1285, *Rutter v Palmer* 38 T.L.R. 555 and *Miller v Midland Great Western Railway* (1905) 5 N.I.J.R. 202.

²²¹ *Smith v South Wales Switchgear Ltd.* [1978] 1 W.L.R. 165.

²²² *Smith v UBM Chrysler(Scotland)Ltd.* 1978 SC (HL) 1 and *Monarch Airlines Ltd. v London Luton Airport* [1997] CLC 98.

²²³ *Supra*, p.230.

²²⁴ *Pyman Steamship Co.v Hull and Barnesley Railway Co.* [1915] 2 K.B. 729.

²²⁵ *Ronan v Midland Railway Co.* (1883) 14 L.R. (Ir.) 157.

²²⁶ *Pearson v Dublin Corporation* [1907] A.C. 351.

²²⁷ (1872) 26 L.T. 704.

²²⁸ [1972] 1 All E.R. 399.

²²⁹ [1895] 1 Q.B. 134, 11 T.L.R. 27.

concerning death or personal injury. In *White v Warwick*,²³⁰ an exclusion clause did not exclude liability in negligence for the personal injuries sustained by the plaintiff. In that case Denning L.J. found that there were in fact two heads of liability and that the head of liability relied on by the plaintiff could be established independently of the contract. The second rule is a presumption that the parties did not intend to exclude negligence unless it is the only liability to which the exception could apply.

²³¹ So in *Alderslade v. Hendon Laundry, Ltd.*, Greene M.R. stated:

Where the head of damage in respect of which limitation of liability is sought to be imposed by such a clause is one which rests on negligence and nothing else, the clause must be construed as extending to that head of damage, because it would otherwise lack subject-matter. Where, on the other hand, the head of damage may be based on some other ground than that of negligence, the general principle is that the clause must be confined in its application to loss occurring through that other cause, to the exclusion of loss arising through negligence. The reason is that if a contracting party wishes in such a case to limit his liability in respect of negligence, he must do so in clear terms in the absence of which the clause is construed as relating to a liability not based on negligence.²³²

This too may be rebutted by the unambiguous wording of the clause, as it is submitted space carriage contracts usually will be. In *Pyman v H & B Railway*²³³ the words “whatever nature...howsoever arising” was sufficient to rebut the presumption. Similarly, the use of “howsoever caused” in an exclusion clause also rebutted the presumption.²³⁴ Although in the case of the latter phrase the courts have

²³⁰ [1953] 1 W.L.R. 1285.

²³¹ *Canada S.S. Lines v R.* [1952] A.C. 192; *Calico Printers Association v Barclays Bank* (1931) 145 L.T. 51 (C.A.) *Archdale v Comservices* [1954] 1 W.L.R. 459; *British Arc Welding Co. v L.N.E. Railway* (1942) 73 Lloyd’s L. Rep. 140.

²³² [1945] 1 K.B. 189, at p. 192

²³³ [1915] 2 K.B. 729 (C.A.)

²³⁴ *White v Warwick* [1953] 1 W.L.R. 1285 (C.A.) and *Regan v. Irish Automobile Club* [1990] 1 IR 278 *cf Belships(Far East) Shipping (PTE) Ltd v Canadian Pacific Forest Products* (1999) 175 DLR (4th) 449. But not “howsoever occasioned”: *Shell Chemicals UK Ltd. v. P&O Roadtanks Ltd.* [1995] 1 Lloyd’s L. Rep. 297.

accepted that its effect will depend on its context.²³⁵ From the case law on these presumptions, the current guidelines²³⁶ in England emerged and these were set forth by Morton L.J. in *Canada SS v The King*:²³⁷

1) If the clause contains language which expressly exempts the person in whose favour it is made (hereafter called 'the *proferens*') from the consequences of the negligence of his own servants, effect must be given to that provision...

(2) If there is no express reference to negligence, the Court must consider whether the words used are wide enough, in their ordinary meaning, to cover negligence on the part of the servants of the *proferens*. If a doubt arises at this point, it must be resolved against the *proferens* ...

