National space legislation : future perspectives for Malaysian Space Law

Saari, C.Z.B.

Author: Saari, Che Zuhaida Binti
Title: National space legislation : future perspectives for Malaysian Space Law
Issue Date: 2014-10-21

National Space Legislation
Future Perspectives for Malaysian Space Law

PROEFSCHRIFT

ter verkrijging van
de graad van Doctor aan de Universiteit Leiden,
op gezag van Rector Magnificus prof. mr. C.J.J.M. Stolker,
volgens besluit van het College voor Promoties
te verdedigen op dinsdag 21 oktober 2014
klokke 16.15 uur

door

Che Zuhaida Binti Saari

geboren te Kota Bharu, Kelantan (Malaysia) in 1971

Promotiecommissie:

Promotor: Em. Prof. dr. P.P.C. Haanappel

Overige leden: Prof. dr. P.M.J. Mendes de Leon
Prof. dr. N.J. Schrijver
Prof. dr. S.M. Williams (University of Buenos Aires, Argentina)

Acknowledgements

First and foremost, the success and completion of this research is by the Mercy of God the Almighty; His Absolute Will and Destiny are beyond all arrangements.

I wish to register my thanks and acknowledgement to the Government of Malaysia, Ministry of Education Malaysia, for financing my study and making the educational system in Leiden University, The Netherlands, feasible to me, and to the Islamic Science University of Malaysia for funding my family during our stay in Leiden; without this generous support, the research could not possibly have been conducted.

My most profound appreciation and gratitude is conveyed to my promotor, Emeritus Professor Dr. P.P.C. Haanappel, Professor of Air and Space Law at the International Institute of Air and Space Law, Leiden University, who has kindly guided and patiently read and supervised my work. Without his invaluable supervision and constant guidance, the completion of this research would not have been possible.

Similar deep appreciation is extended to Professor Dr. Pablo Mendes de Leon and Assistant Professor Drs. T.L. Masson-Zwaan, Director and Deputy Director of the International Institute of Air and Space Law, Leiden University, for their kind assistance and constructive remarks, Professor Dr. N.J. Schrijver, Professor of International Law and Academic Director of the Grotius Centre for International Legal Studies, Leiden University, and Professor Dr. Maureen Williams, Professor of Public International Law at the University of Buenos Aires, Argentina, and Chair of the International Law Association (ILA) Space Law Committee, London, for their valuable comments and priceless time.

I wish to record my deepest respect and gratitude to Emeritus Professor Dr. Isabella Diederiks-Verschoor, Honorary Board Member of the International Institute of Air and Space Law, Leiden University (President Emeritus of the International Institute of Space Law and former Vice-Chairperson of the International Institute of Air and Space Law) for generously providing and assisting me with sources of references. She has inspired me, intellectually and spiritually, to complete this research. Her very warm welcome and hospitality especially during our early days in Holland will never be forgotten. Similar appreciation is conveyed to Professor Dr. C.J.J.M. Stolker, Dean of the Faculty of Law, Leiden University for his kindness and providing me an opportunity to do a PhD in Leiden University.

I am very much indebted to Ms Paula van der Wulp, Office Manager of the International Institute of Air and Space Law of Leiden University, for her first-class assistance and friendship; to Mr John Coast of North Yorkshire, United Kingdom, for proofreading my manuscript and providing editorial assistance in the English language, to Drs. Kora Bentvelsen, Management Assistant of Van Vollenhoven Institute for Law, Governance, and Development, Leiden University, for kindly providing the *Samenvatting* (the Dutch translation of the summary), and to Ms. Esmee ten Donkelaar of Graduate School/Promoties, Leiden Law School, for administrative assistance. My sincere thanks also go to all the other staff members of the International Institute of Air and Space Law and the Faculty of Law, Leiden University.

My special appreciation is conveyed to Dr Mustafa Din Subari, former Director General of the National Space Agency of Malaysia (ANGKASA), for his generous assistance and words of encouragement. His invitation for contributions to the development of the Malaysian Outer Space Act, which is very much appreciated, still could not be met due to my hectic research schedules. I also convey my appreciation to Mr Norul Ridzuan Zakaria, founder and president of Malaysian Institute of Aero and Space Studies (IKAM) and the Space Tourism Society Malaysia Chapter (STS-MC), for his kind contribution in affording the latest development of Malaysian private space activities, to Ms. Noor Asima Osman, former Legal Advisor to ANGKASA, for responding to my emails, to Associate Professor Datin Mary George of the Faculty of Law, University of Malaya, Kuala Lumpur, who introduced me to space law, to Professor Dr. Hj Abdul Samat Musa, former Dean of Faculty of *Syariah* and Law, Islamic Science University of Malaysia, Negeri Sembilan, for his trust in permitting me to pursue a Ph.D in space law despite the fact that it is still in its infancy in Malaysia, and to Professor Abu Bakar Munir, Faculty of Law, University of Malaya, Kuala Lumpur, for his kindness in attending to my correspondence and for his words of encouragement.

My due respect goes to Dato' Mazlan Othman, Director of the United Nations Office for Outer Space Affairs (UNOOSA) and founding Director General of ANGKASA; I had the pleasure of meeting her and I followed the space-related seminars and conferences organized by ANGKASA during her term as Director-General. To Dato’ I send all my gratitude and deepest admiration.

Last but not least, special thanks are due to major university and public libraries, particularly the Law Library and University Library of Leiden University, Leiden, The Netherlands, the Peace Palace Library of the International Court of Justice, The Hague, The Netherlands, Ahmad Ibrahim Law Library and Za’ba Library of University of Malaya, Kuala Lumpur, Malaysia, and IIUM Library of International Islamic University Malaysia, Kuala Lumpur, Malaysia.

My deepest gratitude and appreciation are dedicated to my family. No amount of thanks will ever be remotely sufficient to express my gratitude to my parents Al Fadhil Haji Saari Hussain and Hajjah Wan Zainun Wan Jaafar, to my parents-in-law, the late Wan Abdullah, Wae Tiyoh Maeh Timoh, and Che Zainab Che Yunos, to my sister, Associate Professor Dr. Che Zarrina Saari, my brother-in-law Professor Dr. Joni Tamkin bin Borhan of University of Malaya, Kuala Lumpur, and all my other siblings and in-laws. Your prayers, enduring love and absolute support, physically, spiritually and financially, have strengthened my soul.

I make a special dedication to my husband, Associate Professor Dr. Wan Suhaimi Wan Abdullah of Universiti Teknologi Malaysia, Kuala Lumpur, for his constant and generous comments on my thesis writing intellectually and academically, and for being my support when I could find no answers to my queries, and to my daughter, Shameem Rumaisaa, for her most steady and supportive stance. Words cannot express how grateful I am to both of you for your sacrifice and patience throughout the completion of this research.

I must not forget my dear friends whom I met during my time in the Netherlands: Dr Azizi bin Abdul Aziz, Dr Salmah bt Yaakop and family, Mr. Mohd Zuwairi bin Saiman, Ms. Farahaniza binti Supandi, Ms. Nor Fazilah (Aji) and family, Mr. Mohd Hafeez bin Osman and family, and the late Mr. Mohd Ali bin Mohd Salim (a passenger on board MH17). Your substantial assistance and support will never be forgotten. My special thanks also go to Mr Ahmad Anis bin Muhd Fauzi, Mr Muhammad Nizam bin Awang, and all staff members of the Faculty of *Syariah* and Law, Islamic Science University of Malaysia, and to anyone who I may have inadvertently left off the list, for their supports, assistances and prayers.

C. Zuhaida Saari

To my parent and family,
to all my teachers, friends, and the Malaysian people,
I dedicate this work.

Table of Contents

List of Abbreviations and Acronyms

ABC	All Asia Broadcast Centre
ACMA	Australian Communications and Media Authority
ADCS	Spacecraft Attitude Determination & Control Subsystem
AEGRS	ASEAN Experts Group on Remote Sensing
AIT	Assembly, Integration and Test
ANGKASA	Malaysian National Space Agency
APEC	Asia-Pacific Economic Cooperation
APRSAF	Asia-Pacific Regional Space Agency Forum
APT	Asia Pacific Telecommunity
ARABSAT	Arab Corporation for Space Communication
ASEAN	Association of Southeast Asian Nations
ASPC	Asia Pacific Space Centre Pty Ltd
ASRI	Australian Space Research Institute
AST	Office of Commercial Space Transportation United States
ASTRO	Astro All Asia Network Plc.
ATSB	Astronautic Technology (M) Sdn. Bhd.
BAKSA	*Bahagian Kajian Sains Angkasa*
BIS	Department for Business, Innovation and Skills United Kingdom
BNSC	British National Space Centre
CEDEX	Cosmic-Ray Energy Deposition Experiment
CLP	Current Legal Problems
COMSTAC	Commercial Space Transportation Advisory Committee
COST	Committee on Science and Technology
CRCSS	Cooperative Research Centre for Satellite Systems
CRISP	Centre for Remote Imaging, Sensing, and Processing of Singapore
CSA	Canadian Space Agency
CTO	Commonwealth Telecommunications Organization
DAE	Department of Atomic Energy India
DAS	Disaster Alert System
DBS	Direct Broadcasting by Satellite
DGPS	Differential Global Positioning System

DID	Department of Irrigation and Drainage
DLR	*Deutsches Zentrum für Luft- und Raumfahrt*
DMT	Digital Multimedia Terminal
DOC	Department of Commerce United States
DOD	Department of Defense United States
DOF	Department of Fisheries Malaysia
DOS	Department of State United States
DOT	Department of Transportation United States
DSO	Defence Science Organization of Singapore
DTH	Direct-To-Home
EADS	European Aeronautic Defence and Space Company
ECER	East Coast Economic Region
e-CFR	Electronic Code of Federal Regulations
ECSL	European Centre for Space Law
ELDO	European Launcher Development Organization
ESA	European Space Agency
EUMETSAT	European Organization for the Exploitation of Meteorological Satellites
FAA	Federal Aviation Administration United States
FCC	Federal Communications Commission United States
FDPM	Forestry Department of Peninsular Malaysia
FLAS	Fixed-line Alert System
GBAS	Ground-Based Augmentation System
GIS	Geography Information System
GISTDA	Geo-Informatics and Space Technology Development Agency Thailand
GMDSS	Global Maritime Distress and Safety System
GNSS	Global Navigation Satellite Systems
GPS	Global Positioning System
GSLV	Geosynchronous Satellite Launch Vehicle
HSC	Hughes Space and Communications Company
IAA	International Academy of Astronautics
IAASS	International Association for the Advancement of Space Safety
IAF	International Astronautical Federation
IASL	Institute of Air and Space Law
ICAO	International Civil Aviation Organization

ICJ	International Court of Justice
ICLQ	International and Comparative Law Quarterly
IDA	Infocomm Development Authority of Singapore
IGDP	Integrated Geospatial Database and Planning
IIASL	International Institute of Air and Space Law
IISL	International Institute of Space Law
IIUM	International Islamic University of Malaysia
IKAM	Malaysian Institute of Aero and Space Studies
ILA	International Law Association
ILQ	International Law Quarterly
IMCO	Inter-Governmental Maritime Consultative Organization
IMO	International Maritime Organization
IMSO	International Mobile Satellite Organization
INCOSPAR	Indian National Committee for Space Research
INMARSAT	International Maritime Satellite Organization
INSAT	Indian National Satellites system
INTELSAT	International Telecommunications Satellite Organization
IRPS	Image Receiving and Processing Systems
IRS	Indian Remote Sensing satellites
ISAC	ISRO Satellite Centre India
ISRO	Indian Space Research Organization
ISS	International Space Station
ITSO	International Telecommunications Satellite Organization
ITU	International Telecommunication Union
JAXA	Japan Aerospace Exploration Agency
JBIS	Journal of British Interplanetary Society
JILT	Journal of Information, Law and Technology
JMCL	Journal of Malaysian and Comparative Law
JUPEM	Department of Surveying and Mapping Malaysia
KLIA	Kuala Lumpur International Airport
LKIM	Fisheries Development Authority of Malaysia
LRIT	Long Range Identification and Tracking of Ships
LSO	Launch Safety Officer
MAC	Medium-sized Aperture Camera

MACRES	Malaysian Centre for Remote Sensing
MADA	MUDA Agricultural Development Authority
MARDI	Malaysian Agricultural Research and Development Institute
MASTIC	Malaysian Science and Technology Information Centre
MBNS	MEASAT Broadcast Network Systems Sdn Bhd
MCA	Malayan Chinese Association
MCI	Ministry of Communications and Information of Singapore
MEASAT	Malaysia East Asia Satellite
MEXT	Ministry of Education, Culture, Sports, Science and Technology
MGRS	MACRES Ground Receiving Station
MIC	Malayan Indian Congress
MICA	Ministry of Information, Communications and the Arts Singapore
MICT	Ministry of Information and Communication Technology Thailand
MIMOS Berhad	Malaysian Institute of Microelectronic Systems
MMD	Malaysian Meteorological Department
MMU	Malaysia Multimedia University
MOC	Mission Operation Centre
MOST	Ministry of Science and Technology Thailand
MOSTE	Ministry of Science, Technology, and Environment Malaysia
MOSTI	Ministry of Science, Technology, and Innovation Malaysia
MPL	Maximum Probable Loss
M-R2D2	Malaysian Research for Rocket Plane Design & Development
MRSA	Malaysian Remote Sensing Agency
MSC	Mission Control System
MSC	Multimedia Super Corridor
MTBC	MEASAT Teleport and Broadcast Centre
MUT	Mahanakorn University of Technology Thailand
MyRTKnet	Malaysia Real-Time Kinematic Network System
NAREM	National Resources and Environmental Management
NASA	National Aeronautics and Space Administration
NEA	National Environment Agency of Singapore
NEKMAT	National Fishermen Association
NEqO	Near Equatorial Orbit
NRCT	Thailand National Research Council

NTU	Nanyang Technological University Singapore
Ofcom	Office of Communications
OFR	Office of the Federal Registrar
Oftel	Office of Telecommunications
PBN	Performance Based Navigation
PKNS	Selangor State Development Corporation
PSLV	Polar Satellite Launch Vehicle
RGDIP	*Revue Général De Droit International Public*
RKA	Russian Federal Space Agency
RMAF	Royal Malaysian Air Force
RTM	Radio Television Malaysia
S2S	Sea to Space Division
SAC	Space Application Centre India
SBAS	Space Based Augmentation System
SCOSA	Subcommittee on Space Technology and Applications
SDC	Boeing Satellite Development Center
SDSC	Satish Dhawan Space Centre India
SFC	Space Future Consulting
SIM	Satellite Image Map
SISPELSAT	*Sistem Pelayaran Satelit*
SLASO	Space Licensing and Safety Office
SOAs	Satellite Operating Agencies
SpaceX	Space Exploration Technologies Corporation
SPL	Swiss Propulsion Laboratory
SSTA	Singapore Space and Technology Association
SSTL	Surrey Satellite Technology Ltd.
STARs	Standard Terminal Arrival Routes
STC	Saudi Telecommunications Company
STS	Space Transportation System
STS-MC	Space Tourism Society Malaysia Chapter
SWANS	Suborbital Water-Aero N’Spaceplane
TelBru	Telekom Brunei Berhad
TERLS	Thumba Equatorial Rocket Launching Station India
THEOS	Thailand Earth Observation Satellite

TRSC	Thailand Remote Sensing Centre
UiTM	MARA University of Technology
UKM	National University of Malaysia
UM	University of Malaya
UMNO	United Malay National Organization
UN ESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UNCOPUOS	United Nations Committee on the Peaceful Uses of Outer Space
UNGA	United Nations General Assembly
UniMAP	Universiti Malaysia Perlis
UNIMAS	Universiti Malaysia Sarawak
UPM	University of Putra Malaysia
USAKA	U.S. Army Kwajalein Atoll
USC	United States Code
USM	University of Science Malaysia
UTeM	University of Technical Malaysia
UTM	University of Technology Malaysia
UUM	Universiti Utara Malaysia
VSSC	Vikram Sarabhai Space Centre India
VTOL	Vertical Take-off and Landing
WMO	World Meteorological Organization
ZLR	*Zeitschrift für Luftrecht*
ZLW	*Zeitschrift für Luft- und Weltraumrecht*

Introduction

Among the significant developments in space law in the last century has been the proliferation of a variety of national space laws. There are numerous national space laws applicable in various countries. They include: National Aeronautics and Space Act 1958, Commercial Space Act 1998 (United States of America); Act on Launching Objects from Norwegian Territory into Outer Space 1969 (Norway); Act on Space Activities 1982 (Sweden), Outer Space Act 1986 (the United Kingdom); Space Affairs Act 1993, Space Affairs Amendment Act 1995 (South Africa); Federal Law on Space Activities 1993, Statute on Licensing Space Operations 1996 (Russian Federation); Law of Ukraine on Space Activities 1996 (Ukraine); Space Activities Act 1998 (Australia); Space Development Promotion Act 2005, Space Liability Act 2007 (Republic of Korea); French Space Operations Act 2008 (France), Austrian Outer Space Act 2011 (Austria), and Law of Kazakhstan on Space Activities 2012 (Kazakhstan).[1]

The emergence of national space legislation is in fact responding to numerous factors. Those factors include requirements imposed by international law that states should be held responsible[2] as well as internationally liable[3] for their national space activities. Furthermore,

[1] United States of America: National Aeronautics and Space Act of 1958, Pub. L. 85-568, 72 Stat. 426 (July 29, 1958), Commercial Space Act of 1998, Pub. L. No. 105-303, 112 Stat. 2843 (October 28, 1998); Norway: Act on Launching Objects from Norwegian Territory into Outer Space 1969, Act No. 38 (13 June 1969); Sweden: Act on Space Activities of 1982, Act No. 1982:963 (18 November 1982); United Kingdom: Outer Space Act of 1986, 1986 Chapter 38 (18 July 1986); South Africa: Space Affairs Act of 1993, Statutes of the Republic of South Africa – Trade and Industry No. 84 (24 June 1993), Space Affairs Amendment Act of 1995, No. 64 of 1995 (6 October 1995); Russian Federation: Law of Russian Federation on Space Activities 1993, Federal Law Decree No. 5663-1 (20 August 1993), Statute on Licensing Space Operations 1996, Federal Government Resolution No. 104 (2 February 1996); Ukraine: Law of the Supreme Soviet of Ukraine on Space Activities 1996, No. 503/96-VR 1996 (15 November 1996); Australia: Space Activities Act 1998, Act No. 123 of 1998 as amended (21 December 1998); Republic of Korea: Space Development Promotion Act 2005, Law No. 7538 (31 May 2005), Space Liability Act 2007, Law No. 8852 (21 December 2007); France: French Space Operations Act 2008, Law No. 2008-518 (3 June 2008); Austria: Austrian Federal Law on the Authorization of Space Activities and the Establishment of a National Space Registry (Austrian Outer Space Act) 2011, Federal Law Gazette I No. 132/2011 (6 December 2011); Kazakhstan: Law of the Republic of Kazakhstan on Space Activities 2012, Law No. 528-IV ZRK (6 January 2012).

[2] See Principle 5, Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space (United Nations General Assembly Resolution 1962 (XVIII), adopted on 13 December 1963 (referred to as, 'Declaration of Legal Principles 1963'). See also Article VI, Treaty on Principles Governing the Activities of States in the Exploration and Use of the Outer Space, Including the Moon and Other Celestial Bodies (1967) (Resolution 2222 (XXI), opened to signature on 27 January 1967, entered into force on 10 October 1967. (1967) 610 UNTS 205, 18 UST 2410, TIAS 6347; (1967) 6 ILM 386; (1967) 61 AJIL 644 (referred to as, 'Outer Space Treaty 1967').

[3] See Principle 8, Declaration of Legal Principles 1963, and, Article VII, Outer Space Treaty 1967. This rule was then confirmed and elaborated further in the Convention on International Liability for Damage Caused by

the space legal regime gives assurance to all countries, not only on freedom of use and exploration of outer space,[4] but also on freedom of scientific investigation,[5] as well as freedom of access to all areas of celestial bodies.[6] Such assurances indeed grant the states, inclusive of their public and private bodies, opportunities to utilise outer space to the furthest extent, although there may be various consequences of space activities. However, apart from providing opportunities for exploration and use of outer space, the legal regime simultaneously enforces the requirement of authorization as well as continuous supervision[7] by the states. In other words, the states must provide authorization for their nationals to become involved in space activities, and should therefore also continuously monitor and supervise such activities. Such circumstances, in fact, can only be enforced effectively via the state's national space legislation. Besides all these factors, other essential factors that contribute to the proliferation of the national space laws include the growing importance of commercialization and the increasing involvement of public and private sectors in space activities.

The importance of developing national space law was verified when the United Nations began organizing various workshops from 2002 onwards to discuss the related matters.[8] In supporting such efforts, commencing from 2006 annual symposiums have also been held during the United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS) Legal Subcommittee sessions.[9] The issue of the development of national space law again proved to be a significant matter in 2008 when national space law was included in the agenda

---

Space Objects (1972) (Resolution 2777 (XXVI), adopted on 29 November 1971, opened to signature on 29 March 1972, entered into force on 1 September 1972. 24 UST 2389, 961 UNTS 187, TIAS 7762.

[4] Principle 2, Declaration of Legal Principles 1963, and, Article I, Outer Space Treaty 1967.

[5] Article I, Outer Space Treaty 1967.

[6] *Id*.

[7] See Principle 5, Declaration of Legal Principles 1963, and, Article VI, Outer Space Treaty 1967.

[8] Those workshops include: workshop on 'Capacity Building in Space Law', The Hague, Netherlands (18-21 Nov. 2002); Workshop on 'United Nations Treaties on Outer Space: Actions at the National Level', Daejeon, Republic of Korea (3-6 Nov. 2003); on 'Disseminating and Developing International and National Space Law: the Latin America and Caribbean Perspective', Rio de Janeiro, Brazil (22-25 Nov. 2004); on 'Meeting International Responsibilities and Addressing Domestic Needs', Abuja, Nigeria (21-24 Nov. 2005); on 'Status, Application and Progressive Development of International and National Space Law', Kyiv, Ukraine (6-9 Nov. 2006); on 'Role of International Space Law in the Development and Strengthening of International and Regional Cooperation in the Peaceful Exploration and Use of Outer Space', Tehran, Republic of Iran (8-11 Nov. 2009; on 'Activities of States in Outer Space in Light of New Developments: Meeting International Responsibilities and Establishing National Legal and Policy Frameworks', Bangkok, Thailand (16-19 Nov. 2010); and on 'Contribution of Space Law to Economic and Social Development', Buenos Aires, Argentina (5-8 Nov. 2012).

[9] The symposiums sponsored by International Institute of Space Law (IISL) and the European Centre for Space Law (ECSL). Such symposiums include symposium on 'National Space Legislation – Crafting Legal Engines for the Growth of Space Activities', Vienna, Austria (22 March 2010), and symposium on 'Capacity Building in Space law', Vienna, Austria (26-27 March 2007).

of the 47th session of the UNCOPUOS Legal Subcommittee.[10] In the agenda, the issues appeared as a single item for discussion under the title of 'General exchange of information on national legislation relevant to the peaceful exploration and use of outer space'.

With respect to the Malaysian context, Malaysia is utilising the opportunity of freedom of use of outer space with her involvement in various space applications and activities. Those applications and activities include telecommunications and broadcasting, remote sensing, meteorology, navigation, satellite manufacturing, launching space objects, sending astronauts, scientific research, a suborbital space plane program, and a spaceport project. This sector, in fact, has great potential in Malaysia to flourish further in the future especially with the participation of the private sector. However, despite Malaysia's involvement in various outer space activities, the state has no specific domestic space law to govern the activities in accordance with the international legal rules on space.

Against this background, it is proposed that Malaysia should seriously consider the development of its national space legislation. This suggestion is made on the basis of the fact that such circumstances are vital for the sake of the continuing sustainability of the positive progress of Malaysian space activities. With the appropriate space legislation, the Malaysian Government will be able to monitor and supervise its national activities effectively in accordance with international law. Moreover, the country will be able to deal with the international responsibility and liability of its nationals appropriately at the national level.

Thus, in discussing the study of the development of the Malaysian national space legislation, it is essential to highlight and analyse some related research questions: (1) What are the developments in Malaysian outer space-related activities? (2) What is the status of Malaysia with respect to the United Nations outer space laws as well as her membership of the international and regional space-related organizations? (3) What are the legal frameworks of the selected national space legislations? (4) What can Malaysia learn from the study of those legal frameworks in assisting her to develop national space legislation? (5) Is it necessary for Malaysia to enact a Malaysian outer space law? (6) What are the major aspects to consider in drafting Malaysian outer space legislation? (7) What would a feasible proposed draft

[10] See UNGA, Committee on the Peaceful Uses of Outer Space, Legal Subcommittee, Forty-Seventh Session, (Vienna, 31 March – 11 April 2008), A/AC.105/C.2/L.269.

specimen of a Malaysian Outer Space Act consist of? (8) What are the legal impacts of the birth of the Malaysian Outer Space Act on Malaysia, ASEAN, and world space activities?

In general, the purpose of this study is to analyse the future perspectives for Malaysian space law. However, based on the above-mentioned research questions, this study will focus specifically on three major research objectives as follows:

(1) To present the past, current, and future development of Malaysian space-related activities inclusive of the status of Malaysia with respect to the United Nations space conventions, and her membership of international and regional space-related organizations.

(2) To study the legal framework of selected national space legislations, the outcomes of which will be utilised in assisting Malaysia to develop national space legislation.

(3) To propose a feasible draft specimen of a Malaysian Outer Space Act with some major clauses and also a discussion of some considerable aspects to develop the legislation, the necessities of such legislation and its impacts on Malaysia, ASEAN and world space activities.

Relying on the above research objectives, there are three major significant aspects of the study. The importance of the research lies in the following:

(1) Elucidation of the progress of Malaysian space activities as well as Malaysia's status in regard to the space conventions and membership of the regional and international space-related organizations.

(2) Providing the legal frameworks of selected national space legislations as a basis for developing the Malaysian space legislation.

(3) A proposal for a workable feasible draft specimen of a Malaysian Outer Space Act as a model for rationalising the actual Malaysian outer space legislation.

In respect of methodology, two principal methods are used in preparing this thesis. The first method is library research. This is done by analysing the views and works written by the eminent and notable scholars in outer space law, specifically relating to the United Nations outer space conventions. The same approach is applied with respect to the domestic space laws of some selected countries. In the Malaysian context, the library research mode is used to analyse the Malaysian laws as well as the written sources produced by the relevant scholars and bodies. In the library research mode, various main sources were used as references for the analysis. The sources include various international treaties and conventions, United Nations resolutions, principles, international agreements, and other documents. Apart from these, a variety of domestic legislations, bills and policies from numerous countries are referred to as well. The second method is field research which involves mainly interviews. The interviews were conducted with the Director of the Malaysian Space Agency, the Senior Federal Counsel of the International Affairs Division, Attorney General's Chambers Malaysia and the founder and president of the Malaysian Institute of Aero and Space Studies (IKAM) and the Space Tourism Society Malaysia Chapter (STS-MC). The aim is to know the Malaysia's latest position and progress in developing the Malaysian national space laws. This mode is also applied to gain the latest information on Malaysian space activities, particularly in respect of the suborbital space plane program and commercial spaceport. In such circumstances, the interviews are conducted via, for instance, direct interviews, e-mails, and other means.

In seeking answers to the research questions, as well as to achieve the study's objectives, the thesis is structured into six chapters. Hence, the elaboration of the thesis is presented in the following systematic order:

Chapter 1: Malaysian Space Experiences and Activities: Past, Present and Future.

This chapter aims to explore the space experiences and activities of Malaysia in the past, present and future. The outcome of the discussion will verify whether there is a need for Malaysia to enact Malaysian space legislation. In fulfilling such objectives, this chapter focuses on three major aspects. The first is the Malaysian policy and laws. The second is the Malaysian space technological development and research, and the third is the Malaysian space application and activities. In the first section, the space-related policy and laws applicable in Malaysia are discussed and reviewed. The second section explores Malaysia's space-related technological development and research with regard to three areas. They are: the Malaysian governmental sector, the non-governmental sector, and the Malaysian higher educational institutions. In the Malaysian governmental sector, various Malaysian governmental bodies and agencies are highlighted before the discussion moves on to the non-governmental sector. In terms of the higher educational institutions, the discussion emphasizes the development of both legal and technological education. Lastly, the third section explores a variety of Malaysian space applications and activities. These include activities such as telecommunications and broadcasting, remote sensing, meteorology, navigation, satellite manufacturing and launching, the suborbital space plane program, and the commercial spaceport project.

Chapter 2: Malaysia, International Space Activities, and Laws.

This chapter aims, *inter alia*, to explore the status of Malaysia with respect to international space laws, as well as its involvement as a member of the international and regional space-related organizations. In meeting this goal, this chapter is divided into two main topics. The first is the international space law, and the second is Malaysia as a member of international and regional organizations. Prior to these discussions, the study presents a brief overview of the major world space activities as an introduction to the discussion. The first section on international space law starts with the historical background of the international space law. It then moves on to an overview of the meaning and sources of the law. Next, it analyses the status of Malaysia in relation to the five outer space conventions. The second section on Malaysia as a member of international and regional organizations deals with Malaysia's involvement in space-related organizations at the international and regional levels.

Chapter 3: The Study of the Legal Framework of Some National Space Legislations.

The absence of a Malaysian national space law permits a comparative study of various existing domestic laws. This will provide an opportunity for a legal study and analysis to frame a practicable Malaysian domestic space law. Thus, this chapter aims to present a study of selected national space legislations from selected countries, taking into consideration the obligations imposed by the United Nations outer space conventions. Those countries involved are the United Kingdom, Australia and the United States of America. Apart from countries' national space legislations, the study also discusses other countries that have no national space legislation. They are India, Thailand, Singapore, and Brunei. The selection of all those countries is made based on certain criteria that are mentioned further in the discussion. With respect to countries with no specific space legislation, the writing concentrates on their experiences in relation to their space-related laws, bodies that regulate the activities, as well as their space-related activities and programmes. This chapter also discusses the legal implications of the absence of national space legislation in those countries. Moreover, the research also explores the current status of the countries in regard to the United Nations outer space conventions. The outcome of the chapter will then be applied in seeking to develop the Malaysian space legislation.

Chapter 4: The Proposed Legal Framework for Malaysian Space Law.

Chapter 4 deals with the proposal of legal frameworks for a Malaysian Outer Space Act. The chapter begins by outlining the reasons why Malaysian space legislation is necessary. These reasons include the fact that the legislation will provide legal certainty and transparency of legal rules for the country. Besides that, the country will have a reliable supervisory legal framework, be able to control and monitor national space activities in an efficient manner, and many others. This chapter then discusses some major aspects that should be considered in developing the Malaysian space legislation. Those aspects, to name but a few, include the country's national policy and legal system compliance, national interest-based aspects, domestic laws coordination and others. Lastly, this chapter then proposes a number of significant clauses that need to be incorporated in the Malaysian Outer Space Act. They include the authorisation clause, supervision clause, registration clause, and indemnification clauses. Apart from the major clauses, some other relevant clauses that need to be incorporated in the legislation are also suggested.

Chapter 5: A Feasible Draft Act of a Malaysian Space Law.

Chapter 5 proposes a feasible Malaysian Outer Space Act in the form of a draft specimen. This chapter aims to provide a simulation of a workable Malaysian Outer Space Act in the form of a draft with an expectation that it can become a model to rationalise the actual Malaysian Outer Space Act. However, it is not within the scope of the thesis to provide a comprehensive form of a draft. Although the draft specimen does not appear in its complete form, it is hoped that it can be a guideline to develop the real Malaysian Outer Space Act and will positively influence the Malaysian law makers. It is noted that success in enacting the Malaysian Outer Space Act may generate various legal implications. Thus, in this chapter the study firstly outlines several legal implications foreseeable for Malaysia. Secondly, the chapter also points out the legal effects on the ASEAN space activities, as well as on the world community.

Chapter 6: Conclusion and Recommendations.

Chapter 6 deals with the conclusion and recommendations. In this chapter, the conclusion is made by outlining the findings or outcomes of the research. Apart from presenting the findings, this chapter also provides some practical recommendations for the future development of Malaysia's space law and its space activities.

1 Malaysian Space Experiences and Activities: Past, Present, and Future

1.1. INTRODUCTION

Worldwide recognition was given to Sputnik I when it made a significant impact on outer space activities, opening an episode of a 'prestige-driven race to the moon', as expressed by Professor Frans von der Dunk[1], especially among the space superpowers. With the development of rockets and the advancement in engineering and other technologies, it became possible to send machines, animals and then people beyond the Earth's atmosphere into outer space. Although the possibility of exploring space had long excited people in many walks of life, few could afford the very high costs of launching people and rockets into space. Despite this constraint, the possibility of sending human beings into outer space generated wide interest in the exploration and use of outer space and celestial bodies.

Inspired by this, after 50 years of independence, Malaysia made a bold step when the Government of Malaysia decided to send its first man into outer space. This decision was realized when the first Malaysian astronaut, Dr Sheikh Muszaphar Shukor, made his way to the International Space Station (ISS) through *Program Angkasawan* (Astronaut Programme)[2] on 10th October 2007. Since then, the word '*angkasawan*' has been accepted as synonymous with the words astronaut and cosmonaut. As a matter of fact, Malaysia has been involved in space activities since 1960. This was evidenced in 1960 when the country built the first Malaysian earth satellite station in Pahang, one of the states of Malaysia. However, the real work in space technology started in early 1990, when Malaysia embarked on her plan to design micro-satellites, crafting research programmes in satellite technology along with educational programmes. The impediment to progress in this industry is in fact mainly caused by economic fluctuations as well as lack of local technical expertise and support in the related

[1] Dunk, F.G. von der, Inaugural Lecture, *As Space Law Comes to Nebraska, Space Comes Down to Earth,* Space and Telecommunications Law, University of Nebraska College of Law's, Lincoln, 1st May 2008, at 2.

[2] For further information on *Program Angkasawan* read Chapter 1 of the thesis (1.4.6. *Program Angkasawan Negara*).

domain.[3] Nevertheless, those obstacles are viewed as challenges to further improvement of the related field.

While Malaysia has demonstrated positive progress in gearing up towards involvement in the space frontier and technology, little effort has been made to set up a fully-fledged and proper national space policy and law. This is evidenced by the last 54 years of Malaysian involvement in space activities as there is still a question about Malaysia's ability to put the law into practice. At this juncture, one can consider that space law is still in its infancy in Malaysia.

This chapter discusses the Malaysian space experiences and activities through past, present and future perspectives. Thus, the study highlights three major areas to describe Malaysian participation in space-related activities. The first area is in respect of policy and laws. To address this point, the study aims to scrutinize the applicable policy and numerous laws that are available nationally for Malaysian space-related activities. The second area is technological development and research. At this juncture, the study examines the Malaysian space technological development and research with respect to three areas: (1) the governmental sector; (2) the non-governmental sector; and (3) the higher educational institutions. Thus, to examine Malaysian space-related experiences in terms of technological development and research, the study explores the involvement of Malaysian governmental and non-governmental sectors in such activities. The study also examines the space-related technological and legal education offered by the Malaysian higher educational institutions. The third area is in respect of applications and activities. To address such points, a discussion on various past, present and future space applications and activities in Malaysia will end this chapter.

1.2. POLICY AND LAWS

This section describes Malaysia's space experiences with respect to its policy and laws. In general, Malaysia has no specific comprehensive space legislation to regulate its outer space

[3] Ahmad Sabirin Arshad, "Pembabitan Bangsa Melayu Dalam Bidang Angkasa Lepas", *Proceeding on Wacana Minda Melayu Conference at Kuala Lumpur, Malaysia, October 7-9, 2003,* at 1.

activities.[4] Nevertheless, there are a number of existing laws to control and regulate certain sections of Malaysian space-related activities. These are particularly concerned with the multimedia and telecommunication industries. To name but a few, the laws include the Malaysian Federal Constitution, the Malaysian Communications and Multimedia Act 1998 (Act 588), the Malaysian Communications and Multimedia Commission Act 1998 (Act 589) and the Communications and Multimedia (Licensing) Regulations 2000. Meanwhile, prior to discussing the aforesaid laws and regulations, the study provides information on the Malaysian Space Policy and its Outer Space Bill.

1.2.1. The Malaysian Space Policy and the Malaysian Outer Space Bill

The growth of Malaysian public interest in space activities and industries around 2002[5] inspired the Government of Malaysia to summon Professor Datuk Dr. Mazlan Othman[6] to set up the Malaysian Space Agency (ANGKASA)[7]. ANGKASA, a department under the Malaysian Ministry of Science, Technology, and Innovation, has been entrusted by the Malaysian Government with developing the Malaysian space policy, which is the blueprint for the country's future space activities, particularly when dealing with private enterprises. In conjunction with this, ANGKASA, in collaboration with the Malaysian Attorney General's Chambers (Malaysian AG Chambers),[8] has also initiated a draft Malaysian Outer Space Bill.[9] It is an effort towards formulation of specific space legislation to regulate Malaysia's outer space activities.

---

[4] In spite of the fact that Malaysia had already successfully launched several satellites into orbit, *i.e.,* TiungSAT-1, RazakSAT, the MeaSAT systems, and proudly sent its astronaut to the ISS, all matters regarding space launches and activities have been executed only through bilateral agreements between the parties involved.

[5] As a matter of fact, Malaysia has been engaged in space research since the 1970s but it officially started its space satellite programme in 1990s. See http://cns.miis.edu/research/space/malaysia, accessed: 14 September 2008.

[6] Prior to joining the agency in July 2002, Professor Datuk Dr. Mazlan Othman was a Director of the United Nations Office for Outer Space Affairs (UNOOSA) in Vienna, Austria, in 1999, where she coordinated international cooperation on the peaceful uses of outer space. Around January 2008, she was re-appointed as the Director of the UNOOSA in Vienna.

[7] ANGKASA was formerly known as *Bahagian Kajian Sains Angkasa* (BAKSA) or Space Science Studies Division which is responsible for research and development, policy formulation and strategic planning on issues related to space activities. See http://www.angkasa.gov.my/, accessed: 15 May 2014. For further information, read Chapter 1 of the thesis (1.3.1 (b) Malaysian National Space Agency (ANGKASA).

[8] Malaysian AG Chamber is the office of the Attorney General of Malaysia, the country's chief law officer or the principal legal advisor to the Malaysian Government. The Chamber is within the purview of the Malaysian Prime Minister's Department. Its official website is at http://www.agc.gov.my/, accessed: 15 May 2014.

[9] See http://www.angkasa.gov.my/?q=polisi/undang-undang-angkasa, accessed: 15 May 2014. See also Pracha, Mehmood, "Studies on National Space Laws and Policies in Asia Pacific Region", (2008) 50 *IISL Colloquium on the Law of Outer Space* 24.

In many ways, the idea of a Malaysian Space Policy and Malaysian Space Act has received great attention over the previous years[10]. As a matter of fact, the effort to compose the draft Malaysian Outer Space Bill was started by the Malaysian AG Chambers in December 2004[11]. As ten years have now elapsed, there is an impression that the development of the Malaysian outer space legislation is slow and lethargic. The situation is the same in regard to the progress in drafting the Malaysian space policy. The progress has been dilatory[12] for a number of reasons including scarce local expertise in this area. On top of that, for a certain period, ANGKASA has had other commitments in need of urgent attention and participation by the committee members, including the commitment to the *Program Angkasawan Negara*[13] which includes all subsequent research carried out in outer space. Another notably important reason is deficiency in skilled resources in ANGKASA itself. Hitherto, ANGKASA is still in the course of recruiting its staff and 95 per cent of them are new graduates with no working experience.[14]

In the process of developing the Malaysian space policy, the major aim of development should be, *inter alia*, to set out the vision and goals of space activities in Malaysia for the coming century.[15] Another purpose is to offer the strategic context for investments in the exploration, exploitation, and use of outer space by the Malaysian Government and industry. Apart from that, the aim of the development of the policy is to mobilize and organize the financial and human capital, and institutional resources. This must be done in order to drive investment in work for the nation. Such a situation, indeed, will enhance the productivity and

[10] Mohd Aimi Zaini Mohd Azhar, *Prinsip Undang-Undang Antarabangsa Yang Mengawal Aktiviti Penerokaan dan Penggunaan Angkasa Lepas Serta Penglibatan Awal Malaysia Dalam Industri Aeroangkasa*, (LL.B Project Paper, Faculty of Law, University of Malaya, Kuala Lumpur, 1995), at 149.

[11] Noor Asima Osman, a Senior Federal Counsel, International Affair Division, Attorney General's Chambers Malaysia (previously served as a Legal Advisor to ANGKASA from January 2005-April 2007), "Draft Malaysian Outer Space Bill", Email to author, 7 January 2009.

[12] In November 2008, it was stated that the draft of the Malaysian Space Policy was not yet even at the stage of being drafted and ANGKASA had just started working on the policy by appointing the drafting committees (Interview with Dr Mustafa Din Subari, Director of ANGKASA, on 21 November 2008). However, in October 2011, it was stated that ANGKASA was at the stage of building the programme content of the Malaysian space policy and, upon the Malaysian Ministry of Science, Technology, and Innovation's approval; it shall then be presented at a national workshop with the presence of invited stakeholders. In October 2012, it was reported that the first draft is expected to be finalised in the last quarter of the year. Mustafa Din bin Subari, "Malaysian Space Policy", email to author, 12 October 2011. Read also Statement by Colonel Nazari Abd Hadi, representative of Malaysia, on Agenda Item 51: International Cooperation in the Peaceful Uses of Outer Space, at the Fourth Committee of the 67th Session of the United Nations General Assembly, New York, 18 October 2012, http://www.un.int/malaysia/GA/67/2012-10-18%20Outer%20Space.pdf, accessed: 15 June 2013.

[13] *Program Angkasawan Negara* is a Malaysian Government space programme to send a Malaysian to the International Space Station. For more information, refer to Chapter 1 of the thesis (1.4.6. *Program Angkasawan Negara*).

[14] Noor Asima Osman, "Malaysian Space Policy", email to author, 12 October 2008. Read also *supra* note 11.

[15] See http://www.angkasa.gov.my/?q=en/node/109, accessed: 15 May 2014.

skill levels of the economic sectors as well as the generation of high-value-added products, processes and services. Moreover, its aim is to set up the framework for various actors to ensure effective performance in the exploration, exploitation, and use of outer space, including engagement with external parties.[16]

Meanwhile, to bring the Malaysian Space Policy and Outer Space Act into effect, it is strongly suggested that the Malaysian Government organize regular consultations and discussions with the relevant stakeholders. This effort is imperative in order to ensure that outer space legislation is drafted for mutual benefits of both public and private sectors, thus enabling them to tackle the problems they encounter effectively.

1.2.2. The Malaysian Federal Constitution

The Malaysian Federal Constitution,[17] like many other constitutions, has evolved from events of the past. To present an accurate view of the Malaysian Federal Constitution that might contribute to the creation of the Malaysian outer space legislation, this section will, of necessity, explore the historical background to the making of the Federal Constitution. The discussion concentrates, firstly, on the pre-British era which covers the Malacca Sultanate, the Portuguese invasion, and the Dutch periods. Secondly, the study examines selected events that took place during the British period which influenced the creation of the Independence Constitution 1957, before elaborating on the current Malaysian Federal Constitution[18]. It also explicates the types of Malaysian legislatures with a view to ultimately explaining the legislative competencies in Malaysia with respect to outer space law, policy, and activities. Special reference is made to the Federal List, the State List, and the Concurrent List provided in the Ninth Schedule of the Malaysian Federal Constitution. First, however, a brief explanation of the meaning and nature of a 'constitution' is presented to begin this section.

---

[16] *Id*.
[17] In this section, 'Malaysian Federal Constitution' or 'Federal Constitution' refers to the Malaysian Federal Constitution as at 1st February 2013. All Sections and Parts mentioned in this section, unless specified otherwise, should refer to those written in the Constitution.
[18] *Id*.

(a) Meaning and Nature of a Constitution

The term 'constitution' in its literal sense refers to the body of legal and non-legal rules concerning the government of a state.[19] According to the *Oxford Dictionary of Law*,[20] constitution denotes the rules and practices that determine the composition and function of the organs of central and local government in a state and regulate the relationship between the individual and the state. It signifies the basic framework which provides the foundations for governance. It has to be developed and explained in accordance with needs and changing circumstances.[21] In general, constitutions are divided into two categories: written and unwritten constitutions. A written constitution means that the system of government is contained in a single document. The Malaysian constitution is thus categorised as a written constitution since it is codified in a single document known as the Malaysian Federal Constitution.[22] The advantages of codified constitutions are that they tend to be more coherent, easily understood, and simpler to read. However, an unwritten constitution describes one in which the rules and principles of the constitution are scattered in the forms of statutes, charters, political conventions, and practices,[23] as can be seen in the constitutions of the United Kingdom and New Zealand, amongst of them.

(b) The Historical Background of the Malaysian Constitution

The discussion of the historical background of the Malaysian Constitution is divided into two phases. The first phase is the pre-British era starting from the Malacca Sultanate period in 1402 until the end of the Dutch period in 1824. The second phase is the British period commencing from 1786 when the British first interfered in Malay local affairs until the Independence Day of Malaya (Malaysia) in 1957.

---

[19] Wan Arfah Hamzah and Ramy Bulan, *An Introduction to the Malaysian Legal System,* (Shah Alam: Penerbit Fajar Bakti Sdn Bhd, 2004), at 25.
[20] Martin, Elizabeth A. And Jonathan Law, eds., *Oxford Dictionary of Law*, (New York: Oxford University Press Inc., 2006), at 119.
[21] Abdul Aziz Bari, *Malaysian Constitution: A Critical Introduction,* (Kuala Lumpur: The Other Press, 2003), at 15-16.
[22] Among other states that have written constitutions are United States of America, India, and Australia.
[23] Abdul Aziz Bari, *supra* note 21, at 7-9.

i. Pre-British Period: Malacca Sultanate, Portuguese and Dutch Periods

It is emphasized that the Malaysian Federal Constitution today has not entirely originated from the British period. In fact, the indigenous community had already developed their own constitutional systems when the British came to Malaya in 1786.[24] Hence, the discussion on the historical background of the Malaysian Federal Constitution should begin from the pre-British days, specifically the beginning of the Malacca Sultanate period.[25] During the Malacca Sultanate, the role of ruler was portrayed as the source of law and fountain of justice.[26] There were two important digests of laws or legal codes applicable to the Malacca Sultanate: *Undang-Undang Melaka* (the Laws of Malacca)[27], and *Undang-Undang Laut Melaka* (the Maritime Laws of Malacca)[28]. Both digests are based on the patriarchal law of the *Adat Temenggung*[29] and Islamic law of the *Shafi`i* school of law.[30] Therefore, it has been

[24] *Id,* at 21.

[25] The reign of the Malacca Sultanate (1402 -1511) centred on the modern town of Malacca, one of the states of Malaysia. It stretched from the Muslim Malay settlements of *Bukit* (Phuket), *Setol* (Satun), *Pantai ni* (Pattani) bordering *Ayutthaya* Kingdom of Siam (Thailand) in the north to Sumatra in the Southwest. The Sultanate of Malacca was founded by Parameswara (a Hindu Srivijayan prince) in 1402. Parameswara, who was the ruler of Palembang, was attacked by Majapahit in 1390s. As a result, he fled his palace and reached Temasik Island. Parameswara ruled Temasik for about 4 years. Later, he was attacked by the Majapahit. He then fled to Muar. In 1402, Parameswara established a kingdom named Melaka (Malacca). In 1409, he embraced Islam when he married the Princess of Pasai. He then assumed the title of 'Sultan Iskandar Shah'. It was well-known that Malacca was a well-defined government with a set of laws. The Sultanate thrived on entrepot trade and became the most important port in Southeast Asia during the 15th and the early 16th century. It commanded the main sea route between India and China. It was a major player in the spice trade, serving as a gateway between the Spice Islands and high-paying Eurasian markets. One of the contributing factors to the rise of Malacca was the monsoon winds that enabled the Arab and Indian traders from the west to travel to China in the east and vice versa. Malacca was also a centre of Islam, where religious people met and discussed religious matters. On top of that, Malacca also had a good relationship with the Ming Dynasty. In 1409, the Sultan paid tribute to the Ming emperor to ask for protection against Siam (Thailand); thus, the kingdom was made a protectorate of Ming China. One of the Malacca sultans, Mansur Shah, married a Ming princess, Hang Li Po. By the mid-1430s Malacca had become a major commercial emporium, and by the mid-15th century it was an important territorial power as well. The period of its ascendancy is considered the golden age of Malay history as it encouraged literature, learning, and a lively political and religious life. The city fell to the Portuguese in 1511. See http://en.wikipedia.org/wiki/Malacca_sultanate, accessed: 14 May 2014.

[26] Terms such as *titah* (command), *daulat* (ruler's divinity), *murka* (wrath), *kurnia* (royal grace), *anugerah* (royal bounty), which contain legal values, had already been in use for about 18 centuries. The ruler has power to determine the penalties for crimes such as killing, stabbing, slashing, battery, robbery, theft and others. The ruler also has absolute power to pardon and set free the offender. Ahmad Ibrahim and Ahilemah Joned, *The Malaysian Legal System,* (Kuala Lumpur: Dewan Bahasa dan Pustaka, 1987), at 15. See also Yusoff Iskandar and Abd. Rahman Kaeh, *Sejarah Melayu, Satu Perbincangan Kritis dari Pelbagai Bidang,* (Kuala Lumpur: Heinemann, 1978), at 67-80.

[27] It is also variously referred to as *Hukum Kanun Melaka* and *Risalat Hukum Kanun*. It has forty-four chapters, and it mentions, *inter alia*, the responsibilities of the ruler and his chiefs, the prohibitions amongst members of the community, the penalties for criminal and civil offences, and the family law. For details, read Ahmad Ibrahim and Ahilemah Joned, *id*, at 15-18.

[28] The Malacca Maritime Laws has twenty-five chapters. It is concerned with maritime matters such as the duties of a ship's crew, and the sea voyage rules and trade. For details, see *id.*

[29] *Adat Temenggung* is one of the branches of customary laws in Malaysia. The other form of *adat* is *Adat Perpatih* (developed in a matrilineal kinship structure in areas occupied by the *Minangkabau* people in Sumatra

established that the indigenous community already had their own constitutional system during those periods.

The Portuguese and the Dutch were the first two European powers to arrive in Malacca. Malacca fell to the Portuguese under the command of Alfonso de Albuquerque in 1511.[31] Their interest was more in trade than in political power. They did not exert their influence over the Malays or other Asian communities. As a result, many of the former Malay administrations were retained. Later on, after 130 years of Portuguese occupation, Malacca fell to the Dutch in 1641.[32] Like the Portuguese, the Dutch were also solely interested in trade, especially the spice islands of Maluku and Batavia (Java). In 1795, due to the Napoleonic Wars in Europe, Malacca was surrendered by the Dutch to the British. But in 1818 Malacca was returned to the Dutch, and according to the Anglo-Dutch Treaty of 1824

---

and Negeri Sembilan). *Adat Temenggung* has, on the other hand, patrilineal characteristics. Both *adats* fall under the unwritten law sources. They developed prior to the 15th century. It is strongly believed that *Adat Temenggung* is fundamentally based on the Malacca Law. This is evidenced by the fact that several texts on *Adat Temenggung* are fundamentally based on the Malacca law. In general, the *Temenggung* system was organized on the basis of territorial units, with constitutional and judicial authority vested in a group consisting of *Sultan* (King), *Bendahara* (Chief Minister), *Temenggung* (Chief of Police), *Shahbandar* (Harbour Official) and others. It was agreed that *Adat Temenggung* dealt with aspects of both private and public law. But for some reasons only certain branches of these laws prevailed. For example, only certain aspects of family law, inheritance, and property, that is *harta sepencarian* (jointly owned property), were recognised and received judicial sanction. In respect of inheritance and family law, the *adat* is fundamentally based on Islamic law, although it has been modified by the local custom. At present, the law is now administered by each state, as written in the Schedule Ninth (List 11) of the Malaysian Constitution and in also the Administration of Muslim Law Enactment of each state. See Abdul Monir Yaacob, *An Introduction to Malaysian Law,* (Bangi: Universiti Kebangsaan Malaysia, 1989). See also http://en.wikipedia.org/wiki/Law_of_Malaysia, and, http://www.britannica.com/EBchecked/topic/5341/Adat-Temenggong, accessed: 15 May 2014.

[30] *Shafi'i* school of law is one of the Muslim schools of law which was named after Abu Abdullah Muhammad ibn Idris al-Shafi'i (or well-known as imam *al-Shafi'i*). Other schools of law include *Hanafi*, *Maliki*, and *Hanbali* schools of law. The followers of those schools have different opinions on issues that are not the core of Islamic belief, for instance different views on some laws and obligations of the Islamic law. However, in terms of the basic and fundamental beliefs of the Islamic religion, they believe the same. See http://en.wikipedia.org/wiki/Shafi'i, accessed: 14 May 2014.

[31] The Portuguese established a military and civil administration in Malacca. During the time of the administration, Malacca was governed by a Governor or Captain, who had power over all inhabitants, subjects, and foreigners. In civil affairs, he was assisted by a Council composed of the *Ovidor* (Chief Justice), *Viador* (Mayor), the Bishop or his deputy and a Secretary of the State. In military affairs, he had to consult the Captain-General of War (Commander-in-Chief) and the Sergeant Major. In criminal matters, sentences pronounced by the Chief Justice or a Magistrate were subject to his confirmation. The Chief Justice had civil and criminal jurisdiction. However, the Portuguese left the administration of justice amongst their non-Christian Asian subjects in the hands of their community leaders while the Portuguese came under the jurisdiction of Portuguese judges. See Ahmad Ibrahim and Ahilemah Joned, *supra* note 26, at 18-19.

[32] During the Dutch administration, Malacca was headed by a Governor who had supreme power of authority. He was assisted by a Council, consisting of Collector, Fiscal, Mayor, Upper Merchant, and a Secretary. A *Politie Raad* (Police Council) formed the executive, while the *Raad van Justitie* administered justice. The ecclesiastical affairs were managed by a special council. While Europeans were governed by Dutch laws based on colonial statutes, it is uncertain what law applied to the local and other Asian inhabitants. However, it was Dutch practice in Java to leave the natives to their own customs and laws, so it may be safely assumed that this was also the case in Malacca. See *id.,* at 19-20, and Wan Arfah Hamzah and Ramy Bulan, *supra* note 19*,* at 20-21.

Malacca was exchanged for the island of Benkulen in Sumatra. This treaty is important as it carved the Malay Peninsula and Archipelago into British and Dutch spheres of influence. It fixed the boundary between what is now Malaysia and Indonesia, and simultaneously marked the end of the Dutch claims to Malacca.[33]

Based on the observation made about the administration system practised by the Portuguese and the Dutch in those days, they did not have much influence on the constitutional system of Malaysia. However, the situation was different with respect to the British occupation as they interfered with the administration system of the local community.[34] As a result, the present legal and political system in Malaysia greatly reflects the era of British rule.

ii. British Period: The Making of the Federation of Malaya Constitution 1957 and Some Influencing Factors

This section elaborates on how the Federation of Malaya Constitution 1957 (also known as the *Merdeka* or Independence Constitution) came into existence and explains some factors that influenced the process of drafting it.

Generally speaking, apart from laying down the framework of government, a constitution of a state is very much influenced by the problems and circumstances surrounding its drafting. Since the present Malaysian Federal Constitution grew out of the Malaya Constitution 1957, a review of the historical events behind the drafting process of the Malaya Constitution 1957 is important for providing a comprehensive perspective. It will concentrate on the preliminary period of the British invasion of Malaya up to the Independence Day in 1957.

In the early stages, the British came to Malaya as traders but they ended up interfering in the affairs of sultanates, starting with the cession of Penang in 1786 from the Kedah Sultanate and the acquisition of Singapore from the Johor Sultanate in 1819. In 1824, the British formally gained Malacca from the Dutch after signing the Anglo Dutch Treaty. Afterwards, in 1826, the British formed a unified administration called the Straits Settlements, a

[33] Wan Arfah Hamzah and Ramy Bulan, *supra* note 19, at 12-13.
[34] The British started interfering in local affairs after the cession of Penang in 1786.

collection of territories[35] of the British East India Company[36] in Southeast Asia. The British rule in the Malay states started with the signing of the Pangkor Engagement[37] in 1874 with Perak. Various other treaties were also concluded with other Malay state sultanates, including treaties with the state of Selangor in 1874, Negeri Sembilan in 1879, and Pahang in 1881. Consequently, in 1895 those four states - Perak, Selangor, Negeri Sembilan and Pahang - came under British protection. Thus, they were known as the 'Federated Malay States'. This was when the 'federal system'[38] was first introduced by the British to the Malay states.

The subsequent step taken by the British was to set foot in the northern Malay states, namely the state of Perlis, Kedah, Kelantan, and Terengganu, through a treaty signed with the Siamese in 1909. The last state to come under British protection was Johor, after the signing of a treaty in 1914. At first, the states of Perlis, Kedah, Kelantan, and Terengganu were pressured and persuaded by the British to join the federation. However, the states declined as

[35] The territories comprise three trading centres: Penang, Singapore and Malacca. They were given collective administration in 1826 as a crown colony. The colony was dissolved in 1946. Singapore with its dependencies became a separate crown colony, while Penang and Malacca were included in the Malayan Union which became a Federation of Malaya in 1948. See http://en.wikipedia.org/wiki/Straits_Settlements; and http://encyclopedia2.thefreedictionary.com/Straits+Settlement, all accessed: 15 May 2014.

[36] The British East India Company (1600-1874) was also known as East India Trading Company or English East India Company. It was an early English joint-stock company, chartered by Queen Elizabeth I for the exploitation of trade with Asia. It was incorporated by royal charter on 31 December 1600 under the name of 'Governor and Company of Merchants of London Trading into the East Indies'. Starting as a monopolistic trading body, the company became involved in politics and acted as an agent of British imperialism in India from the early 18th century until the mid-19th century. The company settled down to trade in cotton and silk piece goods, indigo, and saltpetre, with spices from South India. It then extended its activities to the Persian Gulf, Southeast Asia, and East Asia. See http://www.britannica.com/eb/article-9031775/East-India-Company; http://en.wikipedia.org/wiki/East_India_Company, all accessed: 15 May 2014; and "East India Company, British", *The Columbia Encyclopaedia, Sixth Edition, 2001-2007,* at http://www.bartley.com/65/ea/EastIndB.html, accessed: 20 January 2012. For further reading, refer to Lawson, Philip, *The East India Company: A History,* (London: Longman, 1993); and Farrington, Anthony, *Trading Places: The East India Company and Asia, 1600-1834,* (London: British Library, 2002).

[37] The Pangkor Engagement was a treaty signed in 1874 between the British Government and Malay chiefs in Perak. It was the first step in the establishment of British dominion over the Malay states. In January 1874, Governor Sir Andrew Clarke of the Straits Settlements, prompted by the local trading community, organized a meeting between British, Malay, and Chinese leaders to settle a Perak succession dispute and to stop warfare between Chinese secret societies. The Perak succession controversy was settled in favour of Raja Abdullah. In return for British backing, Raja Abdullah agreed to accept a British resident (adviser), with broad power at his court. See "Pangkor Engagement" *Encyclopaedia Britannica,* http://www.britannica.com/EBchecked/topic/441250/Pangkor-Engagement, accessed: 15 May 2014.

[38] The British sought to consolidate and centralize control by federating the four states of Selangor, Perak, Negeri Sembilan and Pahang into the Federated Malay States. With Kuala Lumpur as the capital, Residents-General administered the federation but compromised by allowing the Rulers to have powers limited only to the role as authority on Islam and Malay customs. Modern legislation was introduced to the Malay states with the creation of the Federal Council. Federation brought benefits through cooperative economic development; for instance, Pahang was developed using funds from the revenue of Selangor and Perak. This period of centralization between the 1890s and 1910s, effectively marked the transition of the idea of Malay states as a collective land governed by feudal rulers. See http://en.wikipedia.org/wiki/British_Malaya, accessed: 15 May 2014.

they were unhappy with the British treatment of the Malay rulers of the Federated Malay States. Hence, this group was then categorised as ‘Un-federated Malay States’. This situation ended with the division of the peninsula into three groups of states:[39] (1) the Straits Settlements, (2) the Federated Malay States, and (3) the Un-federated Malay States.

With respect to the establishment of the federation, those states that wished to be members had to sign a treaty with the British. They had to agree to constitute themselves into a federation to be known as the Protected Malay States. In such circumstances, they would be administered under the advice of the British Government. Among the clauses of the federation treaty was the acceptance of the office of the British Resident-General[40] by the Malay Rulers. After introducing the post of Resident in the Federated Malay States and the post of Adviser in the Un-federated Malay States, the British then continued to spread their power and influence via what the Malays alleged was ‘indirect rule’[41]. It was understood that the term ‘Federation’ applied during those days was as much a misnomer as ‘advice’ in respect of the Resident’s relationship with the Malay Rulers.[42] Nevertheless, whatever the situation, the seeds of federalism and constitutional government had already been sown during that period.

The next important event was the establishment of a Federal Council[43] by the British on 20 October 1909. An agreement was signed between the Governor of the Straits Settlements and the Malay Rulers for a constitution of the Federal Council as a result of requests by local

[39] The Straits Settlements were declared a British colony, whereas, the Federated Malay States and Un-federated Malay States were categorised as British protected states.
[40] The British Resident-General was responsible to the Governor of the Straits Settlements. There were four British Residents under the Resident-General. The post of Resident-General was later abolished in 1910 and replaced by Chief Secretary.
[41] It was called ‘indirect rule’ as the Sultans continued to be the Malay states’ rulers, but for all intents and purposes the British officers were in charge. It was also commonly referred to by historians as the ‘Residential System’. It was a system in which each Sultan had to accept a British Resident whose advice had to be asked and acted upon in all matters of administration and revenue, except for Malay religion and customs. In this system, it was claimed that even though, in the *de jure* position, the sultans possessed the power to rule, in the *de facto* position it was the British who actually ran and governed the states. In practice, despite the sovereign position of the Malay Rulers applied during those periods, the reality was that the High Commissioner and the Resident-General always took precedence over them, for example in circumstances where laws were passed irrespective of the rulers’ presence in the meeting. See Abdul Aziz Bari, *supra* note 21.
[42] Wu Min Aun, *The Malaysian Legal System,* 3rd. ed., (Petaling Jaya: Pearson Malaysia Sdn Bhd, 2005), at 143.
[43] Federal Council consists of the High Commissioner as President, the Resident-General, the four Rulers, the four British Residents, and four unofficial members nominated by the High Commissioner.

entrepreneurs'.[44] As a matter of fact, the establishment of the Federal Council 1909 was significant for the constitutional development towards a parliamentary system in Malaya. However, the article[45] in the Federal Council Agreement was unclear with respect to the division of powers between the federal government and the states. It neither conferred specific power on the Federal Council nor defined the limit of the federal authority. The article merely stated the primacy of the federal laws over the state laws in the event of repugnancy. However, as far as the Islamic and Malay affairs were concerned, the article clearly mentioned that those matters should be exclusively reserved to the State Council.