(3) If the words used are wide enough for the above purpose, the Court must then consider whether 'the head of damage may be based on some other ground than that of negligence,' to quote again Lord Greene in the *Alderslade* case. The 'other ground' must not be so fanciful or remote that the *proferens* cannot be supposed to have desired protection against it; but, subject to this qualification, which is no doubt to be implied from Lord Greene's words, the existence of a possible head of damage other than that of negligence is fatal to the *proferens* even if the words used are *prima facie* wide enough to cover negligence on the part of his servants.²³⁸

In addition, the Courts in England also have the ability to regulate the effect of a clause excluding liability in negligence for death or personal injury under s.2 of the

²³⁵ *Bishop v Bonham* [1988] 1 W.L.R. 742, at p.755.

²³⁶ *Evans v Glasgow DC* [1979] SLT 270, at 276 and *The Raphael* [1982] 2 Lloyd's L. Rep. 42.

²³⁷ [1952] A.C. 192; [1952] 1 All E.R. 305; [1952] 1 Lloyd's Rep. 1; [1952] 1 T.L.R. 261; (1952) 96 S.J. 72.

²³⁸ *cf Schenker & Co. (Aust) Pty Ltd. v Malpas Entertainment and Services and Pty Ltd.* (1990) VR 834 where the Supreme Court of Victoria rejected these guidelines as 'strained'.

Unfair Terms Act 1977. In Canada, concurrent liabilities may arise in contract and tort but this is subject to the limitation posed by the existence of an exclusion clause, as Le Dain J. observed in *Central Trust Co. v Rafuse*:

A concurrent or alternative liability in tort will not be admitted if its effect would be to permit the plaintiff to circumvent or escape a contractual exclusion or limitation of liability for the act or omission that would constitute the tort. Subject to this qualification, where concurrent liability in tort and contract exists the plaintiff has a right to assert a cause of action that appears to be most advantageous to him in respect of any particular legal consequence.²³⁹

In Ireland, in contrast to *White v Warwick* where the exclusion of the duty in contract did not result in the exclusion in tort, in *Hughes v J.J. Power Ltd. v Collier*,²⁴⁰ the High Court in examining whether work on an engine of a combine harvester stated to be left with the second defendants at the owner's risk precluded the plaintiff's suit in negligence when further damage was caused to the engine.²⁴¹ Blayney J. found that the defendant's statement clearly indicated that the engine was taken without responsibility and this was sufficient to exclude liability on its part, even if there had been negligence. The duty upon both defendants in contract was the equivalent of that existing in tort i.e. to exercise the ordinary standard of due skill, care and diligence in conducting the repairs and though there the duty though it arose both in tort and in contract it was only one duty and one head of liability, rather than in *White* where two heads of liability existed. Here the first defendant had fallen below that standard in not being aware of removing certain bolts. In relation to the second defendant, the failure to comply with the duty had been excluded as there was nothing else the exclusion clause could have applied to. So it would seem that where

²³⁹ [1986] 2 S.C.R. 147, at p. 206. See Bloom, "Concurrent Tort and Contract – Start of the Limitation Period: *Central Trust v Rafuse*," (1987) 21 *U.B.C. L. Rev.* 429. See also *BG Checo International Ltd. v. British Columbia Hydro & Power Authority* [1993] 1 S.C.R. 12, 99 D.L.R. (4th) 577, 75 B.C.L.R. (2d) 145.

²⁴⁰ Unreported, High Court, May 11th, 1988 (1988) 6 I.L.T. 261 Digest.

²⁴¹ It is doubtful if the clause would have excluded liability where the damage was a result of wilful conduct: *Ronan v Midland Rly Co.* (1883) 14 LR (Ir) 157.

there is a single duty, the release from the duty in contract will also be a release from the duty in tort where it exists.²⁴² It is submitted that a well-drafted exclusion clause would avoid many of the difficulties arising here and be sufficient to rebut the applicable presumptions.