The establishment of the Malayan Union in 1946 also influenced the drafting process of the Independence Constitution. After the Japanese surrender in 1945,[46] the British administration was resumed. In the initial stage, the British established a Military Administration to govern the country. But later on, they felt that radical reform was necessary for Malaya. In such circumstances, they introduced a unified system of government by proposing the creation of a unitary state,[47] known as the Malayan Union.[48] This scheme, however, lasted only for two years due to strong opposition from the Malays, especially with regard to Malayan Union

[44] This effort was made due to the rapid increase in the commercial, mining, and planting communities in the Malay states, in which it was felt there should be a central body to control the finances and direct the course of legislation. See Wu Min Aun, *supra* note 42, at 24.

[45] Article 9 of the Federal Council Agreement stated that, 'Laws passed or which may hereafter be passed by the State Councils shall continue to have full force and effect in the state except insofar as they may be repugnant to the provisions of any law passed by the Federal Council, and connected with the *Muhammadan* Religion, Mosque, Political Pensions, Native Chiefs and *Penghulus* and any other questions which in the opinion of the High Commissioner affect the rights and prerogatives of any of the above-named Rulers or which for other reasons he considers should properly be dealt with only by the State Councils shall be exclusively reserved to the State Councils'.

[46] The Japanese invaded Malaya on 8 December 1941. The invasion took place after the Japanese landed their troops on the beaches at Kota Bharu, Kelantan (a state of Malaysia located in the north-east of Peninsular Malaysia).

[47] Under the Malayan Union, the British dissolved the Straits Settlements. Penang and Malacca were grouped with the Malay states to form a union on 1 April 1946. However, Singapore was left out for economic and political reasons and then became a Crown colony.

[48] Malayan Union was formed on 1 April 1946 by the British with Sir Edward Gent as its first governor. It introduced a concept of broad-based citizenship, where all citizens had equal rights regardless of race. Citizenship was automatically granted to people who were born in any state in British Malaya or Singapore and were living there before 15 February 1942. The same situation applied to those who born outside British Malaya or the Straits Settlements only if their fathers were citizens of the Malayan Union. The situation was similar for those who had reached 18 years of age and had lived in British Malaya or Singapore for 10 out of 15 years before 15 February 1942. People eligible for citizenship application had to have lived in Singapore or British Malaya for 5 out of 8 years preceding the application, had to be of good character, understand and speak the English or Malay language, and had to take an oath of allegiance to the Malayan Union. The Malay rulers had to concede all their powers to the British crown except in religious matters. See http://en.wikipedia.org/wiki/Malayan_Union, accessed: 15 May 2014; and "Encyclopaedia Malayan Union", *Nation Master Encyclopaedia*, http://www.nationmaster.com/encyclopedia/Malayan-Union, accessed: 10 October 2011.

citizenship.[49] The Malays registered strong opposition when they realised that the MacMichael Treaties[50] reduced the status of Malay states to a colony and deprived the Malay Rulers of sovereignty. Consequently, the Malayan Union was dissolved and replaced by the Federation of Malaya 1948.

On 1 February 1948, the Federation of Malay Agreement was substituted as a compromise. It then brought into being a new Federation of Malaya.[51] The Malay Rulers became constitutional monarchs and members of *Majlis Raja-Raja Negeri Melayu* (Conference of Malay Rulers).[52] Written constitutions were introduced to all Malay states with the exceptions of Johor and Terengganu.[53] Each state had its own Executive Council and Council of States to deal with matters not specifically reserved for the Federation.[54] This demonstrated that the Federation of Malay Agreement 1948 had established a pattern of a federal system of strong central government with wide legislative powers.

It was the wish of the United Kingdom Government and the Malay Rulers that progress be made towards eventual self-government.[55] This demonstrated the serious intention and preparation of the British and the Malay Rulers to move towards the higher stage of political advancement. Finally, in 1955, the first federal elections were held for 52 seats on the Federal Legislative Council. The Alliance[56] consisted of three main ethnic parties: the United Malay National Organization (UMNO), the Malayan Chinese Association (MCA) and the Malayan

---

[49] The Malays believed that the Malayan Union proposal would result in the abandonment of the policy of recognising the Malay states as *Tanah Melayu* (Land of the Malays), thus depriving them of their special position and privileges. It also raised the fear of non-Malay domination. Refer Wan Arfah Hamzah and Ramy Bulan, *supra* note 19, at 27.
[50] For the establishment of the Malayan Union, the British sent Sir Harold McMichael to Malaya to obtain cooperation from the Malay Rulers. In 1945, the British emerged with a treaty called the 'MacMichael Treaties' for the Rulers to sign agreeing that the British would have full power and jurisdiction over all Malay states.
[51] The new Federation consisted of all territories of the former Malayan Union, nine Malay states together with Penang and Malacca. But Singapore remained a separate crown colony. It was not included in deference to the fear of the Malays that the Malayan Chinese would outnumber them. A federal government was then set up in Kuala Lumpur under a British High Commissioner. The other primary organs were an Executive Council and a Legislative Council, the representatives of which came from all races.
[52] The Conference of Malay Rulers still exists today and was officially established under article 38 of the present Malaysian Federal Constitution. It comprises nine rulers from nine states (Selangor, Negeri Sembilan, Perlis, Pahang, Terengganu, Kedah, Kelantan, Johor and Perak), and four governors from four other states (Penang, Melaka, Sabah and Sarawak) that have no rulers. Its main task is the election of the *Yang di-Pertuan Agong* (the King of Malaysia), and *Timbalan Yang di-Pertuan Agong* (Deputy) every five years. It organizes meetings generally three times a year. See http://en.wikipedia.org/wiki/Conference_of_Rulers, and http://en.wikipedia.org/wiki/Yang_di-Pertuan_Agong, accessed: 15 May 2014.
[53] Johor and Terengganu already possessed their own constitutions promulgated in 1895 and 1911.
[54] The Federal Government was responsible for defence, police, railways, labour, broadcasting, post and finance including income tax and custom duties.
[55] See the preamble of the Federation of Malaya Agreement 1948.
[56] The Alliance's leader, Tunku Abdul Rahman, became the first Chief Minister.

Indian Congress (MIC); won 51 of the 52 seats. It was proved that the Alliance had majority support from all ethnic groups. Hence, with a sense of confidence and courage, they felt it had become possible to make preparations for full self-government.[57]

After the overwhelming victory in the election, the Alliance leaders turned their attention to the independence issue. They proposed to set up an independence commission to draft a constitution. This was agreed by the British. Consequently a Commonwealth Constitutional Commission[58] was set up and was known as the Reid Commission.[59] It was led by Lord Reid[60] who was nominated by the British Government. The other Commission members were Sir Ivor Jennings[61] (also nominated by the British), Sir William McKell[62] (nominated by the

---

[57] In actual fact, the Alliance was very much influenced by the political developments in other parts of Asia including India, Pakistan, and Ceylon, which gained independence. For a speedier approach to self-government, they felt that there was a need for a Federal Legislative Council with an elected majority. Among the shrewd political strategies employed by the Alliance was its decision to focus its campaign on the independence issues. The election campaign banners were filled with the word *merdeka* (independence). Tunku Abdul Rahman made a statement that 'bad self-government was better than good foreign government'. A thorough discussion is available in Chapter 2, Fernando, Joseph M., *The Making of the Malayan Constitution,* (The Malaysian Branch of the Royal Asiatic Society, 2002).

[58] The Commonwealth Constitutional Commission was proposed by the Alliance and was accepted in the London Conference (18 January - 6 February 1956). It was also agreed that the British would nominate the Commission Chairman and an additional member. At the same time, Australia, Canada, India, and Pakistan were to nominate a member each. They started work in May 1956.

[59] The function of the Reid Commission was to draft a new Federal Constitution in the sense that they had to provide legal frameworks for a strong central government with a measure of autonomy for the states. Among their tasks were to safeguard the position of the Malay Rulers as constitutional monarchs, to create a common nationality for the Federation, and to safeguard the special position of the Malays and the legitimate interests of other communities. This posed two main problems: a suitable scheme for the division of power and resources between the Federal government and the States, and one to safeguard the rights and interests of the Malays and non-Malays. See Fernando, Joseph M. *supra* note 57, at 116.

[60] Lord Reid, the oldest member, was the chairperson of the Commission. He was a prominent Appeal Court Judge and served as a Solicitor-General for Scotland. He was a politician, legislator and law officer. He contributed tremendously to the Commission using his legal expertise and political astuteness. This was proved in his cross-examination during the hearing of the oral evidence and in the debates within the Commission. His careful handling of the private hearing helped the Commission to elucidate the Alliance proposal in the memorandum and the problems that they were likely to pose. See *id.*, at 106.

[61] Sir Ivor Jennings was a former King's Counsel. He served as a vice-chancellor of Cambridge University and was a Master of Trinity Hall, Cambridge. He was the constitutionalist *par excellence* in the Commission. He had published several important works on constitutional matters. His easy-going and unassuming style put the other members of Commission at ease in his company, professionally as well as personally. He composed the actual fifth and final draft of the Constitution. The fluency, clarity, and legal precision of the language in the draft are a testimony to his excellent command of the legal nomenclature. His knowledge of Commonwealth constitution and experience in drafting the Pakistan Constitution gave him a clear advantage over the others. In fact he became the *de facto* master draftsman. Having been part of a commission on university education in Malaya and constitutional adviser to Marshall's government in Singapore in 1955, he was more familiar with the political and geographical conditions in Malaya than the other members. His personal friendship with Tunku Abdul Rahman also gave him a deeper insight into the working of Malayan politics. *Id.*

[62] Sir William McKell was a former Governor-General of Australia. He had served as a minister in several Australian Cabinets, once as Justice Minister, and brought with him considerable experience in political administration. He gained intimate knowledge on the Federal concept in Australia and his experience as a Cabinet member in the Australian Government assisted the Commission to formulate the principles regulating the working of the Federal system in the Constitution. See *id.*

Australian Government), Justice B. Malik[63] (nominated by the Indian Government), and Justice Abdul Hamid[64] (nominated by the Pakistan Government). However, the Canadian Government did not send a representative to the Commission.[65] The most prominent feature of these five members of the Commission was that they were all steeped in English constitutionalism. Despite coming from different countries, they shared a common background of legal training and experience in Commonwealth parliamentary traditions and constitutions derived largely from English constitutionalism.[66] Their task was enormously complex.[67] The Commission, indeed, borrowed ideas from the Constitutions of India, Ceylon, Australia, the United States and constitutional precedents in Britain.[68] Examination of the constitutional documents indicates that Reid, Jennings, and Hamid were the leading players in the shaping of the Malayan Constitution 1957.[69]

The other central factor shaping the drafting process of the Malayan constitution 1957 was the Alliance memorandum.[70] This served as an important foundation for the Commission to draft the new Constitution. In this memorandum, the Alliance leaders did not attempt to draw up the details of the constitutional provisions but left the Reid Commission to work on them. There were two committees[71] appointed by the Alliance to draft the memorandum: the first dealt with communal issues,[72] whereas the second dealt with the structure and function of

[63]Initially, the Indian Government nominated Justice P.Govinda Menon, Madras High Court judge, who also served on the International Military Tribunal for the prosecution of Japanese war criminals in 1946. But when he declined, the Indian Government offered the service to Justice B. Malik, a former Chief Justice of Allahabad. He made a significant contribution in drafting the provisions on the fundamental liberties which were largely drawn from the Indian Constitution. His knowledge regarding the practical problems of interpreting the provision on fundamental liberties faced by Indian Courts truly helped the Commission to avoid some of the pitfalls in framing the same provisions in the Malayan Constitution. See *id.* at 106.

[64] Justice Abdul Hamid was an experienced High Court Judge. He had served as Secretary to the Ministry of Law in West Pakistan. He was involved in drafting Pakistan's Constitution with Sir Ivor Jennings. He contributed to the Commission by preparing the basic drafting and working papers for discussion. He provided an extra dimension to the Commission particularly on the working of the federal principles in Pakistan. See *id.*

[65] The Commission was informed that the Canadian nominee was unable to take up the offer due to health reasons.

[66] *Id.*

[67] They had to frame their recommendations in light of the norms of parliamentary democracy and the principles of a modern constitution taking into account the Malaysian political environment.

[68] *Id.* at 97.

[69] *Id.* at 114.

[70] It was a 20-page memorandum debated in private by a core group from UMNO, MCA, and MIC between April and September 1956. The memorandum not only outlined the general principles of agreement on constitutional issues between the communal leaders of UMNO, MCA and MIC, but also represented the visions, hopes and aspirations of the Alliance leaders for the emerging nation state. See *id.* at 65.

[71] The committee did not include the foreign legal expertise in the discussion probably for reasons of secrecy as it involved the sensitive nature of issues of local communities such as the Malay special position.

[72] The examples of communal issues are citizenship, language and the Malay special position. The first committee comprised Tunku Abdul Rahman, Datuk Abdul Razak, Dr Ismail Abdul Rahman, Ismail Mohamed Ali, Mohamed Khir Johari, Abdul Khir Shamsuddin, Abdul Aziz Ishak and Mohamed Daud (all from UMNO);

government, the Federal-State division powers and resources, the judiciary and others.[73] The second committee, in fact, encountered little difficulty and easily reached an agreement.[74]

The Alliance, indeed, favoured a Westminster-style parliamentary democracy[75] with a Malayan constitutional monarchy and an independent judiciary since they were trained in British parliamentary traditions and English constitutionalism. They proposed a bicameral legislature consisting of a partially elected upper house (*Dewan Negara*) and a fully elected lower house (*Dewan Rakyat*), each of which serves a term of office of five years. The memorandum also made reference to the principle of separation of powers.[76] At the same time, the judiciary was viewed as a check and balance to the power of the Executive and Legislature.[77] Regarding amendments to the Constitution, the Reid Commission established that they should be made by a majority of two thirds of the members of each house of Parliament, present and voting.[78]

For the Federal-State distribution of legislative powers and financial resources, the Alliance proposed greater powers for central government than those provided by the Federation of Malaya Agreement 1948.[79] The other area of great concern in the memorandum was the issue of fundamental liberties.[80] The fundamental source of reference was the Indian Constitution. As a matter of fact, the Reid Commission borrowed heavily from the provisions on

---

H.S.Lee, Leong Yew Koh, Ong Yoke Lin, Tan Siew Sin, Dr Lim Chong Eu, Ng Ek Teong, Too Joon Hin, Yong Pung How and T.H. Tan (all MCA); V.T.Sambanthan, K.Ramanathan, K.L.Devaser, B.Kaher Singh, V.Manickavasagam and A.Krishnadas (all MIC). See *id.* at 68.

[73] The second committee comprised Abdul Kadir Shamsuddin and Senu Abdul Rahman (from UMNO); Ong Yoke Lin and Y.C. Kang (from MCA); and K.Ramanathan and A.Krishna Dass (from MIC). See *id.*

[74] The existing precedents in other commonwealth constitutions, particularly the British, India and Australian Constitutions, provided ample references to draft the constitutional provision outlining the functions and powers of Parliament, the Executive and the Judiciary.

[75] The main exception in Malaya was the inclusion of a provision in the Federal Constitution for the institution of an elected kingship, the Supreme Ruler, with five-year terms. This concept drew its inspiration from the traditional practices in Negeri Sembilan and Perak, where the head of state was elected from the various ruling chiefs. See *id.* at 117.

[76] The Memorandum declared that the judiciary should be completely independent both of the Executive and the Legislature.

[77] *Id.* at 68.

[78] This was identical to the article on constitutional amendment in the Indian Constitution.

[79] This was in accordance with their principal intention to create a strong government. They insisted that the Commission define clearly the legislative and executive powers of the Federal and State Governments in order to avoid possible difficulties in the event of the states being controlled by different parties from that controlling the Federal Government.

[80] Based on the communal tensions experienced by the Alliance during the Malayan Union scheme 1946, the 1948 Federation of Malaya Agreement and the on-going emergency, they wanted to ensure that all the basic rights and liberties of the individual would be guaranteed and written into the new Constitution.

fundamental rights in the Indian Constitution, although they adopted the style of phrasing used in the American Bill of Rights.[81]

The most contentious issues in the final memorandum were the issues of citizenship,[82] the Malay special position, and the national language. Under the Federation of Malaya Agreement 1948, Malays who were subjects of any of the nine Malay Rulers and also the British subjects in Penang and Malacca automatically became Federal citizens, while the other communities could acquire Federal citizenship by application if they fulfilled the residential requirements.[83] However, in the inter-communal constitutional bargain between UMNO and MCA, the Alliance agreed on the application of the principle of *jus soli,*[84] for those born in the Federation after independence.

In respect of language, the main problem was the status of Chinese and Tamil.[85] The Alliance, under a committee headed by the Education Minister, Datuk Abdul Razak, prepared a report called 'The Razak Report'.[86] The Prime Minister, Tunku Abdul Rahman, pointed out the important need for a common language to foster a common nationhood in the Federation.[87] He said that recognising Malay as the principal and national language in the Federal Constitution and simultaneously upholding the rights of others to use their own languages, script and culture was the right thing to do. Despite all these communal tension situations, both UMNO and MCA realised that they had to compromise in dealing with these sensitive issues if they really wanted to submit the memorandum to the Reid Commission.

[81] *Id.* at 133.
[82] For example, the MCA and MIC did not agree with the UMNO proposal that those born in Malaya of alien parents on or after independence would cease to be nationals on reaching the age of 21 unless they made a declaration of the retention of their nationality within a year of reaching that age. For more information, see *id.,* at 74-75.
[83] Those born in the Federation and resident there for eight years could acquire Federal citizenship by application, while residents who had been born outside the Federation needed to fulfil a residential requirement of 15 years. However, this type of citizenship left a large number of domiciled non-Malays as non-citizens. See *id.* at 73.
[84] The principle of *jus soli* referred to the rule by which birth in a state is sufficient to confer nationality, irrespective of the nationality of one's parents. See Martin, Elizabeth A. And Jonathan Law, eds**.,** *supra* note 20, at 301.
[85] The non-Malays felt that the continuous use of their language was important for the preservation of their culture and identity.
[86] It emphasized the adoption of a common syllabus in schools irrespective of the medium of instruction and the introduction of Malay as a compulsory subject in line with the Alliance objective to promote it as the national language. Thus, the means of instruction were English, Malay, Mandarin, and Tamil. See Fernando, Joseph M., *supra* note 57, at 75.
[87] He made comparisons with the Indian Constitution, stating that India had adopted Hindi as the national language while retaining English as an official language for 15 years.

In January and February 1956, a Constitutional Conference was held in London and the proposals were accepted. As a result, the Constitution was then duly promulgated. Thus, on 31 August 1957 the Federation of Malaya became an independent state. The constitution in fact embodied the British and Indian constitutional concepts and also the traditional Malay elements.[88] Although the Malaysian Constitution was largely based on the Indian Constitution,[89] a written constitution with a chapter on fundamental rights with a Parliament vested with extensive powers on the grounds permitted by the Constitution itself, it is not a document hammered out by a constitutional assembly comprising representatives of the people. Rather it developed from an earlier constitution drafted by a commission of foreign experts in constitutional law.[90] Its evolution (and departure) from the original is, however, uniquely Malaysian.[91]

(c) The Malaysian Federal Constitution

As a federal country, Malaysia[92] is governed by the Malaysian Federal Constitution.[93] This Constitution emerged from several changes and amendments[94] of the Independence Constitution 1957. It consists of 15 Parts[95] and 13 Schedules.[96] It is the supreme law[97] of the

---

[88] See Mohamed Salleh Abbas, "The Traditional Elements of the Malaysian Constitution", *The Constitution of Malaysia: Further Perspectives and Developments,* F.A. Trindade and H.P. Lee, eds., (Singapore: Oxfords University Press, 1986), at 1-17; quoted also in Wan Arfah Hamzah and Ramy Bulan, *supra* note 19, at 26.

[89] The Indian Constitution was formulated by a local body, the Constituent Assembly of India comprising politicians, lawyers and other professionals. In Ceylon and Pakistan, this body included foreign constitutional experts, a combination of both local legislators and foreign constitutional experts, especially from the ruling colonial power, Britain. Wan Arfah Hamzah and Ramy Bulan, *supra* note 19, at 103.

[90] Malaya opted for an entirely non-Malayan constitutional commission. This decision was determined by the Alliance in their 1955 election manifesto which stated their preference for a non-Malayan commission, as they felt that such a body would be able to avoid local prejudices and perform its task with complete impartiality. *Id*.

[91] *Id.* at 26.

[92] Malaysia is a federation of 13 states and 3 federal territories. The 13 states are Johor, Kedah, Kelantan, Malacca, Negeri Sembilan, Pahang, Penang, Perak, Perlis, Sabah, Sarawak, Selangor, and Terengganu. The 3 federal territories are the Federal Territory of Kuala Lumpur, Federal Territory of Putra Jaya, and Federal Territory of Labuan. See Article 1, Malaysian Federal Constitution, *infra* note 93.

[93] In this section, the words 'Malaysian Federal Constitution' or 'Federal Constitution' refer to the Malaysian Federal Constitution as at 1st February 2013; all Sections and Parts, unless specified otherwise, also refer to those provided in the Malaysian Federal Constitution.

[94] The Independence Constitution 1957 had experienced some amendments, such as the constitutional crisis in 1983. Here, the amendment involved the questions of assent to Bills and the power of the King (*Yang di Pertuan Agong*) to declare emergencies. Others include the issues of the Malaysian Rulers' immunity 1993, where a special court for the Rulers was established, but apparently the immunity was not removed. For more details, see Abdul Aziz Bari, *supra* note 21, at 29-34.

[95] These 15 Parts are: Part I (The States, Religion and Law of the Federation); Part II (Fundamental Liberties); Part III (Citizenship); Part IV (The Federation); Part V (The States); Part VI (Relations Between the Federation and the States); Part VII (Financial Provisions); Part VIII (Elections); Part IX (The Judiciary); Part X (Public Services); Part XI (Special Powers Against Subversion, Organized Violence, and Acts and Crimes Prejudicial to the Public and Emergency Powers); Part XII (General and Miscellaneous); Part XIIA (Additional Protections

country on which the system of the Malaysian Government and its legal system are based. The Federal Constitution incorporates some indigenous characters,[98] for instance the sultanates or the monarch,[99] the position of Islam,[100] the position of the Malay language,[101] and the special position of the Malays[102].

For States of Sabah and Sarawak); Part XIII (Temporary and Transitional Provisions); Part XIV (Saving For Rulers' Sovereignty, *etc.*); Part XV (Proceedings Against the *Yang Di-Pertuan Agong* and the Rulers).

96 The 13 Schedules are: *First Schedule* (Oath of Applicants for Registration or Naturalization); *Second Schedule* (Citizenship); *Third Schedule* (Election of *Yang di-Pertuan Agong* and *Timbalan Yang di-Pertuan Agong*); *Fourth Schedule* (Oaths of Office of *Yang di-Pertuan Agong* and *Timbalan Yang di-Pertuan Agong*); *Fifth Schedule* (The Conference of Rulers); *Sixth Schedule* (Forms of Oaths and Affirmations); *Seventh Schedule* (Election and Retirement of Senators); *Eighth Schedule* (Provisions to be inserted in State Constitution); *Ninth Schedule* (Legislative Lists); *Tenth Schedule* (Grants and Sources of Revenue assigned to State); *Eleventh Schedule* (Provisions of the Interpretation and General Clauses Ordinance, 1948 (Malayan Union Ordinance No.7 of 1948), applied for interpretation of the Constitution); *Twelfth Schedule* (Provisions of the Federation of Malaya Agreement, 1948 as applied to the Legislative Council after Merdeka Day-Repealed); *Thirteenth Schedule* (Provisions relating to delimitation of constituencies).

97 Supreme means the highest in ranking or authority and even means being in an all-powerful position. Even the *Yang di-Pertuan Agong, i.e.*, the supreme ruler, has been created by the Constitution and is therefore subject to the Constitution and law. See Tun Mohamed Suffian, *An Introduction to the Legal System of Malaysia,* 2nd ed., (Petaling Jaya: Penerbit Fajar Bakti Sdn Bhd, 1989), at 15-17; Rau and Kumar, *General Principles of the Malaysian Legal System,* (Shah Alam: International Law Book Services, 2006), at 43-44 and at 50-53; Abdul Aziz Bari, *supra* note 21, at 35; and Wan Arfah Hamzah and Ramy Bulan, *supra* note 19, at 33-35.

98 Indigenous character here refers to the elements that are unique in the sense that they can only be found in the Malaysian constitution.

99 The constitutional monarchy refers to the office of *Yang di-Pertuan Agong* (the King), *Sultans* (the Malay rulers) and the Conference of Rulers. Malaysia has nine Sultanates. Each of them takes turn, according to the constitutional rules and practices, to be the King. The King shall be elected by the Conference of Rulers for a term of five years. He is the Supreme Head of the Federation. The King is the head of states, while Prime Minister is the head of government. The King is said to have power to reign, while the Prime Minister has power to govern. See *Chapter 1-The Supreme Head* (Article 32-37), *Chapter 2-The Conference of Rulers* (Article 38), *Chapter 3-The Executive* (Article 39-43A) of the Federal Constitution. See Ahmad Ibrahim and Ahilemah Joned, *Sistem Undang-Undang di Malaysia,* 3rd printing (2nd. ed.), (Kuala Lumpur: Dewan Bahasa dan Pustaka, 2005), at 178; Ahmad Ibrahim and Ahilemah Joned, *The Malaysian Legal System, supra* note 26, at 187-189; Abdul Aziz Bari, *supra* note 21, at 44-46; Wu Min Aun, *supra* note 42, at 58-66; Tun Mohamed Suffian, *supra* note 97, at 20-49; Rau and Kumar, *supra* note 97, at 55-58.

100 The Federal Constitution affirms that Islam is the religion of the Federation but simultaneously guarantees the freedom of religion. In other words, other religions may be practised in peace and harmony in the country. The Federal Constitution establishes that every person has the right to profess and practise his religion freely. Persons under eighteen years of age will have their religions determined by their parents or guardians. See Article 3(1), Article 11, Article 12 of the Federal Constitution. See also Abdul Aziz Bari, *supra* note 21, at 46-47.

101 The Federal Constitution declares the position of the Malay language as the national language. It was the Malay Rulers who insisted that Malay language should be the language of the administration. But the usage of the Malay language is still subject to some practical exemptions, for instance when it involves the international community thus necessitating the use of other languages such as English, Arabic, Mandarin and others. See Article 152 of the Federal Constitution. See also Abdul Aziz Bari, *supra* note 21, at 47-50.

102 The Federal Constitution is also concerned with protecting the Malays and natives of the States of Sabah and Sarawak and the legitimate interests of other communities. The King may exercise his function under the constitution to safeguard the special position of the Malays and natives of Sabah and Sarawak as he may deem reasonable of position, such as in the public service, scholarships, exhibitions, and other similar education or training privileges, or special facilities given or accorded by the Federal Government. See Article 153 of the Federal Constitution.

This section aims to analyse the Articles in the Federal Constitution that might be applicable to the country's outer space activities. The major concern is to determine the type of legislatures that have legislative competencies with respect to the country's outer space law, policy, and activities. This issue was mooted in view of the fact that there are two main legislative actors in the Federation of Malaysia: the Federal Legislature (*i.e.* the Parliament)[103] which acts for the Federal Government, and the State Legislature (*i.e.* the Legislative Assembly)[104] which acts for the State Government.

As far as the exercising of the legislative power conferred by the Federal Constitution is concerned, the Parliament may make laws for the whole or any part of the Federation and these laws have effect both outside and within the Federation. However, the State Legislature may make laws for the whole or any part of that state only.[105] Chapter 1 of Part VI,[106] the Federal Constitution, deals with the distribution of legislative powers between the Federal Legislature and the State Legislature. Article 74(1) of the Federal Constitution[107] confers legislative power on the Parliament, which may make laws with respect to any matters enumerated in the 'Federal List or the Concurrent List' in the Ninth Schedule of the Federal Constitution. On the other hand, the legislative power of the State Legislature was conferred by Article 74(2) in which the State Legislature may make laws with respect to any matters enumerated in the 'State List or the Concurrent List' in the Ninth Schedule of the Federal Constitution.

---

[103] The Federal Legislature is also known as the Parliament, in which the legislative authority of the Federation is vested. The Parliament consists of *Yang di Pertuan Agong* (the King) and two chambers (*Majlis* or Houses of Parliament). The first chamber is *Dewan Negara* (Senate), the upper house, and the second chamber is *Dewan Rakyat* (House of Representatives), the lower house. See *Chapter 4 – Federal Legislature* (Article 44 – Article 65) of the Federal Constitution. For further details, read Tun Mohamed Suffian, *supra* note 97, at 32-33; Rau and Kumar, *supra* note 97, at 58-59; Wu Min Aun, *supra* note 42, at 82-92; and, Ahmad Ibrahim and Ahilemah Joned, *supra* note 99, at 187-204.

[104] The State Legislature, by virtue of the Essential Provision, is a unicameral body with the name *Dewan Undangan Negeri* (the Legislative Assembly). Each State Legislature consists of the Ruler or the *Yang di-Pertua Negeri* and a number of elected members as may be provided by the Legislature. See *Part V – The States* (Article 70 – Article 72), Federal Constitution. For details, see Rau and Kumar, *supra* note 97, at 55-58 and 89-90; Tun Mohamed Suffian, *supra* note 97, at 35-36; Wu Min Aun, *supra* note 42, at 92-96; and, Ahmad Ibrahim and Ahilemah Joned, *supra* note 99, at 240-251.

[105] See Article 73 of the Federal Constitution.

[106] Part VI of the Federal Constitution deals with 'Relations between the Federation and the States'.

[107] Article 74(1) of the Federal Constitution mentions: *'Without prejudice to any power to make laws conferred on it by any other Article, Parliament may make laws with respect to any of the matters enumerated in the Federal List or the Concurrent List …'*

The matters on which the Parliament may make laws under the Federal List[108] are summarized as follows:[109] (1) External affairs; (2) National defence; (3) Internal security; (4) Civil and criminal law and procedure and the administration of justice; (5) Federal citizenship and naturalization; aliens, (6) The machinery of government; (7) Finance; (8) Trade, commerce and industry; (9) Shipping, navigation and fisheries; (10) Communications and transport; (11) Federal works and power; (12) Surveys, inquiries and research; (13) Education; (14) Medicine and health; (15) Labour and social security; (16) Welfare of the aborigines; (17) Professional occupations; (18) Holidays, standard of time; (19) Unincorporated societies; (20) Control of agricultural pests, protection against pests, prevention of plant diseases; (21) Newspapers, publications, publishers, printing, printing presses; (22) Censorship; (23) Theatres, cinemas, public amusements; (24) Federal housing and improvement trusts; (25) Co-operative societies; (26) Prevention and extinguishment of fire, including fire services and fire brigades.