However, an exclusion clause may also be set aside “when it is found to be so unreasonable, or applied so unreasonably as to be unconscionable”²⁴³. Although some courts have held that the doctrine should be used sparingly with regard to exclusion clauses.²⁴⁴

5.3.8 *The Sale of Goods and Supply of Services Act 1980*²⁴⁵

Where there has been misrepresentation pre-contractually, section 46 of the Sale of Goods and Supply of Services Act may be of use. It provides that

If any agreement (whether made before or after the commencement of this Act) contains a provision which would exclude or restrict (a) any liability to which a party to a contract may be subject by reason of any misrepresentation made by him before the contract was made, or (b) any remedy available to another party to the contract by reason of such misrepresentation, that provision shall not be enforceable unless *fair and reasonable*.²⁴⁶

However, it must be borne in mind that in order to come within a definition of a consumer for the purposes of the Act, the service supplied must be of a kind

²⁴² *Elder Dempster v Paterson Zochonis & Co.* [1924] A.C. 522, H.L., *Hall v Brooklands Auto Racing Club* [1933] 1 K.B. 205. See Coote, p.35.

²⁴³ *Gillespie Brothers & Co. v Bowles (Roy) Ltd* [1973] QB 400 *per* Lord Denning at p. 415.

²⁴⁴ *Atlas Supply Co. Of Canada Ltd v Yarmouth Equipment Ltd* (1991)103 CPR (3d) 38 (Nova Scotia Supreme Court).

²⁴⁵ No. 16 of 1980.

²⁴⁶ Emphasis added.

ordinarily supplied for private use or consumption.²⁴⁷ If space tourism services are defined widely as space activities or even commercial space carriage, at the current stage of the industry's development, this may not bring the space tourist within the definition of a consumer. If space tourism contracts are viewed narrowly as the provision of a service for private persons, then it will bring the space tourist within the scope of the Act's protection. In *Walker v Boyle*,²⁴⁸ the English equivalent to s.46 was considered. Here a clause excluding liability for errors, omissions or misstatements in a contract for the sale of land which was included in the English Law Society standard for the condition of sale was found not to be fair and reasonable.²⁴⁹ What is fair and reasonable under the Act is to be decided in accordance with the schedule which states that "if a term is fair and reasonable the test is that it shall be a fair and reasonable one to be included having regard to the circumstances which were, or ought reasonably to have been, known to or in contemplation of the parties when the contract was made." In relation to services, regard must be had to the following factors:

- (a) The strength of the bargaining positions of the parties relative to each other, taking into account (among other things) alternative means by which the customer's requirements could have been met;
- (b) whether the customer received an inducement to agree to the term, or in accepting it had an opportunity of entering into a similar contract with other persons, but without having to accept a similar term;
- (c) whether the customer knew or ought reasonably to have known of the existence and extent of the term (having regard, among other things, to any custom of the trade and any previous course of dealing between the parties);²⁵⁰
- (d) where the term excludes or restricts any relevant liability if some condition is not complied with, whether it was reasonable at the time of

²⁴⁷ Section 3 of the 1980 Act, considered in *O'Callaghan v Hamilton Leasing (Ireland) Ltd* [1984] I.L.R.M. 146.

²⁴⁸ [1982] 1 W.L.R. 495.

²⁴⁹ See also *Southwestern General Property Co. v Marton* (1982) 263 E.G. 1090; *Production Technology v Bartlett* [1988] 1 E.G.L.R. 182. See Clark, *supra*, ch 11.

²⁵⁰ See *Western Meats v National Ice* [1982] ILRM 99.

the contract to expect that compliance with that condition would be practicable.