With respect to the State Legislature, the matters on which it may make laws under the State List[110] are as follows:[111] (1) Islamic law and personal and family law of Muslims, Malay customs, offences by Muslims, *Syariah* Courts; (2) Land; (3) Agriculture and forestry; (4) Local government; (5) Local services; (6) State works and water; (7) Machinery of the State Government; (8) State holidays; (9) Offences against State Law; (10) Inquiries for State purposes; (11) Indemnity; (12) Turtles and riverine fishing.

The matters on which both the Parliament and the State Legislature may have power to make laws under the Concurrent List[112] are condensed as follows:[113] (1) Social welfare, social services, protection of women, children and young persons; (2) Scholarships; (3) Protection of wild animals and wild birds, National Parks; (4) Animal husbandry; (5) Town and country planning; (6) Vagrancy and itinerant hawkers; (7) Public health, sanitation and prevention of diseases; (8) Drainage and irrigation; (9) Rehabilitation of mining land which has suffered soil erosion; (10) Fire safety measures and fire precaution in the construction and maintenance of buildings.

[108] See Annex 1: List I-Federal List, under the Ninth Schedule, Malaysian Federal Constitution.
[109] Lee Mei Pheng, *General Principles of Malaysian Law,* 4th ed., (Shah Alam: Penerbit Fajar Bakti Sdn. Bhd., 2001), at 6-7.
[110] See Annex 2: List II – State List under the Ninth Schedule, Malaysian Federal Constitution.
[111] *Id.,* at 7.
[112] See Annex 3: List III – Concurrent List under the Ninth Schedule, Malaysian Federal Constitution.
[113] *Id.,* at 6-7.

It is obviously observed that all articles as well as items enumerated in the three Legislative Lists (the Federal List, the State List, and the Concurrent List) have no literal or direct article, item or even word mentioning the words 'space' or 'outer space'. However, recourse could be made to certain words or subject matters written in the three preceding lists that might seem applicable to outer space activities.

With reference to the Federal List, Item 1 mentions 'external affairs'.[114] This word is then further explained in sub-clauses (a) and (b)[115] by which it may include international treaties, agreements and conventions and also the implementation of the treaties, agreement, and conventions with other countries. At this juncture, it is believed that the term 'external affairs' may perhaps encompass outer space activities (even though it is not always the case). It is relying on the fact that outer space matters normally deal with external affairs of the country, which involves negotiation and agreements with foreign states. In addition, this is indeed made possible by virtue of Article 74(1) of the Federal Constitution,[116] if read together with the Federal List under Item 1(a) and (b), as it will then conclude that the Federal Parliament has the exclusive power to make laws relating to the state's external affairs including matters in respect of space treaties, agreements, and conventions. It also has the power to implement such treaties, agreements and conventions with other countries and to make them operative domestically.[117] Thus, by virtue of Item 1 of the Federal List, it is submitted that the Federal Legislature has legislative competencies with respect to the country's outer space law, policy, and activities.

Item 10 is another Item in the Federal List that may be applicable to outer space activities. It states the words 'communication and transport'.[118] This Item then further provides that the words 'communications and transport' may also include 'telecommunications,[119] wireless,

---

[114] Item 1, List I - Federal List, Ninth Schedule, Federal Constitution, *supra* note 108.

[115] Item 1(a) and (b), List I - Federal List, Ninth Schedule, Federal Constitution; see Annex 1. Item 1 prescribes: *'External affairs, including: (a) Treaties, agreements and conventions with other countries and all matters which bring the Federation into relations with any other country;(b) Implementation of treaties, agreements and conventions with other countries'.*

[116] See Article 74(1), Federal Constitution, *supra* note 107.

[117] Abdul Ghafur Hamid @ Khin Maung Sein, "Judicial Application of International Law in Malaysia: An Analysis", *The Malaysian Bar,* 31 March 2006, http://www.malaysianbar.org.my/international_law/judicial_application_of_international_law_in_malaysia_an_analysis.html, accessed: 14 May 2014.

[118] Item 10, List I - Federal List, Ninth Schedule, Federal Constitution, *supra* note 108.

[119] Item 10(g), List I - Federal List, Ninth Schedule, Federal Constitution, *supra* note 108.

broadcasting, and television,[120]' which are certainly considered part of or interrelated with outer space matters.

A similar possible connection is observed in other Items listed in the Federal List, such as in Item 2 (national defence), Item 3 (internal security), and Item 9 (shipping, navigation and fisheries) since they might involve certain activities with respect to outer space interest. This happens particularly in the application of remote sensing satellites. In addition, Item 4 (civil and criminal law) of the Federal List also seems relevant for it may possibly have their genesis in outer space.

As for the subject matters itemized under the State List of the Federal Constitution, Item 3 (forestry and agriculture) is clearly correlated to outer space activities as it also involves the operation of remote sensing satellites. This is also accurate with respect to Item 3 (protection of wild animals and wild birds) of the Concurrent List. This contention is made since the technology of remote sensing satellites might be utilized for the protection of wild animals and birds.

Hence, based on this preliminary presentation, there are a number of subject matters listed under the Federal List that seem to correspond with outer space-related activities although, in a way, it seems that, with regard to the State List and the Concurrent List, only a few items are involved. Therefore, there are strong grounds for believing, at this particular point, that the legislative jurisdiction and power with respect to outer space law, policy and activities, in pitch and substance, is mainly a competence of the Federal Government.

1.2.3. The Malaysian Communications and Multimedia Act 1998 (Act 588).

The need for national space legislation is no longer in dispute since the burgeoning of commercialization and the involvement of public and private sectors in space activities. Communication is probably one of the most active parts of outer space activities, since satellite communication technology is the most mature, commercial, and obviously practical of all space benefits and applications. It's amazing capacity to reach people in remote areas, on ships on the high seas and in aeroplanes, and also to improve education, healthcare and

[120] Item 10(h), List I - Federal List, Ninth Schedule, Federal Constitution, *supra* note 108.

standards of living does it credit. Thus, in such circumstance, legislation is required to govern the national activities in addition to the international treaties. Numerous countries have the space legislation with respect to communications. They include, to name but a few, the United States of America (Telecommunications Act 1996), the United Kingdom (Telecommunications Act 1984), and Australia (Telecommunications Act 1997).

At present, space law is considered an embryonic domain in Malaysia even though the country has actively participated to a considerable extent in outer space-related activities. Currently, the available and most reliable domestic law governing outer space-related activities is found in the multimedia and communication spheres. The legislative mandate for regulation of these sectors comes from the Malaysian Communications and Multimedia Act 1998 (Act 588) (referred to as 'the MCMA 1998').[121] It is beyond the scope of this section to describe the law in detail. This section, however, aims to provide a general overview of the legal rules specified by the Act.

The MCMA 1998 principally prescribes the licensing system connected with Malaysian communication and multimedia activities. The idea behind the Act came when the Malaysian Government found it difficult to differentiate between telecommunications, broadcasting and information technology industries due to technological advances in Malaysia.[122] For that reason, the Government of Malaysia decided to pass the Act in 1998 to cater for the convergence era of telecommunications, broadcasting and computer technology industries in Malaysia. It is important to note that, prior to the enforcement of this Act in April 1999, the three industries - telecommunications, broadcasting and information technology - were regulated by different legislation. The telecommunications industry was previously regulated under the Malaysian Telecommunications Act 1950, and the broadcasting industry was administered by the Malaysian Broadcasting Act 1988, while the information technology industry was not governed by any specific legislation.[123]

---

[121] It came into force on 1st April 1999. In this section, all Sections and Parts, unless specified otherwise, refer to those in the Malaysian Communications and Multimedia Act 1998 (Act 588) as at 15th March 2013.

[122] Safinaz Mohd Hussein, "Service Provider Licensing System in the Malaysian Communications and Multimedia Industry", (2004) 3 *Journal of Information, Law and Technology (JILT),* http://www2.warwick.ac.uk/fac/soc/law2/elj/jilt/2004_3/hussein/, accessed: 15 May 2014. See also Safinaz Mohd Hussein, *Undang-Undang Komunikasi & Multimedia,* (Petaling Jaya: Prentice Hall, 2002), at 1; Lee, Casey, "The Institutional and Policy Framework for Regulation and Competition in Malaysia", *Regulation, Competition and Development: Setting A New Agenda, CRC International Workshop,* (Manchester, 4-6 September 2002), at 5 and 7, http://www.cassey.com/fea2002-7.pdf, accessed: 20 November 2011.

[123] Safinaz Mohd Hussein, *Undang-Undang Komunikasi & Multimedia, id.,* at 1-2.

The preamble of the MCMA 1998 clearly sets out the purpose of the Act in general. It aims to provide for and regulate the converging communications and multimedia industries, in addition to incidental matters. Section 3 (1) lists four main objectives of the Act:

(1) To promote national policy objectives[124] for communications and multimedia industries;

(2) To establish a licensing and regulatory framework in support of national policy objectives for the communication and multimedia industries;

(3) To establish the powers and functions for the Malaysian Communications and Multimedia Commission;

(4) To establish powers and procedures for the administration of this Act.

In general, the MCMA 1998 consists of 282 Sections and 11 Parts.[125] The core person and body responsible in the regulatory framework is the Minister in charge of communication and multimedia (referred to as 'the Minister') and the Malaysian Communication and Multimedia Commission (referred to as 'the Commission'). The Minister means the Minister currently charged with the responsibility for communication and multimedia.[126] The Commission means the Malaysian Communications and Multimedia Commission established under the

[124] Among the national policy objectives for the communications and multimedia industry in Malaysia are: (1) to establish Malaysia as a major global centre and hub for communications and multimedia information and content services; (2) to promote a civil society where information-based services will provide the basis of continuing enhancements to quality of work and life; (3) to grow and nurture local information resources and cultural representation that facilitate the national identity and global diversity; (4) to regulate for the long-term benefit of the end user. See Section 3(2), MCMA 1998.

[125] The 11 parts provided in the MCMA 1998 are: Part I - Preliminary; Part II - Ministerial Powers and Procedures; Part III - Appeal Tribunal; Part IV - Licences; Part V - Powers and Procedures of the Malaysian Communications and Multimedia Commission; Part VI - Economic Regulation; Part VII - Technical Regulations; Part VIII - Consumer Protection; Part IX - Social Regulation; Part X - General; Part XI - Transitional Provision.

[126] See Section 6 (Interpretation), MCMA 1998. It should be noted that, prior to the enforcement of the MCMA 1998, the Ministry responsible for regulating the telecommunications and broadcasting industries was the Ministry of Energy, Telecommunications and Post, and also the Ministry of Broadcasting. However, when the Act came into force the Malaysian Government restructured the functions of both Ministries, and the power of the Minister of Information was restricted to matters related to Radio Television Malaysia (RTM). The power under the MCMA 1998 has been given directly to the Minister currently charged with responsibility for communications and multimedia. At the time of writing, the Minister in charge is the Minister of Communications and Multimedia. He is the head of Ministry of Communications and Multimedia Malaysia (Previously, this Ministry was known as the Ministry of Information, Communication, and Culture. This is due to the restructuring of the Malaysian cabinet that was announced by the Malaysian Prime Minister, Dato' Sri Mohd Najib Abdul Razak on 15 May 2013). The Minister of Communication and Multimedia obtains his power to regulate the industries under Part II (Ministerial Powers and Procedures), MCMA 1998. For more information, refer to Safinaz Mohd Hussein, *Undang-Undang Komunikasi & Multimedia, supra* note 122, at 4-5. See http://www.kkmm.gov.my/; accessed: 15 May 2014.

Malaysian Communications and Multimedia Commission Act 1998.[127] The MCMA 1998 outlines four types of powers conferred on the Minister: ministerial direction,[128] ministerial determination,[129] ministerial declaration[130] and, lastly, ministerial regulations.[131] The power and procedures of the Commission are enumerated in Part V.[132]

Besides the Minister and the Commission, another essential body that regulates the communication and multimedia industries is the Appeal Tribunal (referred to as 'the

[127] See Section 6 (Interpretation), MCMA 1998. The Malaysian Communications and Multimedia Commission official website is available at http://www.skmm.gov.my/, accessed: 15 May 2014. For more information, read Chapter 1 of the thesis (1.2.4. The Malaysian Communications and Multimedia Commission Act 1998 (Act 589).

[128] The Minister may, from time to time, issue a direction to the Commission of general character or otherwise. The direction must be consistent with the objects and provisions of the MCMA 1998. The Commission shall exercise its powers conferred in a manner which is consistent with the direction. It should also be registered by the Commission as soon as practicable. The Minister, however, may modify, vary or revoke the direction at any time. Some examples of the registered ministerial directions: 'Ministerial Direction on General Licensing Policies'; 'Ministerial Direction on the Standards on International Mobile Telecommunications 2000 Terrestrial Component'; 'Ministerial Direction on Equal Access'; 'Ministerial Direction on Quality of Service'. Refer to Chapter 1 (Ministerial Direction) of Part II, MCMA 1998. Read also Safinaz Mohd Hussein, *Undang-Undang Komunikasi & Multimedia, supra* note 122, at 11-12.

[129] The Minister has the legal right, from time to time, to determine matters under the MCMA 1998, without consultation with any other person including the licensees. The determination should be consistent with the provision of such Act, and only effective from the date of registration by the Commission. The Minister also has the right, at any time, to make modification, variation, or revocation. An example of the registered ministerial determination is 'Ministerial Determination on Spectrum Reallocation'. Refer to Chapter 2 (Ministerial Determination) of Part II, MCMA 1998. Read also Safinaz Mohd Hussein, *Undang-Undang Komunikasi & Multimedia, supra* note 122, at 13-14.

[130] The Minister may, from time to time, make a declaration that a licence is subject to such conditions or enjoys such benefits as the Minister deems fit. The declaration should be in written form. Unlike determination and direction, the declaration has its own procedure to be followed. Before making the declaration, the Minister must give written notice and a copy of the draft direction to the affected licensee. It must also be registered by the Commission. Refer to Chapter 3 (Ministerial Declaration) of Part II, MCMA 1998. Read also Safinaz Mohd Hussein, *Undang-Undang Komunikasi & Multimedia, supra* note 122, at 14-15.

[131] The Minister may, on the Commission's recommendation or otherwise, make a regulation to be published in the *Gazette*, for the purposes listed in section 16(1), MCMA 1998. To name but a few, these include any fees, charges or rates to be imposed, the compounding of offences, any redress, compensation, penalties in respect of breach of or offence against any subsidiary legislation, *etc*. Some examples of the ministerial regulations: 'Communications and Multimedia (Technical Standards) Regulations 2000'; 'Communications and Multimedia (Spectrum) Regulations 2000'; 'Communications and Multimedia (Licensing) Regulations 2000'. Refer to Chapter 4 (Ministerial Regulations) of Part II, MCMA 1998. Read also Safinaz Mohd Hussein, *Undang-Undang Komunikasi & Multimedia, supra* note 122, at 15-34.

[132] The powers conferred on the Commission, among others, are: power of issuing directions (Chapter 1); power to make a determination (Chapter 2); power to hold a public inquiry in response to a written request or on its own initiative (Chapter 3); power to maintain a register in both physical and electronic media form for all matters that must be registered (Chapter 6). Examples of matters required for registration: individual licence (Section 42); class licence (Section 49); dispute resolution decision (Section 88); ministerial direction (Section 9); ministerial determination (Section 12); ministerial declaration (Section 15); Commission's direction (Section 54); and Commission's determination (Section 57). See Chapter 6 (Register) and Part V (Powers and Procedures of the Malaysian Communications and Multimedia Commission), MCMA 1998. Safinaz Mohd Hussein, *Undang-Undang Komunikasi & Multimedia, supra* note 122, at 16. More information on the Commission is available in Chapter 1 of the thesis (1.2.4. The Malaysian Communications and Multimedia Commission Act 1998 (Act 589).

Tribunal').[133] The Minister, on an ad hoc basis, has the right to establish the Tribunal based on certain conditions.[134] The designated function of the Tribunal is to review any appealed matter based on a decision or direction of the Commission.[135] The decision made by the Tribunal is final and binding on the parties, and is not subject to any further appeal.[136]

There are two types of licences introduced under Part IV[137]: individual licences and class licences.[138] An individual licence is granted to a person who conducts an activity which requires a high degree of regulatory control. Examples of local telecommunication companies holding such licences: Telekom Malaysia Bhd.; Digi telecommunications; Celcom (Malaysia); and Maxis International.[139] The class licence, however, is designed to cater for the needs of small operators and has a lighter form of regulatory control and minimal procedural requirements. Examples of multimedia local companies registered under this licence: Information Network Services and Time dot Net Bhd.[140]

Licences are granted to those who provide services and/or facilities that fall under these four categories:[141]

(1) The network facility: this means any element or combination of elements of physical infrastructure used principally for, or in connection with, the provision of network services, but does not include customer equipment such as earth stations, satellite hubs and satellite control stations.[142]

---

[133] See Part III (Appeal Tribunal), MCMA 1998. For more information, read Safinaz Mohd Hussein, *Undang-Undang Komunikasi & Multimedia, supra* note 122, at 34-37.
[134] The Appeal Tribunal could be established by the Minister, either when he considers necessary, or for the good cause and in the interest of justice, or to assist the Commission in performing its functions, or in the public interest. Read Section 17(1), MCMA 1998.
[135] Section 18(1), MCMA 1998.
[136] Section 18(2), MCMA 1998.
[137] Part IV, MCMA 1998. More information is available in Chapter 1 of the thesis (1.2.5. The Communications and Multimedia (Licensing) Regulations 2000).
[138] An individual licence means a licence for a specified person to conduct a specified activity and may include conditions to which the conduct of that activity shall be subject. See Section 6 (Interpretation), and Chapter 1 (Individual Licence) of Part IV, MCMA 1998; a class licence means a licence for any or all persons to conduct a specified activity and may include conditions to which the conduct of that activity shall be subject. See, Section 6 (Interpretation) and Chapter 2 (Class Licence) of Part IV, MCMA 1998.
[139] Safinaz Mohd Hussein, "Service Provider Licensing System in the Malaysian Communications and Multimedia Industry", *supra* note 122, at 3.
[140] *Id*.
[141] More discussion on the four licensable services and/or facilities is available in Chapter 1 of the thesis (1.2.5. The Communications and Multimedia (Licensing) Regulations 2000).
[142] Examples of companies providing the network facility are Telekom Malaysia Bhd., Digi Telecommunications Sdn. Bhd., Telekom Cellular Sdn. Bhd., Asiaspace Dotcom Sdn. Bhd. See Safinaz Mohd Hussein, *Undang-Undang Komunikasi & Multimedia, supra* note 122, at 42. See also "Table 4-8: Licensing in Malaysia [4.5.3] ICT Regulation Toolkit", http://www.ictregulationtoolkit.org/en/PracticeNote.2554.html,

(2) The network services: this refers to a service for carrying communications by means of guided and/or unguided electromagnetic radiation such as a broadcasting distribution service, and bandwidth services[143]

(3) The application service: this refers to a service provided by means of, but not solely by means of, one or more network services, such as data services and electronic commerce.[144]

(4) The content application service: content application service means an application service which provides content, such as satellite broadcasting, and subscription broadcasting.[145]

The MCMA 1998 also offers four different modes of regulation: economic, technical, consumer protection and social. The economic regulation mechanism is intended to establish a regulatory framework that aims to escalate the market value. It takes place through licensing of network facilities, network services, and application services. The licensees should provide these facilities and services according to the terms and conditions of the licence granted. General competition practices are initiated under such regulation when the law states that, for example, entering into a collusive agreement that provides for rate-fixing, market sharing, and boycotting of a supplier or other competitor is prohibited.[146]

The technical regulation, which is intended to assist the economic regulation, aims to alleviate the network interoperability by regulating the technical aspects. It takes effect, for instance, by offering the effective regulatory framework of spectrum assignment, numbering, electronic addressing, and technical standard. For example, no person shall use any part of a spectrum to provide a network service unless he/she holds a spectrum assignment, and it is an

accessed: 8 September 2012. See also Section 19, Communications and Multimedia (Licensing) Regulations 2000, and Section 6, MCMA 1989.

[143] Examples of companies providing network services: Digi Telecommunications Sdn. Bhd.; Telekom Malaysia Bhd.; Fiberail Sdn. Bhd.; Maxis Broadband Sdn. Bhd.; and MIMOS Berhad. See *id*. See also Section 20, Communications and Multimedia (Licensing) Regulations 2000, and Section 6, MCMA 1989.

[144] Examples of companies providing application services: Asia Online Utusan Sdn. Bhd.; Reach Internet Service (MSC) Sdn. Bhd.; United Multimedia Sdn. Bhd.; and NTT MSC Sdn. Bhd. See Safinaz Mohd Hussein, *Undang-Undang Komunikasi & Multimedia, supra* note 122, at 43. See also "Table 4-8: Licensing in Malaysia [4.5.3] ICT Regulation Toolkit", *supra* note 142, and Section 6, MCMA 1998.

[145] Examples of companies providing content application services: Sistem Television Malaysia Bhd.; Natseven TV Sdn. Bhd.; Measat Radio Communications Sdn. Bhd.; and NTT MSC Sdn. Bhd. See *id*. See also, Section 21, Communications and Multimedia (Licensing) Regulations 2000, and Section 6, MCMA 1998.

[146] Part VI (Economic Regulation), MCMA 1998. Safinaz Mohd Hussein, *Undang-Undang Komunikasi & Multimedia, supra* note 122, at 6. See also Lee, Casey, *supra* note 122, at 7-8.

offence for a person to use any technical equipment or system which hinders the network interoperability.[147]

The consumer protection regulation provides a regulatory framework that aims at protection of consumers' rights, and elevates the quality of services in the communication and multimedia industries. It is has been proved, for example, that the providers under the law should deal reasonably with consumers and adequately address consumer complaints. With regard to disputes arising between consumers and licensees, certain procedures should be followed and observed.[148]

The social regulation mechanism is intended mainly to provide a regulatory framework that regulates the content application services. Since these services, for instance broadcasting services, have a great impact on society, a mode of social regulation is offered in the MCMA 1998. It is applied through the licensing system; for instance, no person is permitted to provide a content application service unless they hold a valid licence to provide such services. In terms of content requirements, the law prohibits the provider from providing content that is indecent, obscene, false, menacing and offensive in character with intent to annoy, abuse, threaten or harass any person.[149]

In summary, the MCMA 1998 establishes three major rules: Firstly, the rules with respect to the powers and procedures relating to the three regulatory bodies: the Minister, the Commission, and the Tribunal; secondly, the licensing system; thirdly, the four modes of regulations: economic, technical, consumer and social regulations. Thus, as a final point, the four facilities or services provided by a provider, after being granted a licence, must be controlled and regulated by the Minister and the Commission within the scope of the four modes of regulations. These interrelationships are vital for the purpose of achieving the Government's national objective with respect to communications and multimedia industries.

---

[147] Part VII (Technical Regulation), MCMA 1998. See *id*.
[148] Part VIII (Consumer Protection), MCMA 1998.
[149] Part IX (Social Regulation), MCMA 1998.

1.2.4. The Malaysian Communications and Multimedia Commission Act 1998 (Act 589)

States control their telecommunications industries by enacting specific legislation. Some of them also establish special regulatory bodies to monitor and regulate the related telecommunications activities of the countries. To name a few, the United States of America established a Federal Communications Commission (FCC), while the United Kingdom has an Office of Telecommunications (Oftel) later superseded by an Office of Communications (Ofcom). Australia set up an Australian Communications and Media Authority (ACMA), while Argentina has a *Secretaría de Comunicaciones*, and Bangladesh has the Bangladesh Telecommunication Regulatory Commission.

With respect to Malaysia, its principal regulatory body is known as the Malaysian Communications and Multimedia Commission (referred to as 'the Commission').[150] It was established by the Malaysian Communications and Multimedia Commission Act 1998 (Act 589) (referred to as 'the Commission Act 1998').[151] In principal, the Commission Act 1998 deals with the establishment of the Commission with the power to supervise and regulate communications and multimedia activities in Malaysia, as well as to enforce the communications and multimedia laws[152] and other related matters in Malaysia. In general, the Commission Act 1998 is structured to have 55 Sections and 6 Parts.[153] This section aims to present a general idea of the legal rules laid down by the Act.

The Commission was established on 1st November 1998 pursuant to the provision of the Commission Act 1998[154]. It was set up with its mission and vision[155] when Malaysia adopted

---

[150] The Malaysian Communications and Multimedia Commission is the regulator for the converging communications and multimedia industry. The Commission is one of the agencies under the Malaysian Ministry of Information, Communication, and Culture. Its official website is available at http://www.skmm.gov.my; or http://www.mcmc.gov.my/, both accessed: 15 May 2014.

[151] The Commission Act 1998 obtained its Royal Assent on 23rd September 1998 and came into operation on 1st November 1998. In this section, all Sections and Parts, unless specified otherwise, refer to those in the Malaysian Communications and Multimedia Commission Act 1998 (Act 589), as at 15th March 2013.

[152] The words 'communications and multimedia laws' refer to the Commission Act 1998, and the MCMA 1998. This also includes any subsidiary legislation made under those laws and any other written laws under which the Commission is to exercise any function. See Section 3 (Interpretation), the Commission Act 1998.

[153] Those 6 Parts are: Part I - Preliminary; Part II - The Commission; Part III - Powers and Functions of Commission; Part IV - Employees of Commission; Part V – Finance; Part VI - General Matters.

[154] Section 4, the Commission Act 1998.

[155] Its vision states: 'A globally competitive, efficient and increasingly self-regulating communications and multimedia industry generating growth to meet the economic and social needs of Malaysia', whereas its mission states: 'We are committed to:

(a) Promoting access to communications and multimedia services;

(b) Ensuring consumers enjoy choice and a satisfactory level of services at affordable prices;

a convergence regulation model with respect to the communications and multimedia sectors.[156] The principal role of the Commission is to implement and promote the national policy objectives for the communications and multimedia sector. It also oversees, in accordance with the national policy objectives set out in the MCMA 1998, the new regulatory framework for the converging industries of telecommunications, broadcasting and on-line activities, as well as postal services and digital certifications.[157] The members of the Commission[158] shall be appointed by the Minister[159] and each appointment is for a term of two years. They shall be eligible for reappointment but they cannot hold the office for more than 5 years[160].

The Commission Act 1998 outlines the powers and functions of the Commission in Section 16. The Commission is responsible for advising the Minister[161] on all matters concerning the national policy objectives for communications and multimedia activities. It has the power to implement and enforce the provisions of the communications and multimedia laws and also to regulate all matters related to such activities which are not provided for in the communications and multimedia laws. The Commission can also consider and recommend reforms to the communications and multimedia laws, as well as promote and maintain the integrity of all persons licensed or otherwise authorised under such laws. Apart from that, the

---

(c) Providing transparent regulatory processes to facilitate fair competition and efficiency in the industry;
(d) Ensuring best use of spectrum and number resources; and
(e) Consulting regularly with consumers and service providers and facilitating industry collaboration.

[156] Two legislations were enacted to give effect to the new regulatory model: the MCMA 1998 which sets out a new regulatory licensing framework for convergent communications and multimedia industries, and the Commission Act 1998, which creates a new regulatory body, namely the Malaysian Communications and Multimedia Commission. When the MCMA 1998 came into force, the Telecommunications Act 1950 and the Broadcasting Act 1988 were repealed. On 1st November 2001, the Commission also took over the regulatory functions of the Postal Services Act 1991 and the Digital Signature Act 1997. See http://www.skmm.gov.my/About-Us/History.aspx, accessed: 15 May 2014.

[157] See http://www.skmm.gov.my/, accessed: 15 May 2014.

[158] The membership consists of a Chairman, three members representing the government and not less than two but not more than five other members. See Section 6, the Commission Act 1998.

[159] See *infra* note 161.

[160] Section 10, the Commission Act 1998.

[161] 'Minister' means the Minister charged with the responsibility for communications and multimedia. See Section 3 (Interpretation), the Commission Act 1998. In this case, it now refers to the Minister of Communications and Multimedia under the Ministry of Communications and Multimedia Malaysia (previously known as the Ministry of Information, Communications, and Culture). This happens following the restructuring of the Malaysian cabinet announced by the Malaysian Prime Minsiter, Dato' Sri Mohd Najib Abdul Razak, on 15 May 2013. (The Ministry of Information, Communications, and Culture actually combined the earlier previous Ministry of Information, Ministry of Unity, Culture, Arts, and Heritage, and the communications component from the previous Ministry of Energy, Water, and Communications. This merger was a result of the Malaysian Cabinet reshuffle following the appointment of the Prime Minister on 3rd April 2009). See http://www.kpkk.gov.my/, accessed: 5 September 2012; http://www.kkmm.gov.my/, accessed: 15 May 2014.

Commission is given the obligation to supervise and monitor the related activities, in addition to encouraging and promoting self-regulation in the industries.[162]

In respect of cooperation, the Commission has the responsibility to render assistance in any form to promote cooperation and coordination amongst persons engaged in the activities. It also promotes and encourages research and training in the relevant area. Its final role is to carry out any function under any written law as may be prescribed by the Minister by a notification published in the Gazette.[163] The Commission also issues licences under the MCMA 1998, as under the Postal Services Act 1991 and the Digital Signature Act 1997.

From the preceding description, it is well understood that the Commission Act 1998 only emphasizes provisions surrounding the establishment of the Commission as well as its functions and powers with respect to Malaysian communications and multimedia interests. There are no words relating to space, outer space or similar matters mentioned in the Act.

1.2.5. The Communications and Multimedia (Licensing) Regulations 2000.

Having an appropriate licence is among the main requirements for operating a telecommunications system. Domestic laws published by the states normally prescribe the contents, scope, and procedures for granting such licences. Different states have different types of licences to govern their telecommunications activities. These licences normally accommodate the activities of the providers and concern themselves with the categories of services provided to the customers and users.

In the Malaysian situation, upon exercising the power conferred by Section 16 of the MCMA 1998, the Minister in charge[164] has the legal right to make regulations. One of the salient regulations is the Communications and Multimedia (Licensing) Regulations 2000 (referred to as the 'Licensing Regulations 2000')[165]. This elaborates the licensing rules and procedures

---

[162] Section 16(a), 16(b), 16(c), 16(e), 16(h), 16(g), the Commission Act 1998. See also Ahmad Shamsul Abdul Aziz, "Undang-Undang Media", *Undang-Undang Multimedia,* Siri Perkembangan Undang-Undang Di Malaysia, Eds., Ahmad Shamsul, Khadijah Mohamed and Mazita Mohamed, (Kuala Lumpur: Dewan Bahasa dan Pustaka, 2007), at 72-73.
[163] Section 16(i), 16(f), 16(j), the Commission Act 1998.
[164] See *supra* note 161.
[165] It was published and came into operation on 1st April 2000. In this section, all Sections and Parts, unless specified otherwise, refer to those in the Communications and Multimedia (Licensing) Regulations 2000 as at 15th March 2013.

concerning communications and multimedia activities, as already outlined by the MCMA 1998.

In general, the Licensing Regulations 2000 consists of 37 Regulations and 6 Parts[166]. Parts III and IV specify two types of licences: the individual licence and the class licence.[167] It prescribes, *inter alia*, the standard conditions[168] that the licensee should observe. These include, for instance, the requirement for the licensee to take all proper and adequate safety measures to safeguard the lives and property of the public. In addition, he/she must take reasonable steps to ensure that the charging mechanism used in connection with its network facilities and/or services is accurate and reliable. The Regulation lists the categories of persons who are ineligible to apply for individual and class licences.[169] Apart from that, certain procedures must be followed by the applicants when applying the licences.[170]

The Licensing Regulation 2000 specifies mainly four types of licensable facilities and services that the provider can offer.[171] These facilities and services, as indicated earlier, are prescribed briefly in the MCMA 1998 and are illustrated and listed in detail in the Licensing Regulation 2000. These include the following: [172]

(1) The network facilities such as earth stations,[173] fixed link and cables,[174] radio communications transmitters and links,[175] satellite control station,[176] satellite

[166] These 6 Parts are: Part I – Preliminary; Part II – Licensing; Part III - Individual Licence; Part IV - Class Licence; Part V - Licence Fees; Part VI – General.
[167] See *supra* note 138.
[168] Section 3, the Licensing Regulations 2000.
[169] For the individual licence, persons who are ineligible to make an application are a foreign company as defined under the Companies Act 1965, an individual or a sole proprietorship, a partnership and other persons or classes of persons as may be decided by the Minister from time to time. For the class licence, persons who are not entitled to make such application are foreign individuals who are not permanent residents, and foreign companies as defined under the Companies Act 1965. The Minister, however, may, for a good cause or in the public interest, permit those persons to make applications to be registered under a class licence. See Sections 5 and 23, the Licensing Regulations 2000.
[170] For an individual licence application, an applicant, for instance, is required to fill out a specific form and provide some information including the applicant's particulars, anticipated operating, capital expenditure, proposed financing plan such as sources of financing, proposed operating procedures including the disaster recovery plan, description of the nature of the facilities, services, content and area of coverage and so forth. See Sections 6 and 7, the Licensing Regulations 2000.
[171] A further discussion is available in Chapter 1 of the thesis (1.2.3. The Malaysian Communications and Multimedia Act 1998 (Act 588).
[172] See Sections 19, 20, 22, and 30, the Licensing Regulations 2000.
[173] Earth station means an apparatus located either on the earth's surface, or within the major portion of the earth's atmosphere and intended for communication: (a) with one or more space stations; or, (b) with one or more stations of the same kind, by means of one or more reflecting satellites or other objects in space. See Regulation 2 of Part I (Preliminary), the Licensing Regulations 2000.
[174] Fixed link and cable means a network facility to enable communication between two stations, channels, or adjacent nodes of a network and which is part of a communications system. *Id*.

hubs,[177] space station,[178] submarine cable landing centre,[179] towers, poles, ducts and pits used in conjunction with other network facilities;

(2) The network services including bandwidth services,[180] broadcasting distribution services,[181] cellular mobile services,[182] access application services, space services,[183] switching services,[184] gateway services[185];

(3) The application services such as public cellular service,[186] public payphone services,[187] public switch data services,[188] directory services,[189] internet access services,[190] messaging services[191];

---

[175] Radio communications transmitters and links mean: (a) a transmitter and link designed or intended to be used for the purpose of radio communications; (b) anything designed or intended to be ancillary to, or associated with, such transmitter and link for the purposes of radio communications. *Id*.

[176] Satellite control station means an earth station that performs the function of telemetry, tele-command, and control of the operation of a space station. *Id*.

[177] Satellite hub refers to a satellite ground station functioning as a network management facility and/or gateway. *Id*.

[178] Space station means a station used or intended for use in the space service. *Id*.

[179] Submarine cable landing centre means a network facility where submarine cables are transmitted. *Id*.

[180] Bandwidth service means a managed network service which enables the transmission of units of information over a link within a particular unit of time. *Id*.

[181] Broadcasting distribution service means a network service that distributes television or radio programmes to persons having equipment appropriate for receiving that network service regardless of the means of distribution but does not include: (a) a service (including a tele-text service) that provides only data or text; or, (b) a service that makes programmes available on demand on a point-to-point basis, including a dial-up service. *Id*.

[182] Cellular mobile services means a network service where: (a) an end-user can use a network service while moving continuously between places; (b) the cellular mobile access device used for or in relation to the supply of the network service is not in physical contact with any part of the network facility by means of which the network service is supplied; and, (c) the network service is supplied by use of a network facility that has inter-cell handover functions. *Id*.

[183] Space service reflects to radio communications service using a space station or any other stations located beyond, or intended to go beyond, or which has been beyond, the major portion of the earth's atmosphere. *Id*.

[184] Switching service means a network service that: (a) terminates many circuits; or (b) interconnects or routes traffic between and among circuits. *Id*.

[185] Gateway service means a network service which provides interconnection between a domestic gateway and an international gateway. *Id*.

[186] Public cellular service means an applications service involving a network of base stations or cells for the delivery of voice and data communications. *Id*.

[187] Public payphone service means an application service that is provided in places to which the general public has access that can only be used for communication (other than a free call or a call made with operator assistance) if the user, immediately prior to its use, makes or arranges to make a payment for that particular call but does not include a rented payphone. *Id*.

[188] Public switch data service means an applications service for non-voice services that involves switching of data emanating from one specific network facility to another, including telegram services, telex, ISDN and ATM. *Id*.

[189] Directory service means an applications service enabling a person to obtain the telephone number and limited information about a customer which is sought by such person and includes a directory assistance service or published directory service. *Id*.

[190] Internet access service means an applications service whereby a person is able to access Internet services and applications in conjunction with either a dial-up connection or a direct connection. *Id*.

[191] Messaging service means an applications service which involves the storage or forwarding of a message in multimedia form whereby the message is first routed through a central management centre before it is forwarded to the addressee. *Id*.

(4) The content application services include satellite broadcasting,[192] subscription broadcasting,[193] terrestrial free-to-air TV,[194] terrestrial radio broadcasting.[195]

In conclusion, it appears that the establishment of the Licensing Regulations 2000 has provided further explanation and information on the legal rules and procedures with respect to the licensing system that was already briefly outlined by the Communications and Multimedia Act 1998 (Act 588) in Chapter 1 of Part IV. Therefore, the Licensing Regulations 2000 should be read together with the Communications and Multimedia Act 1998 (Act 588) when dealing with the licensing system in respect of the communications and multimedia industry in Malaysia.

1.2.6. Other Applicable Laws

Further to the earlier discussion on the Malaysian space policy and laws, the Malaysian Government has also passed a number of other relevant laws. This section will list a corpus of existing laws that might have connections with space-related activities in Malaysia. They are, *inter alia*:

(1) The Environmental Quality Act 1974 (Act 127);
(2) The National Forestry Act 1984 (Act 313);
(3) The Protection of Wildlife Act 1972 (Act 76);
(4) The Fisheries Act 1985 (Act 317);
(5) The Merchant Shipping (Oil Pollution) Act 1994 (Act 515);
(6) The Merchant Shipping Ordinance 1952;
(7) The Carriage of Goods by Sea Act 1950 (Revised 1994) (Act 527);
(8) The Geological Survey Act 1974 (Act 129);
(9) The Civil Aviation Act 1969 (Act 3);
(10) The Carriage by Air Act 1974 (Act 148);
(11) The Aviation Offences Act 1984 (Act 307);
(12) The Airport and Aviation Services (Operating Company) Act 1991 (Act 467);

[192] Satellite broadcasting means a content applications service distributed by means of a satellite. *Id*.
[193] Subscription broadcasting means a content applications service whereby programme content is made available to the general public only upon the payment of a subscription fee. *Id*.
[194] Terrestrial free-to-air TV means a content applications service utilising UHF/VHF frequency bands. *Id*.
[195] Terrestrial radio broadcasting means a content applications service by means of radio waves that provides radio programmes that are: (a) are intended to appeal to the general public; (b) can be received by commonly available equipment; (c) are made available free to the general public. *Id*.

(13) The Telemedicine Act 1997 (Act 564);
(14) The Contract Act 1950 (Revised 1974) (Act 136);
(15) The Defamation Act 1957 (Revised 1983) (Act 286);
(16) The Insurance Act 1996 (Act 553);
(17) The Patents Act 1983 (Act 291);
(18) The Penal Code (Revised 1997) (Act 574);
(19) The Atomic Energy Licensing Act 1984 (Act 304);
(20) The Telecommunication Services (Successor Company) Act 1985 (Act 322);
(21) The Copyright Act 1987 (Act 332);
(22) The Digital Signature Act 1997 (Act 562);
(23) The Computer Crime Act 1997 (Act 563);
(24) The Computer Misuse Act 1998;
(25) The Communications and Multimedia (Technical Standards) Regulations 2000;
(26) The Communications and Multimedia (Spectrum) Regulations 2000;
(27) The Communications and Multimedia (Compounding of Offences) Regulations 2001;
(28) The Energy Commission Act 2001 (Act 610);
(29) The Communications and Multimedia (Rates) Rules 2002;
(30) The Communications and Multimedia (Universal Service Provision) Regulations 2002;
(31) The Malaysian Communications and Multimedia Commission Disciplinary Regulations 2007;
(32) The Malaysian Communications and Multimedia Commission (Disciplinary Committees and Disciplinary Appeal Boards) Regulations 2007.

As a final remark, it is concluded that Malaysia still does not have any definite outer space legislation, particularly with respect to launching objects into outer space, the national registration of such objects, indemnification, and liability clauses in case of damage or loss caused by such activities, especially when they involve non-governmental entities.

1.3. TECHNOLOGICAL DEVELOPMENT AND RESEARCH

As Malaysia continues to advance in space activities, significant progress has been observed particularly in space technological development and research. This involves three major sectors: the governmental sector, the non-governmental sector, and the higher educational institutions.

1.3.1. Governmental Sector

Since science and technology are the keys to excellence in today's modern economy, Malaysia in its 'Second National Science and Technology Policy' has set an apparent goal of accelerating the development of its capability and capacity in science and technology. Such policy is aiming, among others, to increase the national capability and capacity for research and development (R&D), as well as technological development, and acquisition. It also aims to encourage partnerships between public organizations and industry, as well as local and foreign companies, for co-development of technologies in order to increase indigenous technology capability. Furthermore, it aims to position Malaysia as a technology provider in the key strategic knowledge industries including the aerospace industry, information and communication technologies, and advanced manufacturing.[196]

In view of the above circumstances, Malaysia, through its Ministry of Science, Technology, and Innovation (MOSTI),[197] has set up a specific division, various departments, and a government-owned company for realizing the aforementioned goals. Thus, this section deals with the division, departments and company particularly responsible for Malaysian space-related activities. They include the Sea to Space Division (S2S), the Malaysian National Space Agency (ANGKASA), the Malaysian Remote Sensing Agency (Remote Sensing

---

[196] See http://www.mosti.gov.my/index.php?option=com_content&view=article&id=2032&Itemid=611&lang=en, accessed: 15 May 2014.

[197] MOSTI was established at first under the name of the Ministry of Technology, Research, and Local Government in 1973. In 1976, when it was given additional responsibility as a leading agency pertaining to environmental matters, the name was then changed to the Ministry of Science, Technology, and Environment (MOSTE). Following the Malaysian Cabinet's decision on March 27, 2004, MOSTE was restructured and this led to the formation of the present MOSTI. Under this new entity, a cluster approach was initiated in February 2007 to introduce five categories. They are: biotechnology, ICT, industry, sea to space, and science and technology services. The MOSTI official website is available at http://www.mosti.gov.my/, accessed: 15 May 2014.

Malaysia), the Malaysian Meteorological Department (MMD), and the Astronautic Technology (M) Sdn. Bhd. (ATSB).

(a) Sea to Space Division (S2S)

The Sea to Space Division (S2S) is one of the divisions set up under the Ministry of Science, Technology, and Innovation (MOSTI).[198] It was established on 2nd February 2007 following the restructuring that took place in the MOSTI. Such restructuring involved the introduction of a cluster approach in the MOSTI. This was done in order to enhance and strategize the implementation of MOSTI's programmes and strategies.[199] Under the cluster approach, five categories have been instituted, inclusive of the Sea to Space Division. The other four categories are: biotechnology, ICT, industry, and science and technology services. The establishment of the Sea to Space Division is, indeed, a means of generating a new economic resource for Malaysia based on knowledge acquisition. This is focusing especially on the areas of space technology and oceanography. In fact, it is hoped that such a strategy will boost the Malaysian economy as well as the quality of life of Malaysian society.

The Sea to Space Division's vision is to humanise space, the atmosphere, and the ocean particularly for knowledge generation and sustainable resources management. It also aims at wealth creation and societal wellbeing. Its mission is to innovate and harness the total solutions that will be performed through science, technology, applications, and services. The related areas involved include oceanography, meteorology, remote sensing, and space. Such circumstances are furnished in order to meet the Malaysian nation's economic, social, security, and environmental needs.[200]

With regard to the objectives of establishing the Sea to Space Division, the Division was indeed formed with numerous purposes. Among the focal objectives are to develop and operationalize the Sea to Space Division infrastructure to benefit national needs, as well as to

---

[198] Other divisions include National Biotechnology Division, Innovation and Commercialization Division, and others.
[199] See *supra* note 197.
[200] See http://www.mosti.gov.my/index.php?option=com_content&view=article&id=1764&Itemid=57&lang=en, accessed: 6 September 2012; http://www.mosti.gov.my/index.php?option=com_content&view=article&id=1551&Itemid=539&lang=en, accessed: 15 May 2014.

develop and provide services in its competency areas including meteorology, oceanography, remote sensing and space. Apart from that, the aim of establishing the Sea to Space Division is to market and commercialise the Division's solutions, both locally and internationally. The Division was also formed to produce and generate more researchers, scientists and engineers with respect to the related areas. It also aims to construct not only the user community and public awareness programmes, but also implement various activities in meeting their targets.

Thus, it is established that the Sea to Space Division, under the MOSTI, is an important Malaysian Government division that contributes significantly in improving and accelerating the growth and expansion of Malaysian space-related activities inclusive of the space technological development and research in Malaysia.

(b) Malaysian National Space Agency (ANGKASA)

The Malaysian National Space Agency (ANGKASA)[201] was established in 2002. It is one of the significant governmental departments under the Ministry of Science, Technology, and Innovation (MOSTI) that deals with space-related activities. It was set up following the growth of Malaysian public interest in space activities and industries around 2002, inspiring the Government of Malaysia to summon Professor Datuk Dr. Mazlan Othman[202] to assist in its formation. It was formerly known as *Bahagian Kajian Sains Angkasa* (BAKSA) or the Space Science Studies Division. ANGKASA is responsible for providing leadership in the Malaysian Space Programme, space education, and research development. It also assists the Malaysian Government in formulating the Malaysian national space policy. Its vision is to harness space as a platform for knowledge generation, wealth creation, and societal wellbeing. Its mission is to develop the country's potential in the space sector in order to support the development of the new economy, generating knowledge, and strengthening the national security infrastructure.[203]

---

[201] The ANGKASA official website is available at http://www.angkasa.gov.my/, accessed: 13 May 2014.
[202] Prior to joining the Agency in July 2002, Professor Datuk Dr. Mazlan Othman was a Director of the United Nations Office for Outer Space Affairs (UNOOSA) in Vienna, Austria in 1999, where she coordinated international cooperation on the peaceful uses of outer space. In January 2008, she was re-appointed to the same position in the UNOOSA in Vienna.
[203] See *supra* note 201.

The ANGKASA has four main divisions: (1) Operations and Space System Division;[204] (2) Technology Development and Space Applications Division;[205] (3) Space Science and Education Division;[206] and (4) Administration and Human Resource Division.[207] ANGKASA has set up three main campuses: (1) the National Planetarium; (2) the National Observatory; and, (3) the Malaysia Space Centre.

The National Planetarium's[208] activities are aimed at promoting and leading Malaysia towards the development of space science. It creates awareness among Malaysians about the significance of space science and technology through the consolidation of space science and local arts. The programme is executed through activities such as exhibitions and film shows open to the public. Various attractions at the Planetarium are available to visitors, such as the ancient observatory park, a binocular or viewing gallery, exhibitions, galleries, and others.[209] Meanwhile, the National Observatory,[210] also known as the Langkawi National Observatory, is a platform for Malaysian scientists and international astronomers conducting their research on space science and equatorial skies. In meeting this objective, the Observatory is accommodated with a telescope for night sky objects observations and a solar telescope for solar observations. The Observatory's other objectives are to equip the country with the basic astronomy infrastructure and encourage interest among Malaysians in understanding space science and its significance.[211]

---

[204] This is a division where the physical infrastructure for space activities of the country is established. The core infrastructures are the Mission Operation Centre (MOC), the Optical Calibration Laboratory, the Assembly, Integration and Test (AIT) Facility, and the Data Centre. The base of the operations centre is at the Malaysian Space Centre, Banting, Selangor, Malaysia.

[205] Its base is the Putrajaya Headquarter, at the address of the National Space Agency (Headquarters), Malaysia.

[206] This is where all the educational programmes and promotion strategies in space science are implemented. Its base is at the National Planetarium, Kuala Lumpur, Malaysia.

[207] Its base is at the Putrajaya Headquarters, at the address of the National Space Agency (Headquarters), Putrajaya, Malaysia.

[208] The National Planetarium is located at the National Space Agency, National Planetarium, Jalan Perdana, Kuala Lumpur, Malaysia. Its official website is at http://www2.angkasa.gov.my/planetarium/, accessed: 13 May 2014.

[209] Other attractions are available such as mini planetarium, picnic area, space ball, Space Theatre, free parking and many others.

[210] The National Observatory is located at the forest restricted area of Bukit Malut Reservoir Dam, Langkawi Island, Kedah, Malaysia. Its official website is at http://www2.angkasa.gov.my/langkawi_observatory/, accessed: 13 May 2014.

[211] *Ibid.*

The Malaysia Space Centre[212] is equipped with facilities such as Mission Operations Centre, Optical Calibration Lab, Mission Control Station, and Image Receiving & Processing Station. The Mission Operation Centre is one of the Malaysian ground stations[213] for remote sensing satellites.[214] Its main function is to control and maintain satellite operations. The Centre is equipped with communications equipment capable of communicating with satellites launched into lower orbits (LEO) and middle orbits (MEO). Its main role is tracking, telemetry, and monitoring of satellites. The Optical Calibration Lab was installed with a class 1000 clean room and equipped with an integrating sphere, spectro-radiometer, and satellite turntable. The facility was used to calibrate RazakSAT's optical system before its launch.[215] Meanwhile, the function of the Mission Control Station, in brief, is to perform the mission plan, command generation, telemetry reception, telemetry archiving, and analysis.[216] The task of the Image Receiving & Processing Station is to receive and archive the images data from satellites together with attitude and ephemeris telemetry data for post-processing and distribution.

The ANGKASA is responsible for the Malaysian satellite programme and launches into outer space. Malaysia has three main satellites: TiungSAT-1, RazakSAT™ and MeaSAT. The TiungSAT-1 was the first Malaysian satellite and its launch was considered Malaysia's initial success in her effort to explore the aeronautics technology field. The programme was developed by the Astronautic Technology (M) Sdn Bhd (ATSB).[217] The RazakSAT™, the country's small satellite, provides specific and timely data for Malaysian users and caters for the needs of countries located in the equatorial belt. It is also a programme of ATSB.[218]

---

[212] The Malaysia Space Centre is situated in 400 acres in Sungai Long, Banting, Selangor, Malaysia. The site was selected for its flat geography and minimal radio interference. It houses two communications antennas operating the RAZAKSAT satellite which provides images for environmental assessment and monitoring. See http://www.angkasa.gov.my/?q=en/node/55, accessed: 13 May 2014.

[213] A ground station, also known as an Earth station, is the terrestrial end of a communication link to an object in outer space. It receives data from various satellites as well as providing data over selected areas. It is used to communicate with and monitor the satellites, checking their operational health and exact position in space. One satellite is able to communicate with several ground stations. See http://www.angkasa.gov.my/index.php?option=com_content&task=blogcategory&id=18&Itemid=190, accessed: 7 September 2012; http://www.angkasa.gov.my/?q=en/node/55, accessed: 13 May 2014.

[214] Another ground station for the remote sensing of satellites is MACRES Ground Receiving Station (MGRS). However, the ground station for communication satellites is called MEASAT Teleport and Broadcast Centre (MTBC). Further information on MGRS is available in Chapter 1 of the thesis (1.3.1(d): Malaysian Remote Sensing Agency (MRSA), while for MTBC read Chapter 1 (1.3.2(a): MEASAT Satellite System Sdn. Bhd.).

[215] See http://www.aprsaf.org/feature/feature_35.html, accessed: 11 July 2010.

[216] See http://www.angkasa.gov.my/welcome/space_technology/facilities.php?section_id=40, accessed: 11 July 2012; http://www.angkasa.gov.my/?q=en/node/55, accessed: 13 May 2014.

[217] Further discussion on ATSB is available in Chapter 1 of the thesis (1.3.1(c): Astronautic Technology (M) Sdn Bhd (ATSB).

[218] More information on TiungSAT and RazakSAT™ satellites are available at *id*; and in Chapter 1 of the thesis (1.4.5. Satellite Manufacturing and Launching).

Finally, the Malaysia East Satellite (MeaSAT) is the name of a line of communications satellites owned and operated by the Measat Satellite Systems Sdn. Bhd.[219] This satellite network consists of a number of satellites already launched into orbit as well as ones expected to be launched in the future. This matter will be discussed further in the forthcoming section.[220]

Apart from the satellites programme, the *Program Angkasawan Negara* is another essential programme initiated by ANGKASA. It is a programme for sending a Malaysian into outer space.[221] Besides that, the ANGKASA has also launched many educational programmes such as Yuri's Night, 100 Hours of Astronomy, National Space Challenge, Rocket Launching Technology Challenge, Workshop on Ionospheric Modelling for Malaysian SBAS, and others. Yuri's Night is a special event in memory of the first manned-spaceflight by Yuri Gagarin in 1961.[222] The 100 Hours Astronomy is a programme to celebrate the International Year of Astronomy.[223] The National Space Challenge is a programme that aims to instil talents and desires in the Malaysian young generation in the field of space science.[224] The Rocket Launching Technology Challenge is a competition programme intended to instil the culture in students with a creative and innovative mind-set.[225] Since Malaysia is planning to implement a Space Based Augmentation System (SBAS), the Workshop on Ionospheric Modelling for Malaysian SBAS is a workshop specifically designed to bring together ionospheric experts and identify the status of research activities in the related subjects. Other programmes include Planetarium Shows, Batik Competition, World Space Weeks, Carnival and Drawing Contest, and Astronaut Fashion Design Competition. The ANGKASA also

[219] Measat Satellite Systems Sdn. Bhd was formerly known as the Binariang Sdn Bhd.
[220] More information is available in Chapter 1 of the thesis (1.3.2(a): MEASAT Satellite System Sdn Bhd).
[221] More information on the *Program Angkasawan Negara* is available at Chapter 1 of the thesis (1.4.6. *Program Angkasawan Negara*).
[222] The event is celebrated on 12 April every year as a symbol of human achievement in space exploration. The date is recorded as a pioneering one in human space exploration by Yuri Gagarin and the first re-usable space vehicle, the Columbia. It is commemorated by students performing in choirs, dances and traditional instrumentals from various schools in Malaysia. See *supra* note 201.
[223] This was a collaboration programme with a learning higher institution, UiTM Arau, Perlis and FalakOnline, a club of Malaysian amateur astronomers. It comprised observation sessions, seminars, discussions *etc*. See *supra* note 201.
[224] Its objectives are to build the students' scientific research skills, to teach the concepts and techniques of space science, to provide experience in science concepts and processes, to help them appreciate the need for space science and to inspire teamwork and cooperation. See *supra* note 201.
[225] This was first introduced in 2003 as a pioneer project. The students are required to create a satisfactory rocket model and launch it into the sky in the hope that it will use minimal frictional force in a very creative style. See *supra* note 201.

publishes online publications including the CAKERAWALA, SEMESTA e-Magazine, and others.

(c) Astronautic Technology (M) Sdn Bhd (ATSB)

Astronautic Technology (M) Sdn Bhd (ATSB)[226] is another Malaysian governmental department under the Ministry of Science, Technology, and Innovation (MOSTI) that is of great significance. It is the pioneer and leader in designing and manufacturing satellites in Malaysia. The ATSB has been actively involved in satellite technologies and has an innovative mission to develop advanced space systems and other related technologies in order to provide value-added applications for its global customers.[227] In accomplishing its target, its Chief Executive Officer[228] stresses staff commitment, discipline, successful strategic collaborations, and joint ventures with local and international partners. Apart from that, their strategic objectives are to lead in research and development of space and related technologies, to achieve operational excellence in delivering products and services, to create expertise in the field of space engineering and allied technologies, and many others.[229] Its building is well-equipped with facilities that include a class 100 000 clean room, an optical room, an environment test facility, and an electronic laboratory.[230]

Being the foremost company directly involved with space technological development and research, particularly of satellite technologies, the ATSB has developed a number of focal space projects. The most well-known are TiungSAT-1 and RazakSAT projects. Other projects include CubeSat and InnoSat. The TiungSAT-1[231] is a micro-satellite programme

---

[226] The ATSB official website is available at http://www.atsb.my/, accessed: 13 May 2014.

[227] See http://www.atsb.my/index.php?option=com_content&view=article&id=44:vision-a-mission-statement&catid=1, accessed: 13 May 2014.

[228] Its Chief Executive Officer (CEO) is Dato' Dr. Ahmad Sabirin Arshad. This fact is taken as of 13 May 2014.

[229] See http://www.atsb.my/index.php?option=com_content&view=article&id=6:atsbr-strategic-objectives-a-values&catid=1, accessed: 13 May 2014.

[230] See http://www.atsb.my/index.php/facilities.html, accessed: 28 June 2012; http://www.atsb.my/index.php?option=com_content&view=article&id=45:about-atsbr&catid=3, accessed: 15 May 2014.

[231] The TiungSAT-1 was a personal initiative of the former Malaysian Prime Minister, Tun Dr Mahathir Muhammad who was inspired after he visited Surrey Satellite Technology Ltd. (SSTL) in the United Kingdom in March 1997. It is hoped that such a project will develop Malaysia into an electronic high-technology provider and resonate with the Multi-media Super Corridor Program within the Malaysian vision of 2020**.** Martin Sweeting, Wei Sun and Mazlan Othman, "TiungSAT-1: Malaysia's Microsatellite Programme", *TiungSAT-1, From Inception to Inauguration,* Eds., Mazlan Othman and Ahmad Sabirin Arshad, (Kuala Lumpur: Astronautic Technology (M) Sdn Bhd, 2001), at 13. See also, The Satellite Encyclopaedia, http://www.tbs-satellite.com/tse/online/sat_tiungsat_1.html, accessed: 15 May 2014.

and the first Malaysian remote sensing micro-satellite. It was named after a strident Myna bird, and was also called MO-46. The TiungSAT-1 operates at LEO at an altitude of 650 km from the earth's surface and at 60 degrees inclination. It measures 690x366x366mm and weighs 50kg. The satellite was developed through a technology transfer and training programme between the ATSB and SSTL, United Kingdom.[232] The purpose of such a programme is to acquire advanced technology and expertise from the technology partner through construction, test, launch, and orbital operations of the TiungSAT-1. The programme consisted of four main tasks: (1) TiungSAT-1 micro-satellite construction, launch, and operation; (2) Its mission control ground station; (3) Technology transfer training; and lastly, (4) TiungSAT-1 micro-satellite technology license and documentation.[233] The satellite was then activated from the Earth control system at the ATSB Earth Control Station situated at Malaysia National University (UKM),[234] seven hours after it was launched into orbit.[235]

The TiungSAT-1 has three missions: (1) Earth observations; (2) scientific Cosmic-Ray Energy Deposition Experiment (CEDEX), and (3) Simple communication applications including communication for email, voice-mail, scientific data exchange, faxes, images, and internet access for small ground users.[236] It uses Radio Amateur Frequencies, giving the Radio Amateur Society access to its Earth images and communications capabilities. The TiungSAT-1 is equipped with two cameras: a Multi-Spectral Earth Imaging Camera system

---

[232] The SSTL is a British world premier provider of small satellite missions that specialises in designing, building, and launching small satellites. The TiungSAT-1 was built at the Surrey Space Centre under a UKP8.4m contract (1997), within a Know-How Technology Transfer and Training Programme between the SSTL and the ATSB. In this programme the Malaysian engineer teams from the ATSB worked alongside Surrey engineers for one year. The comprehensive training programme involved the building, integration, test, launch, and orbital operation. See the SSTL website at http://www.sstl.co.uk/. See also "TiungSat 1 (MySat 1, OSCAR 46, MO 46", *Gunter's Space Page*, http://space.skyrocket.de/doc_sdat/tiungsat-1.htm, all accessed: 13May 2014.

[233] For more information on TiungSAT-1 technology transfer programme, read Ahmad Sabirin Arshad, "TiungSAT-1 Technology Transfer Programme", *TiungSAT-1, From Inception to Inauguration,* Eds., Mazlan Othman and Ahmad Sabirin Arshad, (Kuala Lumpur: Astronautic Technology (M) Sdn Bhd, 2001), at 8. See also Martin Sweeting, Wei Sun and Mazlan Othman, "TiungSAT-1: Malaysia's Microsatellite Programme", *supra* note 231, at 16.

[234] UKM is one of Malaysia's public universities with its main campus located in Bangi, Selangor, Malaysia. Its official website is available at http://www.ukm.my/v5/, accessed: 13 May 2014.

[235] See Surrey Satellite Technology, "Third Satellite Launch this year for SSTL: TiungSAT 1 in Orbit", (27 September 2000), *SpaceRef*, http://www.spaceref.com/news/viewpr.html?pid=2696, accessed: 15 May 2014.

[236] TiungSAT-1 provides 80m resolution multi-spectral Earth imaging, 1.2 km meteorological Earth imaging, digital store-and-forward communications and a cosmic-ray energy deposition experiment. For more information on TiungSAT-1 mission design, read Astronautic Technology (M) Sdn Bhd. and Surrey Satellite Technology Limited, "TiungSAT-1 Microsatellite Mission Design", *TiungSAT-1, From Inception to Inauguration,* Eds., Mazlan Othman and Ahmad Sabirin Arshad, (Kuala Lumpur: Astronautic Technology (M) Sdn Bhd, 2001), at 29. See also Martin Sweeting, Wei Sun and Mazlan Othman, "TiungSAT-1: Malaysia's Microsatellite Programme", *supra* note 231, at 17.

and a Meteorological Earth Imaging camera system that has 72 m and 1.2 km resolutions.[237] The first camera can provide detailed information on the Earth's resources, environmental haze pollution, land use, or agricultural activities. The second camera is capable of monitoring weather patterns and providing hurricane warnings. This achievement, in fact, reflects the preliminary success of Malaysia in her endeavour to delve into aeronautics technology.