So the fact that the consumer had no real chance of negotiating a different contract for a similar service will be relevant.²⁵¹ This will be easier to demonstrate where the supplier can be shown to have a monopoly.²⁵² The issue of insurance will also come into play.²⁵³ The ability of the supplier to guard against the liability through insurance will be a factor particularly where insurance may be obtained without materially affecting the price of the product or service.²⁵⁴ It is material that the risks are insurable by both parties, not whether the parties were in fact actually insured.²⁵⁵ Companies engaged in launch activities are required to have insurance by national law. The extent to which the clause reflects, or fails to reflect, industry practice may be considered.²⁵⁶ The extent to which misrepresentation may occur among parties to a space carriage contract, particularly as to the risks of the space flight, will have to be judged on a case-by-case basis. The 1980 Act may also be of value in the inclusion of implied terms²⁵⁷ as to the supplier's necessary skill to render the service, to supply the service with due skill, care and diligence, to use materials that are sound and reasonably fit for the purpose for which they are required, and that, where goods are supplied under the contract, they will be of merchantable quality within the meaning of section 14 (3) of the Act of 1893.²⁵⁸ These implied undertakings are

²⁵¹ *Woodman v Photo Trading Processing* (1981) 131 N.L.J. 933.

²⁵² *Edmund Murray Ltd. v B.P. International Foundations* (1992) 33 Con L.R. 1. See Clark p. 220-226.

²⁵³ *Grosvenor Hotel v Alfred Mc Alpine Management* (1992) 56 BLR 115 cf *The Flamer Pride* [1990] 1 Lloyd's L. Rep. 429.

²⁵⁴ *George Mitchell (Chesterhall) v Finney Lock Seeds* [1983] A.C. 803.

²⁵⁵ *Singer Co. (UK) Ltd. v Tees and Hartlepool Port Authority* [1988] 2 Lloyd's L. Rep. 164.

²⁵⁶ *Sonicare International Ltd. v East Anglia Freight Terminal Ltd.* [1997] 2 Lloyd's L. Rep. 48.

²⁵⁷ Section 39 of the Sale of Goods and Supply of Services Act. See *Moores v. Yukeley Associates Ltd.* [2000] T.C.L.R. 146 and Clark, p. 216 *et seq.*

²⁵⁸ As substituted by s.10 of the 1980 Act i.e. Goods are of merchantable quality if they are as fit for the purpose or purposes for which goods of that kind are commonly bought and as durable as it is reasonable to expect having regard to any description applied to them, the price (if relevant) and all the other relevant circumstances, and any reference in this Act to unmerchantable goods shall be construed accordingly. See *Irish Telephone Rentals Ltd. v. Irish Civil Service Building Society Ltd.* [1991] ILRM 880.

stated in the Act not to apply to “a contract for the carriage of passengers or goods by land, sea, air or inland waterway from one place to another within the State” but this clearly does not exclude international carriage. The implied undertakings may be negated or varied by an express term of the contract or by the course of dealing between the parties or by usage, if the usage is such as to bind both parties to the contract, but where the recipient of the service deals as consumer it must be shown that the express term is fair and reasonable and has been specifically brought to his attention.²⁵⁹ However, this agreement to negative or vary the implied undertakings cannot invalidate a “term of an agreement for the international carriage of passengers or goods by land, sea or air, including an agreement between parties whose places of business or residences are situated in the State.” Any other attempt to limit or exclude the implied undertakings may give rise to an offence under s.41. The provisions have been used in holiday litigation and s.39 has been held to include a duty to provide information on the dangers of the destination where they were reasonably foreseeable,²⁶⁰ although not a particular activity.

Section 42 of the 1980 Act sets down the application of the principles where a conflicts issue arises. It provides that “[w]here the proper law of a contract for the supply of a service in the course of a business would, apart from a term that it should be the law of some other country or a term to the like effect, be the law of Ireland or where any such contract contains a term which purports to substitute, or has the effect of substituting, provisions of the law of some other country for all or any of the provisions of sections 39 and 40, those sections shall, notwithstanding that term, apply to the contract.”

6. Conclusion

Liability under national space law varies subtly between States. The State will be liable to other States under international law as it will be to foreign nationals. However, its liability to its own nationals is regulated under State law, for example

²⁵⁹ Section 40 of the Sale of Goods and Supply of Services Act 1980. See *McCarthy v Joe Walsh Tours Ltd.* [1991] I.L.R.M. 813.