Since the Government of Malaysia is willing to spend a large amount of money to upgrade space-related technologies, including satellite technology with the hope of minimising the cost of leasing satellites from other countries,[238] the ATSB has continued to expand its efforts to develop a more advanced remote sensing satellite project. This project is called RazakSAT[239]. The RazakSAT system is a collaborative programme between the ATSB and the Satrec Initiative Co Ltd, South Korea.[240] It is a 180kg mini-satellite that gives a high-resolution Earth Observation mission capability. Its developing cost is approximately Ringgit Malaysia 150 million (about 43 million USD).[241] It was put into a unique Near Equatorial Orbit (NEqO) and become the first remote sensing satellite of its genre in history to orbit the Equator.[242] The images cover countries such as Malaysia, Indonesia, Singapore, Thailand, Brunei, India, Sri Lanka, the Philippines, some African countries including Somalia, Rwanda and Nigeria, and some South American countries. This successful event has bolstered the ATSB's aim of becoming the leading South-East Asian company in this class of satellite.

---

[237] For details, read Norhizam Hamzah, Ahmad Sabirin Arshad and Mohammad Ridwan Hidayat, "TiungSAT-1 Earth Imaging System", *TiungSAT-1, From Inception to Inauguration,* Eds., Mazlan Othman and Ahmad Sabirin Arshad, (Kuala Lumpur: Astronautic Technology (M) Sdn Bhd, 2001), at 47.

[238] On top of that, such efforts can guarantee the safety of data and information gained from the technology. See "Dana Besar Majukan Satelit Jimat Kos Sewa", *Berita Harian,* 24 April 2009.

[239] The satellite was named 'RazakSAT' in tribute to the second Prime Minister of Malaysia, Tun Abdul Razak (known as "Bapa Pembangunan Malaysia" or Father of Malaysian Development) for his contribution towards Malaysia's development.

[240] Satrec Initiative Co. Ltd is a Korea-based company, located at Daejeon, South Korea. It engages in the provision of communication products that offer, *inter alia,* satellite platform for earth orbit small satellite missions, payloads including imaging systems for 100 kg class satellite, ground station systems including satellite image data receiving and processing stations and mission control stations. For details, refer to Satrec Initiative Co. Ltd website, https://www.satreci.com/eng/, accessed: 13 May 2014.

[241] The cost is considered lower than the cost of developing a satellite of the same capabilities due to the advanced technology and material used, as well as the competitive labour rates.

[242] The RazakSAT will orbit the equator every 100 minutes at an altitude of 685km. In view of the fact that it provides a high number of passes over the equatorial region, for example 14 times per day over Malaysia, it will provide great benefits to the equatorial region as the imaging opportunities will be three times greater than the usual sun-synchronous orbit. This unique feature gives the RazakSAT the ability to maximise its imaging opportunity and significantly increase its re-visit time over the coverage area. Refer http://www.atsb.my/index.php/products-a-services.html. Read also Norhan Mat Yusoff and Norhizam Hamzah, "The Role of RazakSAT in Remote Sensing", in *The Geospatial Resource Portal,* http://www.gisdevelopment .net/magazine/Malaysia/2006/apr-jun/26_1.html, all accessed: 28 December 2009; http://www.atsb.my/index.php?option=com_content&view=article&id=67&Itemid=56, accessed: 13 May 2014.

The RazakSAT is equipped with a Medium-sized Aperture Camera (MAC)[243] to capture useful high-resolution images for agriculture, town planning, natural disasters, fish migration, security, and forest management. The satellite is a three-axis stabilised type and has a comprehensive sensor suite including a space-borne Global Positioning System (GPS) receiver, star tracker, fibre-optic gyroscopes, magnetometers, and fine and coarse sun sensors. Satellite actuator systems, which include reaction wheels, allow accurate positioning of the satellite. The combinations of high-resolution and large-attitude manoeuvrability allow the RazakSAT to offer a highly customised and configurable imaging system.[244] It is capable of monitoring and tracking the open burning that occurs within or outside Malaysia, and to send direct information to specific departments such as the Fire and Rescue Department.[245] With the launch of the RazakSAT, Malaysia can offer relevant tertiary Geography Information System (GIS) programmes and GPS technology[246] not only locally but also globally, especially to West Asia and the European countries.

The RazakSAT's mission and control operations are carried out by the ATSB's ground station engineers at Hicom-Glenmarie Industrial Park, Shah Alam. It also involves two other ground stations, namely the Malaysian Remote Sensing ground station in Temerloh, Pahang and the ANGKASA's ground station in Banting, Selangor.[247] These stations are equipped with Image Receiving and Processing Systems (IRPS)[248] that are capable of receiving and

---

[243] MAC is a push-broom camera with five linear detectors (one panchromatic, four multi-spectral) weighing approximately 50 kg. It can produce high-resolution images in one panchromatic (PAN) band and four multi-spectral (MS) bands. At an altitude of 685km, it has a ground sampling distance of 2.5m (PAN) and 5m (MS). See *id*.

[244] The summary details of the RazakSAT specification are: Orbit: Near Equatorial Low Earth Orbit (NEqO) at 685km 9 degrees inclination; Mechanical Configuration: 1200mmxH1200mm hexagon type, 180kg mass; Power Generation: Greater than 300W at end of life; Payload Features: Medium-sized Aperture Camera Panchromatic: 2.5m, Multi-spectral (4-bands): 5.0m; Imaging Capacity: 20km swath by 500km strip for total area of 10 000 km2; Data Down Link Rate: 30 Megabits per second single channel. See *id*. See also http://www.satreci.com/eng/program/program_01.htm, accessed: 10 March 2012; https://www.satreci.com/eng/ds1_1.html?tno=5, accessed: 13 May 2014.

[245] "RazakSAT Mampu Kesan Pembakaran Terbuka", *Berita Harian,* 23 March 2006.

[246] The GIS and GPS technologies are expected to create a new-age economy of futuristic jobs in Malaysia. See Michael Sun, "Geography Information System: Think Geo-Spatial!", http://www.atsb.my/index.php/media/razaksatlsupgrlsupg-in-the-media.html, accessed: 11 June 2011; http://www.malaysiagis.com/index.php/local-gis/news/328-geography-information-system-think-geo-spatial-, accessed: 13 May 2014.

[247] Michael Sun, "Geography Information System: RazakSAT Satellite Opens Doors", *id*.

[248] The IRPS has three subsystems: (1) Antenna and RF subsystem (ARS) which performs the tracking, receiving the RazakSAT X-band downlink signals, demodulation and bit-synchronization the signals; (2) Receiving and archiving subsystem (RAS); (3) Search and Processing Subsystem (SPS). See http://www.atsb.my/index.php/project/space-systems.html, accessed: 24 March 2012;

processing RazakSAT images and other Earth Observation satellite images for post-processing and distribution to users. Apart from IRPS, the ATSB also offers a Mission Control System (MSC) for tele-command, telemetry, and control purposes.[249]

Apart from the TiungSAT and RazakSAT, there are a number of other projects such as CubeSAT and InnoSAT. These are small satellites that were launched together with the RazakSAT. Having experience of dealing with those satellite projects, the ATSB was then appointed as project manager by the Government of Malaysia in the *Program Angkasawan,*[250] especially in handling logistic activities.[251] Other projects expounded by the ATSB are, *inter alia*: Calibration System Development,[252] Spacecraft Attitude Determination & Control Subsystem (ADCS),[253] Space-borne GPS Receiver,[254] National Tsunami Early Warning System,[255] Environment Radiation Monitoring System,[256] Differential Global Navigation Satellite System,[257] Robotic Telescope,[258] Smart Mosque Project,[259] Al-Falak

http://www.atsb.my/index.php?option=com_content&view=article&id=69:razaksatr-image-receiving-a-processing-station-irps&catid=40:space-systems&Itemid=2, accessed: 13 May 2014.

[249] The IRPS and MSC integrated solution is suitable for customers who need the complete solutions to control their satellite and to process the images received. See *id*.

[250] For details see Chapter 1 of the thesis (1.4.6. *Program Angkasawan Negara*).

[251] Such activities include the logistic aspects of Malaysian astronauts' training in NASA and the Yuri Gagarin Cosmonaut Training Centre in Star City, Russia, the launching at Baikonur Cosmodrome, the Soyuz spacecraft's docking at the ISS 2 days later and the landing. The tasks also cover media coverage, the astronaut's communication with earth, landing activities, the astronaut's inauguration and safe return of the astronaut. See http://www.atsb.my/v2/mediacenter_new_7%20oct.html, accessed: 8 March 2012.

[252] It involves extensive post-processing for raw images collected, and data calibration of the imaging systems of satellites for local application. See http://www.atsb.my/index.php/project/space-systems.html, accessed: 10 March 2012; http://www.atsb.my/index.php?option=com_content&view=article&id=71:calibration-system-development-&catid=40:space-systems&Itemid=2, accessed: 13 May 2014.

[253] The ADCS maintains spacecraft stabilisation and adjusts it to a desired direction when necessary. The ATSB developed the ADCS sensors, actuators, and Flight Control Software. See *id*.

[254] This is a spacecraft orbit determination and timing system designed for cost-effective LEO application. It provides GPS standard time, position, and velocity measurements. See *id*.

[255] In this project, sensors and instruments such as deep ocean buoys, seismic sensors, tidal gauges, and coastal cameras are placed throughout the country. Data from the sensor are transmitted back to the Centre for processing, modelling, and analysis. See http://www.atsb.my/index.php/project/advanced-technology.html, accessed: 10 March 2012.

[256] Specific sensors are placed throughout the country to monitor levels of radiation and provide early warning to safeguard against exposure to potentially hazardous radioactive environments. See *id*.

[257] This has been developed in response to the low resolution of the current GPS system. It encompasses the following networks: firstly, four broadcasting stations at Bagan Datoh (Perak), Melaka (Melaka), Kuantan (Pahang), Kuala Besar (Kelantan); secondly, two remote sensing stations at Port Klang (Selangor), Kuala Terengganu (Terengganu); and thirdly, One National Control Centre at Port Klang, Selangor. See *id*.

[258] This is an application of spin-off technology where the observer can remotely control the telescope and its instruments from convenient places. This robotic observatory is located at Langkawi Island, National Planetarium Kuala Lumpur, and Malacca. See *id*.

[259] This is a project involving installation of SMART Mosque system that disseminates the latest information and knowledge to the mosque community. Al-Jamiul Badawi Mosque at Kuala Batas, Kedah, is the first mosque in the world installed such system. See *id*.

Virtual Reality Solar System,[260] Wind and Runway Visual Range System,[261] and Thermal Infrared Satellite Mission Studies.[262] It also offers products and services such as satellite design and manufacturing. The ATSB has even ventured into exporting satellite components to countries such as South Africa and Germany, with future plans to export a complete satellite.[263] Apart from that, the company offers also various satellite platforms[264] which have been tested and qualified as suitable for educational use. It carries out also work orders for satellite payloads and components including Magnetometer Module, Reaction Wheel, Micro Thrusters, and Digital Fine Sun Sensors. Its other products and services include launch services,[265] Vigilant Ground-Based Imaging Systems[266] and Early Warning Systems, navigation, tracking and communication systems[267].

With all this experience in dealing with satellite technology development, as well as other projects and services, it is believed that the ATSB has the capability to venture further in such technology. Furthermore, Malaysia's efforts to venture into space technology, particularly in the small satellite business,[268] have served as a contribution to and from the developing

---

260 Al-Falak Virtual Reality Solar System is a 3D virtual reality application that enables the user to interact with and explore the solar system. It was developed for Falak Al-Khawarizmi Complex (Mufti Department, Malacca). See *id*.

261 This system is installed at the end of the runways of 16 airports throughout Malaysia. It comprises a set of wind and visibility sensors that will capture the weather data that will be transmitted over the wireless network to the Malaysian Meteorologist Department's station for processing. See *id*.

262 This is a system for data collection, processing, and dissemination to monitor the harmful impact on the ecology, economy and the general health of population in Malaysia and South East Asia caused by forest, peat fires and smog or haze. See *id*.

263 See http://www.atsb.my/v2/mediacenter_new_7%20oct.html, accessed: 13 May 2014.

264 The Platforms include: ATS-1 Platform (125gsm) which is suitable to nurture as elementary level in understanding about space and satellite exploration innovation teaching via miniature educational platform; ATS-10 Platform (10kg) which is ideal for educational and small scientific payloads; ATS-100 Platform (100kg) which is for Earth Observation missions and appropriate for countries that have just embarked on a satellite programme; ATS-500 Platform (500kg) which is perfect for more complex Earth Observation missions. For details see http://www.atsb.my/index.php?option=com_content&view=article&id=58:satellite-systems-design-and-manufacture&catid=37:products&Itemid=60, accessed: 15 May 2014.

265 The ATSB has developed a Rideshare Adapter, a versatile and smart configurable deployment of electronics that enables multi-payload manifesting with an interface to the launch vehicle. It provides a cost-effective, rapid integration rideshare for science, technology and education payloads for the Falcon 1 Launcher. See *id*.

266 The ATSB has installed Vigilant telescopes and cameras, the robotic telescopes and cameras that can be remotely programmed and controlled via the internet, in Antarctica and several locations in Malaysia including Langkawi, Kuala Lumpur, Shah Alam and Malacca. These Vigilant series of imaging systems are used by the educational and professional sectors. See *id*.

267 The ATSB manages high-technology products including the National Tsunami Early Warning System, the National Radiation Monitoring System, and the Runway Visual Range Projects, where sensors are placed at strategic locations and the data are sent back to a control centre for processing, modelling, and decision-making.

268 Based on the concept of 'faster, cheaper, and better', the small satellite business is considered the most suitable for developing countries with emerging economies as it involves modest development costs. See Mazlan Othman and Ahmad Sabirin Arshad, "Role of Small Satellites for Developing Countries", *TiungSAT-1, From Inception to Inauguration,* Eds., Mazlan Othman and Ahmad Sabirin Arshad, (Kuala Lumpur: Astronautic Technology (M) Sdn Bhd, 2001), at 203. See also Mazlan Othman, "The Small Satellite Business: Contributions

countries. Indeed, such a situation could benefit the country, for instance in communication, navigation, earth observation and international relations. From the above points, it has been established that the ATSB, with all its projects, makes a significant contribution to the Malaysian space-related industry.

(d) Malaysian Remote Sensing Agency (MRSA)

The Malaysian Remote Sensing Agency (MRSA)[269] is also one of the departments under the MOSTI. It was established in August 1988 and became fully operational in January 1990. Its main objective is to develop the remote sensing applications and related technologies in order to apply them in the operational agencies for effective management of agriculture production, natural resources, environment, disaster, security, and land development. Through its vision and missions, the MRSA is aiming to conduct research and development programmes, as well as advising the Malaysian Government on matters related to remote sensing and other related technologies.[270]

MRSA is well equipped with a computer system for satellite data image processing, a geographic information system and global positioning system, a microwave remote sensing laboratory, remote sensing digital photographic laboratory, remote sensing data archiving and retrieval centre, and a satellite ground receiving station. The satellite ground receiving station is known as Remote Sensing Malaysia Ground Receiving Station (MGRS) and was established in March 2000. The station is able to receive data from various remote sensing satellites including the Canadian Radarsat-1, the French SPOT 2, 4 and 5, the American Landsat-7, and others.[271]

---

to and from Developing Countries", *TiungSAT-1, From Inception to Inauguration,* Eds., Mazlan Othman and Ahmad Sabirin Arshad, (Kuala Lumpur: Astronautic Technology (M) Sdn Bhd, 2001), at 217.

[269] It was formerly known as Malaysian Centre for Remote Sensing (MACRES). See its official website at http://www.remotesensing.gov.my/portalarsm/start.html, accessed: 15 May 2014.

[270] Its vision is to optimise the use of remote sensing and related technologies for sustainable development of the country. Its mission is to provide solutions in those technologies and to acquire and distribute remote sensing satellite images for Malaysia's needs. Other functions include implementing the National Remote Sensing Programme and acting as the chairman of the national 'Working Group of Remote Sensing', as well as coordinating the implementation of Malaysian remote sensing activities. See http://www.remotesensing.gov.my/, accessed: 10 January 2014.

[271] Other satellites include the USA Terra and Aqua satellites, the Indian IPS-P4 satellite, and the NOAA of USA. The station has been upgraded to also receive data from the RazakSAT. See http://www.remotesensing.gov.my/page.cfm?name=groundstation, accessed: 10 January 2014.

There are four major activities conducted by the MRSA. Firstly, it is related to data services whereby it acts as the sole and centralised remote sensing image satellite provider for all Malaysian Government agencies. It provides data from the Radarsat-1, the Spot 2,4 and 5, the Landsat, the NOAA, the Terra/Aqua (MODIS), the IRS (OCM), the QuickBird, and the IKONOS satellites. In addition, it is also responsible for any negotiation with foreign satellite operators for the procurement of direct reception of satellite images.[272]

Secondly, the main activity of the agency is related to the research and development programme. It was formulated to support various user agencies including those in agricultural production management, natural resources, environment, disasters, security, and land development. The programme focuses mainly on the application and technology developments. In the application development, it stresses the application packages for operation of remote sensing and related technologies in natural resources and environmental, disaster and security management, such as precision farming, rice monitoring and yield prediction system, disaster management and others.[273] For the technology development, it engages with selected remote sensing technology areas such as microwave remote sensing research development.[274]

Thirdly, it deals with training services. The MRSA acts as the main training centre to increase the number of trained remote sensing professionals. This training is conducted by a qualified team of Remote Sensing Malaysia trainers. The trainees are usually given hands-on practice in basic and advanced image processing, such as satellite data integration and image interpretation and classification.[275] Finally, the last major activity of the MRSA is consultancy services. The services offered are applied to various applications for the government and private sectors.

---

[272] At the end of 2007, the MRSA received 952 requests from various users involved in the processing of 173 Landsat TM scenes, 3039 Spot scenes, 431 Radarsat scenes, 70 Ikonos/QuickBird, and others. There are 3,372 satellite image products distributed to 147 users. See *id*.

[273] Other application packages being developed include integrated geospatial database and planning system, monitoring of environmentally sensitive areas, satellite image maps, satellite image atlas of Malaysia, fish forecasting, environmental health and biodiversity inventory. See *id*.

[274] For details, see http://www.remotesensing.gov.my/page.cfm?name=Microwave; see also http://www.remotesensing.gov.my/page.cfm?name=SIPS, all accessed: 10 January 2014.

[275] See http://www.remotesensing.gov.my/article.cfm?id=198, accessed: 10 January 2014.

The MRSA has conducted a number of major national programmes. These programmes include:[276]

(a) Integrated Geospatial Database and Planning (IGDP) system: A system of comprehensive natural resource and environmental management with geographic analytical capabilities;

(b) Precision Farming: It aims to increase Malaysian crop production using integrated remote sensing, GIS, GPS, and sensor technologies. It stresses the concept of 'The Right Input, The Right Amount, The Right Time, and The Right Place';

(c) Rice Monitoring and Yield Prediction System: This system enables the estimation of the rice yield one month before harvesting, compared to 6-12 months after harvesting by the conventional method;[277]

(d) Monitoring of Environmentally Sensitive Areas: This focuses on observation of development activities that might affect Malaysia's environmentally sensitive areas such as water catchments, highlands, reserved forests, and wetlands;

(e) Disaster Management: This relates to the management of major natural disasters occurring in Malaysia such as forest fires, floods, and landslides. The programme involves processing and analysing satellite images and disseminating value-added data and related information;

(f) Microwave Remote Sensing Research and Development: The programme involves all-weather capability microwave remote sensing that is highly required for a country with persistent cloud cover such as Malaysia. It comprises system development, modelling and application development;[278]

(g) Integrated Remote Sensing and GIS Software Development: This is a package for resource, environmental, and strategic application that consists of, *inter alia*, remote sensing image processing, GIS analysis, and model-based

---

[276] More information on these programmes is available in Chapter 1 of the thesis (1.4.2. Remote Sensing). See also http://www.remotesensing.gov.my/article.cfm?id=391#, accessed: 10 January 2014.

[277] It is a collaboration project between the MRSA, Malaysia Multimedia University (MMU), and MUDA Agricultural Development Authority (MADA).

[278] Under the system development, the project developed a laboratory equipped with anechoic chamber and a C-band mobile scatter meter. While, the modelling and application development involves laboratory research and field measurement that resulted the development of theoretical and application model for monitoring and yield forecasting of paddy and oil palm crops. It is a collaboration project of MRSA with the Malaysian Multimedia University (MMU).

analysis models. This project was conducted in collaboration with Peking University of China;

(h) Satellite Image Map (SIM): The main activities involved are satellite image processing, spatial data integration and cartography.

In conclusion, the MRSA, through its projects and programmes, has made significant contributions to the development and expansion of Malaysian space-related activities and experiences, particularly in the area of remote sensing technology.

(e) Malaysian Meteorological Department (MMD)

The Malaysian Meteorological Department (MMD)[279] is another department under the Malaysian Ministry of Science, Technology, and Innovation (MOSTI). It was established in 1958 when the Department of the Meteorological Office was formed. In 1965 it was renamed the Malaysian Meteorological Service, formed under the Malaysian Ministry of Transport. In 1984 it was transferred to the Ministry of Science, Technology, and the Environment (MOSTE). The MOSTE was restructured in 2004 and became officially known as MOSTI.[280] The MMD's vision is to become a world-class meteorological centre that affords excellent services both locally and internationally by 2020. However, its mission is to offer effective meteorological, climatological, and geophysical services for national security, societal well-being, and sustainable socio-economic development. It is also to enhance those services for the improved protection of life, property and the environment, and to increase safety on land, at sea and in the air. Its purpose is also to enhance quality of life and help achieve sustainable economic growth.[281] It is to be noted that the MMD uses relatively little space technology; nevertheless, it merits discussion.

The MMD maintains an observation station network for monitoring weather conditions and seismic activities in Malaysia. The MMD has various functions. Among its major tasks is to issue timely meteorological information and forecasts for civil and military aviation, marine activities, and the general public. Other functions are to provide early warnings on weather phenomena and dangerous sea conditions in the Malaysian region, to offer immediate

[279] The MMD official website is available at http://www.met.gov.my/, accessed: 13 May 2014.
[280] For further information, refer to *supra* note 197.
[281] See http://www.met.gov.my/index.php?option=com_content&task=view&id=102&Itemid=327, accessed: 13 May 2014.

information on earthquake events that affect the country, and to provide seismological information to civil engineering and construction industries. Furthermore, it also compiles climatological, atmospheric composition and seismological data, prepares climatological statistics, and monitors atmospheric composition, and also supplies information and technical advice on meteorological aspects of air pollution. Other tasks are to conduct cloud-seeding operations in order to increase water resources for agriculture and other purposes, and to participate in international programmes on research, data collection and exchange in meteorological related matters *etc*.[282]

The MMD supplies a number of major services that are accessible via its official website.[283] Those services are:[284]

(a) Weather forecasting: The MMD provides online access to the general weather forecast as well as forecasts for major towns and tourist destinations in Malaysia;[285]

(b) Seasonal and long-range weather outlook: It provides current El-Nino conditions with the current sea surface temperature, and predictions from the European Centre for Medium-Range Weather Forecast (ECMWF) seasonal forecast model;[286]

(c) Weather warnings: This service supplies warnings of strong winds and rough seas, and warnings of severe weather such as thunderstorms and heavy rain, tropical cyclones and storms;[287]

(d) Marine meteorological forecast: This service is offered particularly for fishermen. It comprises seven-day weather forecasts, winds, waves, and tidal forecasts;[288]

(e) Aviation meteorology: Among the services provided under this category is an aviation briefing terminal that consists of, for example, a pilot briefing

---

[282] For more information on other functions, refer to http://www.met.gov.my/index.php?option=com_content&task=view&id=100&Itemid=177, accessed: 13 May 2014.

[283] See *supra* note 279.

[284] For details, see http://www.met.gov.my/index.php?option=com_content&task=view&id=1315&Itemid=1050, accessed: 13 May 2014.

[285] For Malaysia's online current weather forecast, see http://www.met.gov.my/index.php?option=com_weathergeneral&Itemid=960, accessed: 13 May 2014.

[286] For details, see *id*.

[287] For details, see *id*.

[288] For details, see *id*.

package and Kuala Lumpur International Airport (KLIA) radar images. Other services include a weather forecast kiosk which offers a forecast service via world forecasts, local forecasts, satellite, radar, and earthquake info;[289]

(f) Meteorological observation: This is accomplished using images from satellites such as MTSAT, FY-2E, NOAA, and TERRA/AQUA, as well as radar images. The service provides observations on temperatures, humidity, visibility, and rainfall;[290]

(g) Earthquake and tsunami warnings: This service provides current earthquake information and tsunami alerts with the locations where they are taking place. It also provides a list of recent earthquakes;[291]

(h) Weather modification: This service involves information on cloud-seeding operations conducted throughout Malaysia;[292]

(i) Environmental studies: These supply information on solar ultraviolet index, rainfall acidity measurement, ozone monitoring programme, air quality data, summaries of air pollution observations and others;[293]

(j) Climate: This presents details on Malaysia's general climate, Malaysian climate change monitoring information, Malaysian climate data, world city climate information, and others;[294]

(k) Agromet: This supplies a '10-Day Agromet Bulletin' reporting weather review that is useful for agricultural users in Malaysia. It also presents the weather outlook for the next 10 days and the expected weather impact for the coming period. Information provided also includes rainfall, evaporation, solar radiation, temperature, and soil moisture distribution.[295]

The MMD has established a number of forecast offices throughout the country with the responsibility to provide meteorological services. To name but a few, they include the Central Forecast Office, KLIA Forecast Office, Bayan Lepas Forecast Office, Butterworth Forecast Office, and many others.[296] The Central Forecast Office's tasks, among others, are to provide

---

[289] For details, see *id*.
[290] *Id*.
[291] *Id*.
[292] *Id*.
[293] *Id*.
[294] *Id*.
[295] *Id*.
[296] Other forecast offices include Kuantan Forecast Office, Subang Forecast Office, Gong Kedak Forecast Office, Sarawak Branch and Sabah Branch. See

short-range general weather forecasts for the whole of Malaysia, and also short-range city forecasts for Malaysia's major cities and tourist areas. It is also expected to monitor weather conditions and issue severe-weather advice and warnings when necessary. The main responsibilities of the KLIA Forecast Office are to monitor the weather conditions around KLIA, issue aerodrome warnings when necessary, and provide meteorological information for Air Traffic Management Service, Airport Operation Centre, and Search and Rescue operations. The Bayan Lepas Forecast Office maintains weather monitoring over the states of Kelantan, Terengganu, and Pahang, besides providing meteorological services for civil and military aviation. The Butterworth Forecast Office is more oriented towards providing weather forecasts to the Royal Malaysian Air Force in their daily flight operations.[297]

Based on the above facts, it is evident that the MMD, through its meteorological and seismological services made feasible by space-related technology, has made significant contributions to the country particularly with respect to enhancing the protection of public life, property and the environment, as well as safety on land, at sea and in the air. Such efforts therefore certainly contribute to Malaysia's sustainable development and economic growth.

1.3.2. Non-Governmental Sector

Apart from the Malaysian governmental sector, the non-governmental sector has also contributed to the development and progress of space-related activities in Malaysia. This section is devoted to emphasizing a number of non-governmental sectors that participate in the growth and evolution of the activities. To name but a few, they include MEASAT Satellite System Sdn Bhd, Malaysian Institute of Aero and Space Studies (IKAM), the Space Tourism Society Malaysia Chapter (STS-MC), and Astro All Asia Network Plc. (ASTRO).

(a) MEASAT Satellite System Sdn. Bhd.

MEASAT Satellite System Sdn. Bhd.[298] (hereinafter referred to as the 'MSS') is one of the main private companies directly involved in space activities in Malaysia. It is the only

---

http://www.met.gov.my/index.php?option=com_content&task=view&id=92&Itemid=196, accessed: 13 May 2014.

[297] *Id*.

[298] The MEASAT Satellite System Sdn. Bhd. official website is available at http:///www.measat.com, accessed: 13 May 2014.

Malaysian licensed communication satellite operator, and it operates as MEASAT Global Berhad.[299] The MSS was formerly known as Binariang Satellite System Sdn. Bhd. (referred to as 'Binariang').[300] In 1992, in response to the Vision 2020 plan laid out by the former Malaysian Prime Minister, Tun Dr Mahathir Mohamed, specifically with respect to the development of Malaysian communications infrastructure, Binariang started to develop the country's first communication satellite project called 'Malaysia East Asia Satellite' (MEASAT).[301] In 2002, Binariang became a wholly-owned subsidiary of a holding company, MEASAT Global Berhad; in 2004 it was renamed MEASAT Satellite System Sdn. Bhd.[302]

The major vision of MSS is to become a leading emerging-market satellite operator that provides innovative and 'best-in-class' satellite solutions in the Malaysian, Asian and African markets.[303] It is headquartered in Malaysia, with representative offices in India and the Philippines. Since 1996, the MSS has provided reliable satellite solutions to customers across the Asia-Pacific region.

The central operation of MSS mainly involves the MEASAT satellite system which began in May 1994, when Binariang signed a contract with Boeing Satellite Systems International, Inc. (referred to as 'Boeing').[304] Such a satellite system has the capacity to provide digital video and audio broadcasting, telecommunication services, and high-speed internet access. It comprises four communication satellites: MEASAT-1/AFRICASAT-1, MEASAT-2,

[299] On 28 September 1956, MEASAT Global Berhad was incorporated under the name of Malayan Tobacco Company Ltd (MTC), with its main operations focused on manufacturing, importation, and tobacco product sales. In November 1999, MTC disposed of its tobacco manufacturing business, and marketing and distribution operations to become an investment holding company upon the acquisition of MEASAT Satellite Systems Sdn. Bhd. in May 2002. Later, on 23 July 2003, MTC changed its name to MEASAT Global Berhad to reflect its core business as Malaysia's sole licensed regional satellite system. See http://www.measat.com/investor_structure.html, accessed: 13 May 2014.

[300] Binariang Satellite System Sdn. Bhd is a private company established as a result of the Malaysian Government's 1987 privatisation policy, initiated to manage the change from the Government monopoly to privately owned and operated telecommunication services. It is the first cellular operator in Malaysia to offer fully digital services. See http://www.boeing.com/defense-space/space/bss/factsheets/376/measat/measat.html, accessed: 4 April 2012.

[301] MEASAT was a technology breakthrough with its pioneering Director-To-User (DTU) system transmitted via high-powered Ku-band transponder purposely designed for countries with heavy tropical rainfall. Elbert, Bruce R., *The Satellite Communication Applications Handbook*, (Artech House, 2003), at 245.

[302] See MEASAT Global Berhad Annual Report 2008 available at http://www.measat.com/investor_bod_annual.html; and http://www.measat.com/corp_profile_history.html, both accessed: 13 May 2014.

[303] See http://www.measat.com/corp_vision.html, accessed: 13 May 2014.

[304] Boeing Satellite System International, Inc. is a unit of the Boeing Company, the world's leading aerospace company which manufactures commercial communication satellites and is a major provider of space systems, satellites, and payloads for national defence, science, and environmental applications. It is headquartered in Chicago. Its website is available at http://www.boeing.com; See also http://www.answers.com/topic/boeing-satellite-systems-international-inc, all accessed: 13 May 2014.

MEASAT-3, and MEASAT-3a.[305] The first three satellite networks, i.e. MEASAT-1, MEASAT-2, and MEASAT-3, were designed and built by Boeing Satellite Development Center (SDC) through its Hughes Space and Communications Company (HSC).[306] MEASAT-3a was built by Orbital Sciences Corporation.[307] Apart from these, the next MSS satellite will be MEASAT-3b. Its expected launch date is on 29 May 2014. The satellite was constructed by EADS Astrium.[308]

MEASAT-1 and MEASAT-2 were launched in 1996.[309] Both were designed to provide 11 to 12 years of direct-to-user television services in Malaysia, in addition to the general communications service in the region, from Malaysia to the Philippines, and from Beijing to Indonesia. Both satellites are categorised as high-powered Boeing 376HP communication satellites that provide regional C-Band coverage for the Asian region as well as Australia and Hawaii. They also pioneered the use of Ku-Band transponder in the high-rainfall region of South East Asia that covers Malaysia, Indonesia, Eastern Australia, Vietnam, Taiwan, and the

---

[305] For details of location, background, transponder and performance specification of MEASAT satellites fleet, refer to http://www.measat.com/satellite_91e_measat3.html, accessed: 13 May 2014.

[306] The purchase of Hughes Space and Communication Company by Boeing in 2000 gave Boeing an impressive range of products for design, manufacture, launch, and support of satellites. Boeing Satellite Development Center is a major business unit of Boeing Defense, Space & Security. It is a factory responsible for designing, manufacturing, testing, and shipment of satellites ordered from Boeing, headquartered in El Segundo, California. It also supplied equipment for a satellite control station on Malaysia's Langkawi Island and trained Malaysian spacecraft controllers. See http://www.boeing.com/defense-space/space/bss; See also http://en.wikipedia.org/wiki/Boeing_Satellite_Development_Center, all accessed: 4 April 2012.

[307] Orbital Sciences Corporation is one of the world's leading providers of small-to-medium-class satellites. It is an American company specializing in manufacturing and launching communication, science and technology, imaging and defence satellites. Its headquarters are in Dulles, USA. Its website is available at http://www.orbital.com, accessed: 13 May 2014.

[308] EADS Astrium was an aerospace subsidiary of the European Aeronautic Defence and Space Company (EADS) that provided civil and military space systems and services from 2006 to 2013. Its headquarters are in Paris, France. In late 2013 Astrium was merged with Cassidian, the defence division of EADS and Airbus Military to form Airbus Defence & Space. The EADS itself was reorganised as Airbus Group in January 2014. Its official website is available at http://www.astrium.eads.net/; see also "Satelit 3b Baharu MEASAT dilancarkan 29 Mei", *Utusan Online,* 2 May 2014, http://www.utusan.com.my/utusan/Dalam_Negeri/20140502/dn_42/Satelit-3b-baharu-MEASAT-dilancarkan-29-Mei, accessed: 2 May 2014; see also http://www.measat.com/satellite_91e_measat3b.html; and http://www.satlaunch.net/p/launch-schedule-2013.html; http://en.wikipedia.org/wiki/EADS_Astrium; http://en.wikipedia.org/wiki/EADS, accessed: 4 April 2014.

[309] MEASAT-1 was launched on 12 January 1996 using the Ariane 44L rocket vehicle. Ten months later, on 13 November 1996, MEASAT-2 was launched using the same vehicle. Both were launched from Centre Spatial Guyanais at Kourou in French Guyana. MEASAT-1 has five high-power transponders in Ku-band for the direct-to-user service, powered by a 112-watt travelling-wave tube amplifier. The regional service is provided on 12 transponders in C band, using 12-watt solid state amplifiers. It was located in a geostationary orbit at 91.5 degrees east. Meanwhile, MEASAT-2 has 9 Ku-band and 6 C-band transponders and was located in a geostationary orbit at 148 degrees east. See Elbert, Bruce R., *supra* note 301; http://www.measat.com/satellite_91e_measat3.html, accessed: 13 May 2014.

Philippines.[310] Such launches led, indeed, to a rapid boost in Malaysian infrastructure development, and telecommunications and broadcasting industries, especially Malaysia's first digital Direct-to-Home Multi-Channel Television services.

When the operational life of MEASAT-1 and MEASAT-2 was approaching the end, the MSS developed an operational strategy to extend the satellites' lives. This was done by relocating MEASAT-1 from 91.5 degrees east to a new orbital location at 46.0 degrees east.[311] Since then, MEASAT-1 has continued to offer its services to Africa. With this new role it was renamed AFRICASAT-1. Meanwhile, MEASAT-2 was moved to an inclined orbit at 148.0 degrees east to extend its operational life.[312]

Then, in March 2003, the MSS ordered a Boeing 601HP satellite and designated MEASAT-3 to increase its service capacity. This new satellite will join MEASAT-1 and MEASAT-2 in the MEASAT system. MEASAT-3 was successfully launched on December 11th, 2006, from Baikonur Cosmodrome, Kazakhstan, aboard the Proton Breeze M launch vehicle. It was located at 91.5 degrees East with MEASAT-1.[313] MEASAT-3 was designed for a minimum 15 years' service life.[314] The launch provided back-up capacity in order to meet the increasing market demand for satellite services in the region. Its C-band payload covers Africa, the Middle East, Eastern Europe, Asia, and Australia. However, its Ku-band payload was designed to provide services for the development of data services and Direct-to-Home applications in Malaysia, China and India.

The other MEASAT fleet member is MEASAT-3a. It was launched on the 21st of June 2009 from the Baikonur Cosmodrome in Kazakhstan aboard the Land Launch Zenit-3SLB launch vehicle provided by the Intelsat Corporation. MEASAT-3a was located at the 91.5 degrees

---

[310] MEASAT-1 and MEASAT-2 are operated from a satellite control facility located 915m above sea level in Gunung Raya, Langkawi Island, and the northwest coast of Peninsular Malaysia. See MEASAT Global Berhad Annual Report 2008, *supra* note 302, at 11; Elbert, Bruce R., *supra* note 301. For details, refer also to http://www.boeing.com/defense-space/space/bss/launch/launched.html, accessed: 4 April 2012.

[311] The relocation of MEASAT-1 was carried out at the end of 2007. See MEASAT Global Berhad Annual Report 2008, *supra* note 302, at 10.

[312] See MEASAT Global Berhad Annual Report 2008, *supra* note 302, at 11.

[313] See Boeing Satellite Chronology of Launches, *id*.

[314] MEASAT-3 employs 24 C-band and 24-Ku band transponders. See http://www.boeing.com/defense-space/space/bss/factsheets/601/601fleet.html, accessed: 13 May 2014.

East orbital location, the same orbital location as MEASAT-3.[315] The satellite has a 15-year mission. It provides an additional 12 C-band transponders to cover Africa and Eastern Europe in the West, and Japan and Australia in the East, beside the 12 Ku-band transponders and high-powered spot beams that concentrate on Malaysia and Indonesia. The aim of building MEASAT-3a is to work in tandem with MEASAT-3 to increase the internet, telecommunication and broadcasting capacity by up to 50 per cent to support the burgeoning plans of their customers. This satellite was also designed to support the continuing growth of the company's Direct-to-Home, broadcasting, and telecommunication services. With this new launch, the MEASAT fleet has a total of 100 transponders across their four satellites.[316] The expectation is that MEASAT-3a will provide a significant boost to the MSS network capacity and simultaneously continue to expand their business in Malaysia, Asia Pacific, and Africa. This became evident when MSS signed an agreement with the MEASAT Broadcast Network Systems Sdn Bhd (MBNS) to supply transponder capacity for the MEASAT-3a satellite for a period of another 15 years.[317]

With respect to facilities, the MSS operation hub known as the MEASAT Teleport and Broadcast Centre (MTBC) accommodates the organization's Corporate Office, Satellite Control Centre and Customer Support Operations. The MTBC houses the telemetry, tracking, and command activities for the MEASAT satellites fleet. It also has two other backup satellite control centres to ensure the efficacy of its services.[318] The MTBC also houses the MEASAT Network Management Centre which offers customer support services by monitoring the satellite communication payloads' status and customer traffic. Apart from that, it also supplies customer teleport facilities.[319]

In brief, there are three core services offered by the MSS. They are: transponder leasing, broadcasting and telecommunication solution. The transponder leasing offers full-time and flexible leasing, and an occasional-usage service. The broadcast services include standard-

[315] MEASAT-3a provides an additional 24 transponders to the 48 transponders provided by MEASAT-3. The satellite, after separation from its launch vehicle, was acquired by the control centres of the Orbital Sciences facility in Dulles, USA and at the MEASAT Teleport and Broadcast Centre (MTBC), CyberJaya, Malaysia.

[316] See "MEASAT-3a enters Commercial Service", 17.07.2009, *MEASAT breaking News*, http://www.measat.com/investor_calendar.html, accessed: 13 May 2014.

[317] MEASAT Broadcast Network Systems Sdn Bhd (MBNS) is a wholly-owned subsidiary of ASTRO All Asia Networks, plc (ASTRO). Discussion on ASTRO is available in Chapter 1 of the thesis (1.3.2(c) Astro Holdings Sdn. Bhd). See also "Supply of Transponder Capacity on MEASAT-3a To ASTRO", 27.05.2009, *MEASAT breaking News*, http://www.measat.com/investor_calendar.html, accessed: 13 May 2014.

[318] The locations are in Langkawi Island (Kedah) and Bukit Jalil (Selangor), Malaysia.

[319] For details, refer to http://www.measat.com/corp_facilities.html, accessed: 13 May 2014.

definition and high-definition video play-out, video up-linking, video turnaround, fibre, and co-location services. The telecommunication services include supplying the co-location services, up-linking, and disaster recovery services.[320] Apart from those services, the MSS also offers programmes such as scholarships and internships for those interested in satellite-related technology.

It is evident that the MSS, being a premium supplier of satellite communication services and with its ability to provide a backbone communication infrastructure to Asia's leading broadcasters, direct to home platforms and telecommunication operators, has contributed to the proliferation and expansion of the Malaysian space industry. Furthermore, its services in regard to satellites capacity are well-known and have been used by over 145 countries across the Asia-Pacific, Middle East, Africa, Europe, and Australia, accounting for 80 per cent of the world's population. Such achievements and reputation, in fact, undoubtedly support the development of Malaysia's communication and broadcasting industries.

(b) Malaysian Institute of Aero and Space Studies (IKAM) and Space Tourism Society Malaysia Chapter (STS-MC)

Space tourism is a new dimension of space exploration. It was intensely discussed after the success of SpaceShipOne. Since then, everyone knows that vacationing in space is a reality. In view of the fact that space tourism will create new business opportunities for the government and the community, a number of countries such as the USA, India, UEA, Sweden and the United Kingdom have shown an interest in space tourism projects. These mainly involve the development of spaceport and suborbital space planes. Responding to this, NASA announced their plan to use 50 million dollars of federal economic stimulus fund to support the development of their commercial space transportation.[321] In this regard, the private sector has also made a great contribution to the growth of the space tourism industry. In Malaysia, the active private sectors participating in space tourism are the Malaysian Institute of Aero and Space Studies (IKAM) and the Space Tourism Society Malaysia Chapter (STS-MC).

[320] For detailed information on the services offered, refer to http://www.measat.com/services_transponder.html, accessed: 13 May 2014.
[321] Sutton, Jane and Phil Stewart (eds.), "NASA Wants Proposals for Space Taxis", 10 August 2009, *Reuters*, http://www.reuters.com/article/newsOne/idUSTRE57944520090810, accessed: 13 May 2014.

IKAM[322] was established in February 2000. It is a voluntary and pioneering private organization dealing with space tourism in Malaysia and is recognised as a non-profit organization. Its main objective is to promote space tourism in Malaysia apart from other aspects of space studies such as space economy, space science, and space technology.[323] Although the establishment of IKAM dates back to 2000, space tourism initiatives in Malaysia can be traced back to as early as July 1999. In this month, the first space tourism public lecture in Malaysia was held at the School of Aerospace Engineering, University of Science, Malaysia.[324] Indeed, a month later, in August 1999, space tourism's popularity was demonstrated by a famous local newspaper's publication of a caricature describing the proposal to develop Kuala Lumpur International Airport to a spaceport by 2020.[325]

IKAM became an internationally recognised institute when, in September 2002, it signed an agreement with Space Future Consulting (SFC)[326] in London on the cooperation and promotion of space tourism in Malaysia. This collaboration has brought the SFC space tourism experts to Malaysia to deliver lectures and conduct research into this field. The first lecture on space tourism under this collaboration was held in February 2004 at the Faculty of Tourism and Hotels, MARA University of Technology (UiTM).[327] Many other series of lectures have since been organized under this collaboration.[328]

---

[322] The founder and president of IKAM is Mr. Norul Ridzuan Zakaria**.**

[323] Norul Ridzuan Zakaria, "IKAM & Space Tourism Society Malaysia Chapter (STS-MC)", email to author, 6 June 2009.

[324] The 'Space Tourism' public lecture was delivered by Norul Ridzuan Zakaria on the 3rd July 1999 at a seminar known as 'Space Studies Seminar'. The seminar was organized by the Terengganu Science Centre, Perak State Economic Planning Unit (UPEN, Perak) and School of Aerospace Engineering, University Science of Malaysia, Tronoh, Perak, and attended by 600 attendees. The seminar was divided into three parts: Space Science, Space Technology, and Space Economic. Space tourism was one of the lectures presented under the space economic part. In this lecture, it was proposed that Kuala Lumpur International Airport (KLIA) could be developed into an international commercial spaceport known as Kuala Lumpur International Spaceport (KLIS). Norul Ridzuan Zakaria, "The First Lecture", Email to author, 3 November 2009. See also "KLIA can be turned into Spaceport", *Sunday Star*, 4 July 1999. Refer also to "A Brief History of Malaysian International Space Tourism Initiative (July 1999 – 2011)," Brochure prepared to commemorate the 5th anniversary of the establishment of Space Tourism Society Malaysia Chapter on July 2011, email to author, 6 July 2011. Available also at http://www.scribd.com/doc/59298184/A-Brief-History-of-International-Malaysian-Space-Tourism-Initiative-July-1999-2011, accessed: 13 May 2014.

[325] See Utusan Malaysia, 24th August 1999. Read also "A Brief History of Malaysian International Space Tourism Initiative (July 1999 – 2011)," *id*.

[326] For more information on the Space Future Consulting, refer to its website at http://www.spacefuture.com/, accessed: 13 May 2014.

[327] The lecture was delivered by Prof. Patrick Collins. He is a Chief EXCO of the Space Tourism Society Malaysia Chapter and one of the senior partners in the editorial and research board of the Space Future Consulting. See http://www.spacefuture.com/masthead.shtml/, accessed: 13 May 2014.

[328] The lectures delivered were entitled, *inter alia*, 'New Opportunities for Malaysia in Space Tourism', held in December 2005 at the Second International Tourism Outlook Conference, Faculty of Tourism & Hotel, UiTM. On February 2006 the British Council organized a public lecture entitled, 'Space Tourism – Fun Things to do in the 21st Century', held at the Faculty of Civil Engineering, UiTM. In November 2006, a lecture on 'Space

In February 2003, IKAM published a book on space commercialisation entitled 'Pengenalan Ekonomi Angkasa' (Introductory Space Economy). It was the first ever space book written in the Malay language and had an illustration of a suborbital space plane with two jets and two rocket engines, known as "Langkasa" (Space Eagle).[329] Next, in November 2004, the space tourism initiative was gradually accepted in Malaysia when the State Government of Perak[330] made an official announcement to allow the Sultan Azlan Shah Airport[331] to be developed as a spaceport for the purpose of Malaysian space tourism. The airport is considered the most suitable and available airport for such purposes as it has a very low flight frequency and is equipped with adequate facilities. Then, in December 2005, the first official meeting between SFC and the Malaysian Department of Civil Aviation was held to discuss the operation of a spaceport and space plane in Malaysia.[332] Following these efforts, in August 2006 IKAM published a second book entitled 'Space Tourism-New Economy and Technology for Developing Countries' which describes ideas such as a space tourism simulator and space tourism observatory.[333]

Then, in July 2006, the Space Tourism Society Malaysia Chapter (STS-MC)[334] was established in conjunction with seven years of space tourism development in Malaysia. This

---

Tourism: An Opportunity for Aerospace Engineering Lecturers and Students" was held at the School of Aerospace Engineering, University of Science Malaysia.

329 The book was written by Norul Ridzuan Zakaria. It is the first book on space tourism published in Malaysia, with a chapter describing suborbital and orbital tourism. The book illustrates the first ever concept of a suborbital space plane published in Malaysia, and with the concept of a twin-boom designed to carry a passenger inside a capsule on each boom. Such a unique capsule design enables the passengers inside to clearly video-photograph the scenery from various angles during the journey. Each capsule is equipped with a small rocket engine, a communication system, and a parachute for safe landing in case of emergency. For details, see Norul Ridzuan Zakaria, *et al.*, "The Symbiotic Relationship between Astronaut Program and Space Tourism Development – A Third World Perspective", *Space Future,* http://www.spacefuture.com/archive/the_symbiotic_relationship_between_astronaut_program_and_space_tourism_development_a_third_world_perspective.shtml, accessed: 13 May 2014. This paper was presented at 2nd IAASS Conference, Chicago, 14 May 2007.

330 Perak is one of the thirteen states of Malaysia. It is the second largest state located in Peninsula Malaysia, bordering Kedah and Thailand to the north. Sultan Azlan Shah Airport is one of the domestic airports in Malaysia. It is Perak's main airport situated in Ipoh, the state capital of Perak. For further details, see http://en.wikipedia.org/wiki/Perak, accessed: 13 May 2014.

331 The facilities available include a terminal and runway for medium-sized passenger jets including Boeing 737 and Airbus A320. Furthermore its location is close to Kuala Lumpur, the capital city of Malaysia. Norul Ridzuan Zakaria, *et al*., "The Symbiotic Relationship between Astronaut Program and Space Tourism Development – A Third World Perspective", *supra* note 329.

332 However, the research noted that there has been no new progress on this matter. Norul Ridzuan Zakaria, *et al*., "The Symbiotic Relationship between Astronaut Program and Space Tourism Development – A Third World Perspective", *supra* note 329.

333 The authors of the book are Norul Ridzuan Zakaria, Ramli Zahari, Abd. Azis Abd. Majid, and Jamaludin Othman.

334 The founder and president of STS-MC is Norul Ridzuan Zakaria.

was realized due to the offer made by the Space Tourism Society[335] to IKAM in June 2006 to sponsor and establish a chapter of the Society in Malaysia. As a result, the Space Tourism Division under IKAM, which was responsible for space tourism activities, was converted into STS-MC in July 2006. Thus, IKAM and Space Future Consulting remain the major sponsors of the Chapter.[336] It is noted that the STS-MC is the 5th international Chapter of the Space Tourism Society in the world and the second Chapter in Asia.[337]

Among activities conducted by the STS-MC are presentations on space tourism at international conferences organized by major world space agencies such as the European Space Agency (ESA). Among the presented papers are the following titles: 'The Symbiotic Relationship Between Astronaut Program and Space Tourism Development – A Third World Perspective',[338] 'Human Factors Engineering in Designing the Passengers' Cockpit of the Malaysian Commercial Suborbital Spaceplane', 'Spherical Meal Container Food and Beverage Management System for Space Hotel',[339] 'Safety and Trend Considerations in Designing the Costumes for the Passengers of Commercial Suborbital Spaceplane', 'The Advantages, Potentials and Safety of VTOL Suborbital Space Tourism Operations', and 'Internet TV aboard Commercial Suborbital Spaceplanes and at Spaceports for Safety and Commercialization'.[340] Apart from this, at the national level, the STS-MC, in collaboration with Perak State Government, has also undertaken a project on the first space tourism commercial product which involves the development of a spherical meal container made of

---

[335] Space Tourism Society is a non-profit society specifically focused on space tourism. It is based in the USA. Its mission is to encourage as many people as possible to travel into the Earth's orbit. It has Chapters in countries such as Japan, Norway, and the United Kingdom. Its Founder/President is John Spencer (an award-winning NASA space architect). Its website is available at http://spacetourismsociety.org/; see also http://en.wikipedia.org/wiki/Space_Tourism_Society, accessed: 13 May 2014.

[336] Norul Ridzuan Zakaria, "IKAM & Space Tourism Society Malaysia Chapter (STS-MC)", email to author, 6 June 2009.

[337] Norul Ridzuan Zakaria, *et al.*, "The Symbiotic Relationship between Astronaut Program and Space Tourism Development – A Third World Perspective", *supra* note 329. See also Mohd Roshdi Hassan, "Membina Pesawat Angkasa Suborbital Sendiri", *Utusan Online,* 3 April 2008, http://www.utusan.com.my/utusan/info.asp?y=2008&dt=0403&pub=Utusan_Malaysia&sec=Rencana&pg=re_08.htm, accessed: 13 May 2014.

[338] The paper was presented at the 2nd International Association for the Advancement of Space Safety (IAASS) Conference, Chicago, on 14 May 2007. See *supra* note 329.

[339] Both papers were presented at the 4th IAASS Conference, Huntsville, USA, 19-21 May 2010. See http://www.congrex.nl/10a06/, accessed: 11 April 2012; http://www.scribd.com/doc/50159913/Human-Factors-Engineering-in-Designing-the-Passengers-Cockpit-of-the-Malaysian-Commercial-Suborbital-Space-Plane, accessed: 13 May 2014.

[340] Papers were presented at the 5th IAASS Conference, Paris, France, 17-19 October 2011. See http://www.congrex.nl/11a03/, accessed: 11 April 2012; http://eprints.usm.my/25130/1/Paris.The_Advantages,_Potentials_and_Safety_of_VTOL_Suborbital_Space_Tourism_Operations.pdf, accessed: 13 May 2014

high-quality plastic; it was called ‘Labu Sayong’.[341] It was purposely designed for the astronaut and space tourist. The project was officially launched in November 2006 and, in fact, originated in the Malaysian Astronaut Program.[342] Aside from those activities, the STS-MC has also produced and distributed various posters to the public. The posters included the ‘Labu Sayong’ poster distributed in July 2007 and the ‘Perak-Pioneering Space Tourism into the 50th Anniversary of Independence’ poster distributed in August 2007. However, in conjunction with the celebration of ‘One Decade of Space Tourism in Malaysia’, they also circulated a high-resolution poster entitled, ‘Commercial Suborbital Spaceflight as a Tool to Promote Interest of Space Travel in Developing Countries’.[343]

In respect of the STS-MC core missions, two core projects have gained attention. The first is the M-R2D2 (Malaysian Research for Rocket Plane Design & Development) project. This is a project that aims to design and develop a prototype suborbital space plane through a partnership with Swiss Propulsion Laboratory (SPL) and Project Enterprise.[344] The second project is the development of a Malaysian commercial spaceport. This project involves building, for instance, a spaceflight terminal/mall, suborbital space plane, zero gravity squadron, astronaut hall of fame, visitor transit centre, space resort, international aeronautics and astronautics academy, and many others.[345] These two projects will be discussed further in the approaching section.[346]

In relation to international affiliation, besides SFC, STS-MC has also successfully developed international relationships with various other international space actors. This became evident when, in February 2008, STS-MC signed an agreement with SPL on the development of a

---

[341] ‘Labu Sayong’ is a Malay word that refers to a traditional earthenware water container that was used by an individual to carry drinking water and to keep it cool for a long journey. It originated in Perak, a state on the north-west coast of peninsular Malaysia. For details on this project, see Norul Ridzuan Zakaria, *et al*., “The Symbiotic Relationship between Astronaut Program and Space Tourism Development – A Third World Perspective”, *supra* note 329.
[342] *Ibid*.
[343] The poster was presented by the STS-MC at the 12th Annual International Symposium held at the International Space University, France, in February 2008. It consists of an illustration of the Ascender suborbital space plane and an explanation about the practicality of developing such a plane for the developing countries. See http://www.klia.com.my/poster3.jpg; Norul Ridzuan Zakaria, “POSTER ISU 2008”, email to author, 6 July 2008.
[344] Norul Ridzuan Zakaria, “An Aviation Approach to Space Transportation”, email to author, 24 August 2009. See *id*., “IKAM & Space Tourism Society Malaysia Chapter (STS-MC)”, email to author, 6 June 2009.
[345] For details, visit http://spaceportmalaysia.com/invest.html, accessed: 13 May 2014.
[346] More discussion of the M-R2D2 project is available in Chapter 1 of the thesis (1.4.8. Suborbital Space Plane). However, for the Malaysian spaceport it is available in Chapter 1 of the thesis (1.4.9. Commercial Spaceport).

carbon-neutral rocket propulsion system. Furthermore, in May 2009, STS-MC signed a memorandum of understanding with SPL and the Talis Institute, owner of the Project Enterprise for cooperation as partners in the M-R2D2 project. This arrangement attracted the attention of various parties in space travel including California Spaceport Authority and IAASS.[347] Thus, it marks the consciousness of the international space community regarding the emergence of the STS-MC in the related industry. Responding to its active involvement in the related industry, in May 2010 STS-MC was entrusted as a Board Member of IAASS.[348] And, during the 4th and 5th IAASS Conferences held from 19-21 May 2010 and 17-19 October 2011, STS-MC was also appointed a Program Committee Member and Conference Abstract Reviewer. Then, in April 2011, the STS-MC was assigned to the IAASS Technical Committee for Suborbital Spaceflight Safety.[349] Next, in May 2011, the Space Tourism Society entrusted the STS-MC to represent the Society at the future IAASS Conferences, starting with the 5th IAASS Conference.[350]

Moreover, STS-MC made a great effort to promote the initiative of suborbital space tourism to Malaysian society, particularly when they successfully organized a suborbital space plane design competition among secondary schools in Malaysia.[351] This effort could be regarded as a successful one since the idea of suborbital space tourism was effectively conveyed to the public through various competition advertisements in local newspapers.[352] As a result, five hundred pupils participated in the competition and one hundred were short-listed. In the competition, the participants were required to produce 3D-perspective drawings and scale models of their designs of suborbital space planes for judging by international suborbital space plane and space tourism experts.[353] Apart from that, STS-MC has pioneered the

---

[347] This was proved when both parties reported the news of the joint development agreement in their bulletins of Spot beam California, and IAASS Newsletter. See "A Brief History of Malaysian International Space Tourism Initiative (July 1999 – 2011)," *supra* notes 324 at 4. For more details, refer to www.californiaspaceauthority.org/html/spotbeams/spot090526.pdf, accessed: 2 May 2012.

[348] Norul Ridzuan Zakaria, "STS-MC Nominated to be the Board Member of IAASS", email forwarded to author, 22 May 2010.

[349] Norul Ridzuan Zakaria, "STS-MC now a Member of Suborbital Space Safety Technical Committee of IAASS", email forwarded to author, 21 April 2011.

[350] See "A Brief History of Malaysian International Space Tourism Initiative (July 1999 – 2011)," *supra* note 324, at 5.

[351] The competition started in February 2011 and lasted for 18 months.

[352] Norul Ridzuan Zakaria, "Competition Co-organized with Utusan Malaysia", email forwarded to author, 3 January 2011. See also "Menangi Penyertaan di Kem Angkasa Eropah: Pertandingan Mereka Bentuk Kapal Angkasa Kebangsaan", *Utusan Malaysia,* 3 January 2011, at 24.

[353] See "Lima Sekolah Terbaik ke Perancis", *Utusan Malaysia,* 23 May 2011, at 25; Norul Ridzuan Zakaria, "5 Winners of Design Competition Announced by Utusan Malaysia Today", email forwarded to author, 23 May 2011.

production of an animated movie on orbital space tourism called, 'Re-Entry'. It consists of animated orbital space planes, space resorts, and lifestyles.[354]

The STS-MC, indeed, strongly believes that space tourism will be of significant benefit to a third-world country such as Malaysia, especially through its space plane technology transfer programme as well as by creating new economic opportunities. They also claim that space tourism will win the hearts of people since the space plane prototype can be built at the same cost of sending an astronaut to the International Space Station or perhaps less.[355] In fact, they further claim that, in comparison to the Astronaut Program, the space tourism programme was seen as an alternative to the continuation of the Malaysian space programme, especially with regard to the limited budget of the Malaysian Government.[356] As a matter of fact, it is contended that the third-world astronaut programmes were indeed intended to promote the country's international image and to instil confidence and pride in its people; this is different from the astronaut programmes of first-world countries which really contribute to science and technology via their continuous experiments conducted on board the International Space Station. For these reasons, the STS-MC then proposes that space tourism is the most suitable programme for the continuation of the Malaysian Astronaut Program.[357] The Government of Malaysia has been urged to openly support space tourism development, particularly with respect to the development of a reusable launch vehicle, as it will not commit itself to maintaining expendable launch vehicles, as experienced in the first- and second-world countries.[358]

Relying on the aforementioned reasons, the STS-MC had made several efforts to convince the Malaysian Government about their space tourism projects. These included the submission of the IAASS White Paper hard copies to selected Malaysian Government bodies such as Malaysian National Space Agency (ANGKASA), Ministry of Science, Technology and

---

[354] The original script and characters of the movie were written by Prof. Patrick Collins. See "A Brief History of Malaysian International Space Tourism Initiative (July 1999 – 2011)," *supra* note 324, at 5 and note 325.
[355] Norul Ridzuan Zakaria, "Discussion Topic: Role of Government Agencies in Space", email to Space Travel Bureau and forwarded to author, 10 October 2009.
[356] It is claimed that the Malaysian Astronaut Program has given a momentous boost to the space tourism promoted by the STS-MC when it disseminates the idea of having an opportunity to travel into outer space like an astronaut. It was foreseen that there would be no other Malaysian astronauts after the first due to the expensive cost involved. See Norul Ridzuan Zakaria, *et al*., "The Symbiotic Relationship between Astronaut Program and Space Tourism Development – A Third World Perspective", *supra* note 329.
[357] By adopting such a strategy, the Astronaut Program would not be considered an economic burden and would therefore no longer be detested by the third-world countries.
[358] Norul Ridzuan Zakaria, et al., "The Symbiotic Relationship between Astronaut Program and Space Tourism Development – A Third World Perspective", *supra* note 329.

Innovation (MOSTI), Ministry of Transportation and the Ministry of Tourism.[359] The Paper mentions, among other things, the growth of space tourism activities in Malaysia. Such effort was made in order to make the Malaysian Governmental bodies aware of the emergence and potential of space tourism-related activities in Malaysia. Besides that, the STS-MC also conducted discussions with the MOSTI and ANGKASA on their M-R2D2 project. This resulted in the MOSTI showing interest in two areas, namely the suborbital space plane as a microgravity research platform,[360] and the development of local capability and expertise in space-related areas.[361]

Meanwhile, at the international level, the STS-MC is becoming one of the most established space tourism organizations in the developing countries. In addition, it has been verified that the STS-MC is the most active Chapter of the Space Tourism Society. As the STS-MC is actively involved in space tourism activities, the Chapter has received a lot of moral and technical support from their technology partners such as SPL, Projects Enterprise, Space Future & Bristol Spaceplanes, as well as the Space Tourism Society. Apart from that, the Chapter also receives strong moral support from IAASS, the world-famous non-profit organization of space safety. Such circumstances, in fact, have been significant for the growth of the space-related activities of the STS-MC, both nationally and internationally.