²⁶⁰ *Mc Kenna v Best Travel Ltd. T/A Cypriana Holidays* [1996] IEHC 42; [1998] IESC 57.

under FTCA. In the absence of a specific law, general principles of State liability will apply, for instance as in Ireland. States are liable for the actions of their agencies but in some cases, for example, NASA, the agency may have the power to settle claims arising from its own activities below a particular limit. In relation to liability to contractors and sub-contractors, some States, such as the US, regulate their exposure to liability through the use of waivers. Liability to the US by private operators who are contractors and subcontractors of the State also benefit from the use of waivers. However, the more common approach is to require the operator or licensee to indemnify the State for its exposure to liability under international law. Curiously, under the Korean regime, liability arising under the 1972 Convention is covered but not that which could arise under the Outer Space Treaty or general principles. State laws vary on the scope of the exposure to liability. Australia, the UK and Sweden have adopted laws with the potential to shift the entire cost on to the operator. Other states, such as Belgium will determine the scope applicable on an incremental basis. France has a more measured response only imposing an obligation to indemnify up to the limit provided for under the Act. This is the preferred approach for indemnities. In the absence of a specific indemnity, recovery will still be possible by the State under general principles of restitution.

In relation to liability to third parties, national space laws generally impose strict liability regimes on operators for damage caused to the surface of the earth. Some jurisdictions, for example, Korea will apply a negligence based theory where liability arises due to war or armed conflict. Such a shift is not seen in other national laws, such as France, and it may be viewed as a reflection of the political situation of that state. France does provide a defence of contributory negligence and the inclusion of such a defence is advised as it results in some of the burden of liability being shifted away from the operator where it would be unfair not to do so. In the absence of specific laws, general tort law may be availed of. While it remains to be seen if strict liability will be adopted for unilateral accidents, as concluded in Ch.III, strict liability may be applied when brought within the scope of trespass or *Rylands v Fletcher*. Negligence principles may be applied in the case of certain bilateral accidents, such as those occurring in outer space. The burden of proving a breached duty of care causing harm may be shifted if *res ipsa* is applied. Analogical precedents suggest it may not be applied however. In the case of contractual inter party liability, there has

been recent legislative action in the US. Federal law now requires the execution of waivers between spaceflight participants and the State and between permittees and licensees and spaceflight participants. While no waiver is prescribed between the operator/carrier and the participant, state law is quickly filling the void, for instance, in Virginia and Florida. In considering whether such an approach is recommended for EU States, an immediate challenge arises to the use of ‘spaceflight participant’. While all space tourists can be classified as spaceflight participants, private researchers and scientists who pass to or through space for purposes other than recreation are more correctly viewed as spaceflight participants rather than as tourists. The use of the latter, wider term would therefore seem preferable in the general regulation of private manned commercial spaceflight. However, use of the term may mask the distinction that may drawn in legal terms among those that are space tourists engendering a higher level of protection as consumers of a service generally and as a consumer of a package holiday specifically, those spaceflight participants that are not consumers of a package but may still be viewed as consumers generally nonetheless and those spaceflight participants that cannot be viewed either as consumers or as tourists. The significance of this distinction is particularly pertinent considering the trend towards the mandatory inclusion of waivers in all contracts between spaceflight entities and spaceflight participants. This leaves open the possibility of applying consumer law to have such clauses excluded as unfair for consumers or unconscionable and the motivation to apply general principles to argue that they are not validly incorporated into the contract. As Yates observes:

There is no such thing as an exclusion clause in the abstract. It only makes sense in the context of the other terms and obligations of the contract.²⁶¹

From the U.S. case law on waivers, it is clear that exclusion clauses, by analogy, will not automatically be viewed as unfair and that liability may be found to be validly excluded in that jurisdiction given the high risk nature of the technology and the ultrahazard posed by the activity. In addition, statute has provided that any space

²⁶¹ Yates, *supra*, at p.7.

flight participant must be informed of the risks and is therefore aware of them before consideration changes hands.

In Ireland, on the question of the incorporation of the exclusion clause into a private space carriage contract for persons, where the contract is signed, the clause will bind, provided that there is no fraud, misrepresentation or unconscionability. Although the Courts are disinclined to find an exclusion clause validly incorporated in the case of consumer contracts given among other things, the unequal distribution of bargaining power between the parties, where the consumer is actual aware of the term or where reasonable steps have been taken to bring the clause to the attention of the consumer, the clause may be found to be incorporated.

On the separate question of whether the clause actually excludes liability for the events giving rise to the damage caused, where the liability arises from what would otherwise have been a tortious act but for the existence of the clause, the defendant will have to rebut the presumption that the clause does not exclude such liability and the presumption that such liability was not intended to be excluded save where it is the only liability that could arise. An explicit and well-drafted clause would overcome these hurdles. But would such a clause be just and reasonable in a consumer contract? The factors identified above – the ultrahazardous nature of the activity and the high risk associated with the technology - in addition to the fact that the primary purpose of the clause in such circumstances is to redistribute the burden of insuring against the risk to the consumer incline one to the view that the clause is just and reasonable, particularly if all the requirements of the CSLAA have been met. Although, this may be subject to change if an international convention similar to the Warsaw Convention was drafted. But even if the clause is found to be validly incorporated, the Court may not find the scope of the clause to exclude all liability. The factors outlined above apply with particular force to the launch, re-entry and operation of the space object, however, outside of this these factors are not of very great weight, such as liability for torts committed onboard the space object unconnected with its launch, re-entry or operation. In such cases, the exclusion clause should be treated as any other clause excluding liability in tort in a non-hazardous activity. The same point can be made in reference to an exclusion clause in a standard form contract subject to the Unfair Terms Regulations in assessing

whether the clause creates a significant imbalance between the parties. If the contract has not excluded the implied obligations under the Sale of Goods and Supply of Services Act 1980, then they will apply. Any express exclusion of the obligations must be fair and reasonable and specifically brought to the consumer's attention. Although some contracts for the carriage of persons are excluded from the scope of the Act including carriage by air, contracts for the carriage of persons into or through space are not. What is fair and reasonable in this context is to be determined with regard to the criteria in the schedule to the Act such as the bargaining power of the parties and the consumer's awareness of the extent of the term.

How the competing interests between the desire to protect the space tourism industry and the public interest in consumer protection are to be reconciled in the EC is a matter to yet to be determined. The pre-disclosure requirements of US federal law are certainly an element that should be adopted in the EC or, failing that, by Member States desiring to establish a spaceport. It grants wide protection prior to the passing of consideration both to consumers and non-consumers alike. Furthermore, it is in harmony with the EC consumer ideology. The state law approach adopted in Virginia and Florida, which requires waivers of liability by the participant coupled with informed consent procedures, has the practical effect of shifting the burden of insurance from operator to participant. It is probable that such waivers will become standard terms in contracts for carriage of persons, whether required by state law or not. Where state law does not require such waivers, they may be subject to challenge as unfair or as unconscionable. This may result in spaceflight operators establishing themselves in those states which permit and, indeed, require the inclusion of such waivers in order to minimise exposure to liability. Nonetheless, even in a state where such a waiver would be severed from the contract, the pre-disclosure requirements and informed consent procedures should provide an adequate defence establishing a voluntary assumption of risk for tort actions (although even in the best case scenario where the clause is voided and severed, the dispute may then turn on whether the consent was properly informed). As such the need to incorporate a mandatory waiver in state law is much reduced when viewed solely as a tool to protect industry; its importance is then primarily in maintaining efficiency in reducing the costs of litigious behaviour. In relation to liability that does not arise from the actualisation of risks inherent to spaceflight and non-tortious liability, such as for a breach of

contract, the waivers as provided for in Virginia and Florida would not exclude such liability in either case. At the current phase of the industry's development, the limited waiver requiring the exclusion of liability for damage due to the actualisation of the inherent risks of spaceflight favours the industry, however, the freedom to waive all liability is not precluded and such an 'all-risks' waiver would weigh the scales disproportionately against space tourists as consumers and would be contrary to current consumer ideology.