In sum, it has been established that IKAM and the STS-MC are the active private sectors in Malaysia involved directly with Malaysian and international space-related activities. Based on the preceding discussion, it is also evident that the Chapter's involvement and participation in the related activities have been recognised worldwide. It is foreseen that the STS-MC will further develop their activities and continue promoting their ideas and projects for the growth of space tourism activities.

[359] The paper entitled "AN ICAO for space?".
[360] The tourism suborbital space vehicle is the most effective platform for microgravity research. See http://www.parabolicarc.com/2009/05/30/overview-nasas-commercial-suborbital-research-program/, accessed: 6 April 2012.
[361] The discussion was held on 15 June 2009. See Norul Ridzuan Zakaria, "FW: Perbincangan M-R2D2 pada 15 Jun 2009", Email to ANGKASA and Ministry Of Science Technology and Innovation (MOSTI) and forwarded to the author, 17 June 2009.

(c) Astro Holdings Sdn. Bhd.

Satellite technology is an element of space technology that provides services to people. Satellites are mainly used as a means of accessing information that leads to decision-making and transmission of information. One of the major types of satellite is communication satellites which are used to transmit information from one point to another. They provide a worldwide linkup of radio, telephones, and television broadcasting. Based on this development, satellite television was introduced. This is a broadcasting service technology that allows subscribers to receive television signals, which have been uploaded to a satellite, through a receiver unit or satellite dish.[362] Currently, there are a number of satellite television providers around the world offering subscription-based services such as Sky Digital marketed by British Sky Broadcasting in the United Kingdom, Bell TV and Shaw Direct in Canada, and Dish Network and DirecTV in the United States of America. In Malaysia, the sole provider of Direct-To-Home (DTH) satellite pay-multi-channel services and the leading commercial radio broadcaster and TV programming in the country is known as Astro Holdings Sdn. Bhd. (previously known as ASTRO All Asia Networks Plc).[363]

Astro Holdings Sdn Bhd operates its Malaysian business through its subsidiary company called Astro Malaysia Holdings Sdn Bhd.[364] As a holding company; it has become an integrated electronic media enterprise that offers wide-ranging multimedia broadcasting services.[365] It initially introduced its satellite pay-television subscription services in 1996 under the brand name 'Astro', the first Malaysian direct broadcast satellite pay-tv service.[366] At present, Astro Holdings, under its subsidiary Astro Malaysia, has a 52 per cent penetration of TV-owning homes in Malaysia or 3.5 million customers, making it a key pay-tv operator

[362] For further reading on satellite communication and satellite television technologies, refer to Maral, Gerard, Michel Bousquet and Zhili, *Satellite Communications Systems: Systems, Techniques and Technologies,* (United Kingdom: John Wiley & Sons Ltd, 2009); Ross, John A., *Howard W. Sams Guide to Satellite TV Technology,* (Indianapolis: Prompt, 1999); Long, Mark E., *The Digital Satellite TV Handbook,* (USA: Newness, 1999).
[363] The name was changed after ASTRO All Asia Networks Plc was de-listed from the main market of Bursa Malaysia Securities Berhad on 14 June 2010, and thus taken over by the Usaha Tegas Group Holdings Bhd. which is now the parent company of Astro Holdings Sdn Bhd. See http://en.wikipedia.org/wiki/Astro_Malaysia_Holdings, accessed: 14 May 2014.
[364] The website for Astro Malaysia Holdings Sdn. Bhd. is available at http://www.astromalaysia.com.my/; See http://www.astromalaysia.com.my/AboutUs.aspx, accessed: 14 May 2014.
[365] Elbert, Bruce R., *The Satellite Communication Applications Handbook*, (Artech House, 2003) at 245; http://www.astromalaysia.com.my/AboutUs.aspx; http://www.astro.com.my/byond/home.aspx; http://en.wikipedia.org/wiki/Astro_Holdings_Sdn_Bhd#Holdings; all accessed: 14 May 2014.
[366] Astro is an acronym for 'All-Asian Satellite Television and Radio Operator'. The service initially started with 22 television and 8 radio channels. See official website of Astro, http://www.astro.com.my; see also http://en.wikipedia.org/wiki/Astro_(Malaysian_satellite_television), all accessed: 14 May 2014.

in Southeast Asia.[367] It is also regarded as Malaysia's top multimedia broadcaster and producer of Malay, Chinese, Indian and English language programming content with access to some 12 million viewers.[368] It also operates nine Malaysian radio stations including the top-ranking stations in four major languages - Malay, Chinese, Indian, and English - through which cumulatively the stations reach over 13 million radio listeners a week.[369]

As a subsidiary of Astro Holdings, Astro Malaysia is pioneering the Direct-to-U (DtU)[370] digital satellite broadcasting services in Malaysia, as well as in the South and East Asian regions. With its commitment to providing subscribers with high-quality broadcasting services, the company has invested in state-of-the-art technology in all its operation areas. As Malaysia is in a heavy rainfall region, Astro Malaysia has employed the digital Ku-band satellite technology, using the high-powered Ku-band payload of the MEASAT (Malaysia East Asia Satellite)[371] system. Using a small satellite dish of 60cm in diameter, the company manages to provide satellite services direct to its users with a 99.7 per cent service availability rate.[372] With this high payload capacity, it also has the ability to decrease the outage incidence.[373] In December 2011, Astro Malaysia, in collaboration with the Government of Malaysia, launched Malaysia's first free satellite TV, called NJOI , as part of its aspiration to make long-life learning, information, and entertainment available to all in Malaysia free of charge.[374]

Cognisant of the fact that the highest quality of broadcasting services requires an excellent broadcast centre, the company has developed its own broadcast centre, known as the All Asia

---

[367] See http://www.astro.com.my/portal/about-astro/index.html, accessed: 14 May 2014.

[368] See "MEASAT-3a Satellite Successfully Launched", 22.06.2009, *MEASAT breaking News*, http://www.measat.com/investor_calendar.html, accessed: 14 May 2014.

[369] See http://www.astro.com.my/portal/about-astro/index.html, accessed: 13 May 2014.

[370] Direct-to-U (DTU) is a brand of direct-to-home (DTH) service which relates to broadcasting that involves high-power Ku-band transmissions utilizing the transponders of the MEASAT satellite system. See http://www.astro.com.my/portal/about-astro, accessed: 25 April 2012; http://www.astro.com.my/portal/about-astro/index.html, accessed: 13 May 2014.

[371] For more information on MEASAT, see Chapter 1 of the thesis (1.3.2 (a): MEASAT Satellite System Sdn Bhd); see also Elbert, Bruce R., *supra* note 365, at 245.

[372] When a subscriber subscribes to Astro, a satellite dish is installed at the subscriber's home or office. The satellite dish will receive the down-linked signals and transmit them to a Digital Multimedia Terminal (DMT) which is connected to a television set. The DMT extracts, decompresses and decodes the audio, video and data signals relayed by the satellite dish. See http://en.wikipedia.org/wiki/Astro_(Malaysian_satellite_television); http://www.astro.com.my/portal/about-astro/index.html, accessed: 13 May 2014.

[373] Outage incidence means signal interference or loss in reception due to rain fade. See *id*.

[374] http://www.astro.com.my/portal/about-astro/index.html; http://www.astro.com.my/njoi/index.html, accessed: 13 May 2014.

Broadcast Centre (ABC).[375] This is the nerve centre of the company's operation in Malaysia and other markets. ABC is one of the world's largest and most advanced all-digital broadcast and production complexes. It is a 24-hour broadcast production centre that supports the company's operations including broadcasting and transmission, production and an on-line subscriber management call centre. The Centre is well equipped with all-digital facilities accommodating the latest broadcasting equipment and systems. The facilities include uplink and downlink systems, programme production studios, multiple audio and video editing suites, and electronic graphic facilities.[376] The Broadcast Control Centre at the ABC works closely with the MEASAT Satellite Control Centre located in Langkawi Island[377] to monitor the broadcast system and to ensure the excellent quality of its broadcasting service.

With regard to its products and services, the company has designed a programme that functions as a 'touch button' entry into the world of entertainment and information with the best selection of local, regional and international programming. It provides the subscribers with access to the 24-hour multi-channel digital television and radio services. Its television services also offer a wide range of programmes including dramas, movies, entertainment shows, global news, documentaries, and educational programmes. Currently it broadcasts over 170 pay-television channels in four major languages - Malay, Chinese, Indian, and English - and also packages 20 digital radio channels over the DTH platform.[378] Apart from that, ASTRO is expanding several interactive multimedia services by aggregating and distributing multimedia content to subscribers through many communication and mobile devices. These available interactive application services include monitoring the Kuala Lumpur Stock Exchange, distance learning, home shopping, home banking, ordering programmes, playing interactive games, and software download capacity. They are also planning more interactive services concentrating on communications, entertainment, information and convenience in the future. It is hoped that these efforts will position Malaysia in the forefront of multimedia technology.[379]

---

[375] The All Asia Broadcast Centre (ABC) is located in the Multimedia Super Corridor (MSC) on a 29 acre site at Technology Park Malaysia, Bukit Jalil, Kuala Lumpur, Malaysia.
[376] See *id*.
[377] Langkawi Island is an island under the state of Kedah, a state adjacent to the Thailand border.
[378] See http://www.astro.com.my/portal/about-astro/index.html; http://www.astromalaysia.com.my/AboutUs.aspx, accessed: 13 May 2014.
[379] See http://www.astro.com.my/aboutastro/products.asp, accessed: 30 October 2009; http://www.astro.com.my/portal/about-astro/index.html, accessed: 13 May 2014. See also Elbert, Bruce R., *supra* note 365, at 245.

Furthermore Astro Holdings, along with its strategy to work with regional partners and in line with its objective to expand its business in the overseas market, has produced and aggregated local content for distribution not only within Malaysia and Indonesia, but also to other regional and international markets such as Singapore, Vietnam, and the Middle East.[380] In fact, it has entered successfully into a shareholders' agreement with the Saudi Telecommunications Company (STC), a leading telecommunications service provider in the Middle East, to aggregate digital content in various formats.[381] Apart from that, its service is also available in Brunei.[382] It has also invested in pay-television and radio broadcasting in India,[383] and launched an airtime marketing venture in China.[384]

In a nutshell, even though the company did not contribute directly to the development of space technology in Malaysia, it is worth discussing since the company is one of the major users of satellite technology in Malaysia and has an essential connection with the MEASAT (Malaysia East Asia Satellite) system. Its contribution to Malaysia as the sole provider of satellite pay-television services, especially in the area of broadcasting and telecommunication technology, cannot be neglected. Its excellent services have indeed contributed to the sustainable development of the country.

1.3.3. Higher Educational Institutions

In this section, the higher educational institutions specifically referred to are universities. The public and private universities in Malaysia are playing important roles in the growth of space activities, particularly with regard to space technological development and research. In fact, such institutions supply the country with manpower and experts in the field. The excellence of the education strategy in a higher educational institution will no doubt produce excellent professionals for the country.

---

[380] See http://en.wikipedia.org/wiki/Astro_(Malaysian_satellite_television)#International_operations_and_joint_venture ; http://en.wikipedia.org/wiki/Astro_Holdings_Sdn_Bhd#Astro_Overseas_Ltd, accessed: 13 May 2014.

[381] See The Astro All Asia Networks Plc. Making Difference Annual Report 2009, at 15, available at http://www.astroplc.com/09/pdf/AnnualReport2009.pdf; http://www.docstoc.com/docs/18274167/Annual-Report-ASTRO, accessed: 13 May 2014.

[382] In Brunei, the service is available under the 'Kristal-Astro' brand which was launched on 24 January 2000. http://en.wikipedia.org/wiki/Astro_(Malaysian_satellite_television)#International_operations_and_joint_venture , accessed: 13 May 2014.

[383] In April 2007, ASTRO All Asia announced a joint venture with the Sun Group in India, one of the country's leading media groups. It also owns 20 per cent of South Asia FM Ltd which has licences to own and operate 23 FM radio stations in India. See The Astro All Asia Networks Plc., Imagine Annual Report 2007.

[384] Refer to The Astro All Asia Networks Plc., Imagine Annual Report 2007, *id*.

In Malaysia, space education is offered mainly by the public universities in various undergraduate and postgraduate programmes.[385] In most cases, at undergraduate level, the course normally takes about 3–4 years. For postgraduates, the Master's programme requires 1-2 years full-time or 2-4 years for part-time study. However, the doctorate programme (Ph.D.) normally takes 3–4 years on a full-time basis and 4-7 years part-time. This section presents a description of space-related education, including both technological and legal aspects, offered by the higher educational institutions in Malaysia.

(a) Technology Education

Space technology education has been considered a necessary subject area in a number of countries. It is offered by various higher educational institutions around the world. Among the universities ranked as top-class aerospace universities, to name but a few, are the Massachusetts Institute of Technology School of Engineering (USA)[386], Stanford University School of Engineering (USA),[387] Cranfield University School of Engineering (United Kingdom),[388] University of Manchester School of Mechanical Aerospace and Civil Engineering (United Kingdom),[389] and Institut Supérieur de I'Aéronautique et de I'Espace (France).[390] Space technology education in Malaysian universities is presented chronologically as follows:

(i) University of Malaya (UM):[391]

In the University of Malaya (UM), the Faculty of Arts and Social Sciences' Department of Geography[392] offers a programme that reflects the multidisciplinary nature of Geography at

[385] In Malaysia, there are 20 public and 634 private higher educational institutions altogether whose programmes have been recognised by the Malaysian Government. See http://jpt.mohe.gov.my/IPT%20MALAYSIA/SENARAI%20IPTA.php; and also http://jpt.mohe.gov.my/eng/menudirektori.php, accessed: 13 May 2014.
[386] For details, refer to http://engineering.mit.edu/; see also http://www.infozee.com/channels/ms/usa/top-rankings.htm, accessed: 13 May 2013.
[387] For more information, see http://engineering.stanford.edu/, accessed: 13 May 2014.
[388] For details, see http://www.cranfield.ac.uk/soe/departments/aerospaceengineering/index.html, accessed: 13 May 2014.
[389] For details, see http://www.mace.manchester.ac.uk/, accessed: 13 May 2014.
[390] For details, see http://www.isae.fr/en/index.html; see also, http://theknowledgeworld.com/world-of-aerospace/Best-Aerospace-University-World.htm, both accessed: 13 May 2014.
[391] UM official website is at http://www.um.edu.my/, accessed: 13 May 2014.

both undergraduate and postgraduate levels. At the undergraduate level, the Department offers a Bachelor of Arts degree, in which the space-related subjects taught include Geographic Information Systems (GIS), Advanced Remote Sensing, Interpretation of Aerial Photographs and Remote Sensing, Application and Implementation of GIS, and Advanced GIS. The Master of Arts course is available by dissertation, and Doctor of Philosophy requires a thesis. The Department focuses on several research areas related to space applications including Geographic Information Systems (GIS), Environmental Management, and Remote Sensing.[393]

(ii) University of Technology Mara (UiTM):[394]

In the University of Technology Mara (UiTM) there are three faculties involved in space technological education. The first faculty is the Faculty of Mechanical Engineering.[395] It offers a programme called Diploma in Mechanical Engineering. This is a 3-year programme in which, in the final year, the students are given an optional module to specialize in areas of interest such as automotive and aerospace engineering.[396] Another faculty dealing with space technological education is the Faculty of Electrical Engineering.[397] At the postgraduate level, the faculty offers a Master of Science in Electrical Engineering, and also a Master of Science in Telecommunications and Information Engineering. Among the space related courses offered are mobile and satellite communication networks, internet protocol networks, and broadband networks. For a Doctor of Philosophy, the research is in electrical engineering.[398] The third faculty is the Faculty of Communication and Media Studies.[399] It offers a programme called Diploma in Communication and Media and also a Bachelor of Mass

---

[392] Department of Geography was established in 1959. Its official website is at http://geografi.um.edu.my/, accessed: 13 May 2014.
[393] See http://geografi.um.edu.my/research-thrusts.php, accessed: 20 June 2012; see also http://geografi.um.edu.my/undergraduate-overview.php, accessed: 13 May 2014.
[394] UiTM official website is at http://www.uitm.edu.my, accessed: 13 May 2014.
[395] The Faculty of Mechanical Engineering (UiTM) was established in 1996. Its website is at http://fkm.uitm.edu.my/v1/, accessed: 13 May 2014.
[396] See http://fkm.uitm.edu.my/v1/programmes/overview, accessed: 14 May 2014.
[397] The Faculty of Electrical Engineering (UiTM) was established in 1968 initially under the name of the Department. It was then upgraded to a Faculty in 1996. Its official website is at http://fke.uitm.edu.my/v1/, accessed: 13 May 2014.
[398] The PhD research areas focussing in communication engineering deal with matters like mobile satellite, antennas, and wireless networks. For more information, see http://fke.uitm.edu.my/v1/programmes/postgraduate/msc-in-telecommunications-and-information-engineering-ee770.html; http://fke.uitm.edu.my/v1/programmes/postgraduate/phd-in-electrical-engineering-ee990.html, accessed: 14 May 2014.
[399] The Faculty of Communication and Media Studies was established in 1972. Its official website is available at http://masscomm.uitm.edu.my/v1/, accessed: 14 May 2014.

Communications with Honours in Broadcasting. The space-related courses offered include introduction to broadcasting and multimedia, comparative broadcast systems, radio broadcasting, and radio and TV presentation. With respect to postgraduate study, two types of Master's programmes are offered: Master of Mass Communications by research and the same programme by coursework.[400] The Doctor of Philosophy is also made available by thesis.

(iii) National University of Malaysia (UKM):[401]

The University's Faculty of Engineering and the Built Environment[402] offers, through its Department of Electrical, Electronic and Systems Engineering,[403] a Bachelor of Engineering in Communication and Computer Engineering. The programme includes courses such as control system analysis, power systems, digital signal processing, and multimedia signals. The Faculty also offers a Master of Engineering for Communications and Computer Engineering by coursework in which space-related courses such as satellite communications, telecommunication networks, multimedia communication, communication systems, and mobile and personal radio communication are taught.[404] The Doctor of Philosophy programme offered by the Faculty is by research especially in areas such as telecommunication engineering, space science and communication, and signal processing.[405]

---

400 The courses offered include new communication technologies, telecommunication media management, and international communication. http://masscomm.uitm.edu.my/v1/programmes/undergraduate/37-diploma/55-mc110-diploma-in-communication-and-media; http://masscomm.uitm.edu.my/v1/programmes/undergraduate/38-degree/120-mc243-bach-of-mass-comm-hons-broadcasting; http://masscomm.uitm.edu.my/v1/programmes/postgraduate/39-master; http://masscomm.uitm.edu.my/v1/programmes/postgraduate/40-phd/58-mc990-phd-in-mass-communication-by-research, accessed: 14 May 2014.

401 UKM official website is at http://www.ukm.my/, accessed: 13 May 2014.

402 The Faculty of Engineering and Built Environment's official website is at http://www.ukm.my/jurutera/index.php/en/, accessed: 13 May 2014.

403 The Department of Electrical, Electronic, and Systems Engineering was formed in 1984. Its official website is at http://www.ukm.my/jkees/index.php/en/, accessed: 13 May 2014.

404 See http://www.ukm.my/jkees/index.php/en/academic-programmes/undergraduate-programmes; http://www.ukm.my/jkees/index.php/en/postgraduate-academic-program/postgraduate-coursework, http://www.ukm.my/jurutera/index.php/ms/postgraduates-4/pgcoursework/mengcom, accessed: 20 June 2012; http://www.ukm.my/jkees/index.php/en/postgraduate-academic-program/postgraduate-coursework, accessed: 13 May 2014.

405 http://www.ukm.my/jkees/index.php/en/postgraduate-academic-program/postgraduate-research, accessed: 13 May 2014.

(iv) University of Technology Malaysia (UTM):[406]

The University of Technology Malaysia (UTM) offers a programme in space applications. Its Faculty of Geoinformation and Real Estate[407] offers Bachelor of Science (Remote Sensing), Bachelor of Engineering (Geomatics), and Bachelor of Science (Geoinformatics).[408] This faculty has conducted space courses such as GIS and remote sensing since the late 1990s. Specifically, the Bachelor of Science (Remote Sensing) offers courses such as introduction to space science, remote sensing technology, satellite systems and data delivery, microwave remote sensing, remote sensing for terrestrial applications, digital image processing, satellite technology and earth stations, GPS surveying, and sensor and satellite design, while the Bachelor of Engineering (Geomatics) offers space-related subjects such as satellite surveys, introduction to remote sensing, satellite navigation, advanced satellite surveys, and field astronomy. For the Bachelor of Science (Geoinformatics), among the space-related subjects taught are remote sensing and environmental studies, as well as GPS surveys.

There are three Master's programmes in which the space-related subjects taught: (1) Master of Science in Remote Sensing; (2) Master of Science in Geomatic Engineering; (3) Master of Science in Geoinformatics. The first Master's programme teaches space-related courses such as principles of remote sensing, digital image processing, microwave remote sensing, satellite orbit and instrumentation, GPS surveying, and application of remote sensing.[409] The second Master's programmes offered courses such as GPS surveying, GPS navigation, and navigation system. However, the last Master's programme offered deals with subjects such as principles of geographical information systems and spatial databases.[410] Apart from these Master's programmes, the Faculty also offers a PhD in these related fields.[411]

[406] UTM official website is at http://www.utm.my/, accessed: 13 May 2014.
[407] Its official website is at http://www.fksg.utm.my/, accessed: 13 May 2014.
[408] See http://www.fksg.utm.my/academic_programs/undergraduates/remotesensing.php; http://www.fksg.utm.my/academic_programs/undergraduates/geomatic.php; http://www.fksg.utm.my/academic_programs/undergraduates/geoinformatics.php, all accessed: 13 May 2014.
[409] See http://www.fksg.utm.my/postgraduate/remote_sensing.php, accessed: 13 May 2014.
[410] See http://www.fksg.utm.my/postgraduate/Geomatic.php; http://www.fksg.utm.my/postgraduate/Geoinformatics.php, all accessed: 13 May 2014.
[411] See http://www.fksg.utm.my/postgraduate/remote_sensing.php; http://www.fksg.utm.my/postgraduate/Geoinformatics.php; http://www.fksg.utm.my/postgraduate/Geomatic.php; all accessed: 13 May 2014.

(v) International Islamic University of Malaysia (IIUM):[412]

Space education has been offered at the International Islamic University Malaysia (IIUM) by the Kulliyyah of Engineering.[413] The Kulliyyah's vision is to be a 'world-class centre of engineering education and research with values and ethics'.[414] The Department of Mechanical Engineering[415] of the Kulliyyah offers undergraduate programmes such as a Bachelor of Engineering with Honours in Aerospace in which the courses include spacecraft dynamics and control, spacecraft systems engineering, launch vehicle technology, aerospace propulsion, aircraft design, aircraft structures, flight mechanics, automatic control propulsion, aerospace engineering laboratory, and control systems.[416]

Another Department of the same Kulliyyah offering space-related subjects is the Department of Electrical and Computer Engineering.[417] It offers an undergraduate programme for a Bachelor of Engineering with Honours in Communications Engineering. This programme was designed for specialisation in areas of telecommunications, satellite and microwave telecommunication systems, optical communication and signal processing. The courses taught, to name but a few, include satellite communication systems, multimedia communications, wireless communications, digital communications, and antennas and wave propagation.[418] With respect to postgraduate study, the Department offers a Master of Science in Communication Engineering, and a Doctor of Philosophy in Engineering. The Master's programme is either by research or by both the coursework and research, whereas the Doctorate programme is offered only by research. The Master's coursework offers subjects

---

[412] IIUM's official website is available at http://www.iium.edu.my/, accessed: 13 May 2014.
[413] The Kulliyyah of Engineering (IIUM) was established in 1994. Its website is at http://www.iium.edu.my/engineering, accessed: 13 May 2014.
[414] The faculty started with three departments and three undergraduate engineering programmes, while it currently has six departments that offer eight undergraduate and various postgraduate programmes. See *id*.
[415] The Department's website is available at http://iium.edu.my/mec/, accessed: 3 May 2012.
[416] Another degree offered is Bachelor of Engineering with Honours in Mechanical-Automotive. See http://www.iium.edu.my/engineering/programmes-courses/undergraduate-programmes/curriculum-structure; http://www.iium.edu.my/sites/default/files/AERO.pdf; http://www.iium.edu.my/sites/default/files/AUTO.pdf, accessed: 13 May 2014.
[417] The Department's website is available at http://www.iium.edu.my/engineering/departments/electrical-computer-engineering/, accessed: 13 May 2014.
[418] See http://eng.iium.edu.my/~kskkk/commu, accessed: 3 May 2012. The current research shows that the degree of Bachelor of Engineering with Honours in Communications Engineering is not mentioned anymore in the Faculty's website. See http://www.iium.edu.my/engineering/programmes-courses/undergraduate-programmes/curriculum-structure, accessed: 14 May 2014.

on satellite communications, microwave communications systems, image processing, and digital communication.[419]

(vi) University of Putra Malaysia (UPM):[420]

The University of Putra Malaysia's (UPM) Faculty of Engineering[421] has offered space education since 1996. The course is conducted by the Department of Aerospace Engineering which was established in the same year.[422] The Department offers a Bachelor of Engineering in Aerospace with an emphasis on aeronautics and astronautics engineering courses with specialization in aircraft and spacecraft vehicles.[423] The programme is designed to concentrate on knowledge and skills in aeronautical, mechanical, electrical and electronics engineering, material and structural engineering, and computer and industrial studies.[424] Upon completion, the students are recommended to complete a 10-week industrial placement offered by the aerospace industries. The aerospace courses offered in this programme include aerospace material and process, satellite technology, space mechanics, control systems, measurement and sensors, aerospace laboratory, management of aerospace and agriculture industry, launcher technology, failure analysis, aerospace software engineering, spacecraft dynamics and control, space environment and mission, aircraft structures, aircraft stability and control, and aircraft design.[425]

With respect to postgraduate study, the Department offers a Doctor of Philosophy (PhD) and Master of Science (M.Sc.). These programmes stress research and courses connected with aircraft and spacecraft engineering. This includes topics such as aircraft design and structure, aerodynamics, aircraft engines, satellites, orbital analysis, control systems and flight technology, space trajectory, spacecraft systems, space stations, and spacecraft attitude

---

[419] See http://www.iium.edu.my/sites/default/files/msc%20automotive.pdf, accessed: 2 April 2014.
[420] UPM's official website is available at http://www.upm.edu.my/, accessed: 13 May 2014.
[421] The faculty website is available at http://www.eng.upm.edu.my/html/en, accessed: 13 May 2014.
[422] The department was initiated to support the development of the national aerospace industry as announced in the Malaysia National Blueprint for the Development of Malaysian Aerospace Industry. See http://www.eng.upm.edu.my/introductionkaa, accessed: 13 May 2014.
[423] Aeronautics engineering involves knowledge and applications related to aerodynamics, aerospace material, structure, propulsion, flight mechanics, aircraft stability and control. Astronautics engineering deals with orbit mechanics, estimation and control of height, telecommunications, aerospace structure, and rocket propulsion. See http://www.eng.upm.edu.my/html/en/undergraduate-aerospace, accessed: 3 May 2012; http://www.eng.upm.edu.my/dokumen/FKJUR1_KAA.pdf, accessed: 13 May 2014.
[424] See *id*.
[425] *Id*.; see also Mohd Ibrahim Seeni, Mazlan Hashim and Samsudin Ahmad, "Space Education in Malaysian Universities", *Joint Malaysia-China Seminar on Space for Sustainable Development, Kuala Lumpur, Malaysia, September 2-4, 2004*, at 2.

control.[426] The Department has also assigned an on-going research work group among the Department staff members that focuses on conducting research in areas such as aerospace materials and structures, space vehicle guidance and control, and aerospace vehicle design.

(vii) University of Science Malaysia (USM):[427]

University of Science Malaysia (USM) is another Malaysian higher educational institution involved in space technology education. It was introduced through its School of Aerospace Engineering.[428] The School acts as the University's centre of aeronautics and astronautics to deliver aerospace knowledge and conduct research and development. It offers a Bachelor of Engineering with Honours in Aerospace Engineering.[429] The students are required to undergo 10 weeks of practical or industrial training in government or private aerospace agencies before graduating, as a continuation of the practical engineering course conducted by the School. The space courses offered include spacecraft subsystem elements, spacecraft subsystem design, spacecraft design, aerospace structural design, aerospace policy and management, and orbital mechanics.[430]

The School also offers a Master of Science and Doctor of Philosophy degree by research in the aeronautic and astronautic fields, as well as in satellite technology. Currently, the School is focusing on areas related to aerospace structures, aerospace control, aerospace composites and propulsion, astronautics, and others.[431]

---

[426] See Aerospace Engineering Postgraduate brochure, Department of Aerospace Engineering, UPM, available at http://www.eng.upm.edu.my/html/en/postgraduate-aerospace, accessed: 5 May 2012; http://www.eng.upm.edu.my/dokumen/90801_Kejuruteraan_Aeroangkasa.pdf, 13 May 2014.

[427] USM's official website is available at http://www.usm.my/, accessed: 13 May 2014.

[428] The School was established in 1999 and is located at one of the University's branch campuses at Seberang Perai Selatan, Pulau Penang, Malaysia. Prior to the School's establishment, it operated under the name of Aerospace Engineering Unit from 13 May 1998 until 28 February 1999. Its official website is at http://aerospace.eng.usm.my/, accessed: 13 May 2014.

[429] This programme emphasizes multidisciplinary engineering concepts such as mechanical, electrical, and electronic engineering, and non-technical subjects such as management, languages, computers etc. See *id*.

[430] Kamarul Arifin bin Ahmad, Programme Chairman for the Aerospace Engineering, "Courses offered for undergraduates", Email to author, 4 November 2009.

[431] See http://aerospace.eng.usm.my/index.php?option=com_content&task=view&id=29&Itemid=59, accessed: 5 May 2012; http://aerospace.eng.usm.my/index.php?option=com_content&task=view&id=23&Itemid=53, accessed: 13 May 2014.

(viii) University of Technical Malaysia (UTeM):[432]

The Faculty of Electronics and Computer Engineering[433] of the University of Technical Malaysia (UTeM) offers a Bachelor of Electronics Engineering with Honours in Wireless Communication. This programme covers areas such as broadcasting equipment and receivers, satellite and radar, and radio communication. The courses offered include telecommunications technology, wireless communication systems, radio navigation systems, and wireless data networks.[434] Another programme offered by the Faculty is a Bachelor of Electronic Engineering with Honours in Telecommunication Electronics. It relates to areas of microwave systems, satellite systems, radar systems, mobile radio systems, and digital and multimedia communication systems.[435] For postgraduate, the Faculty offers a Master of Electronic Engineering by research, Master of Electronic Engineering in Telecommunication Systems by coursework, and a Doctor of Philosophy in Electronic Engineering by research.[436]

(b) Legal Education

Apart from space technological education, space legal education is also a necessity for a country venturing into space technology and its advancement. However, in Malaysia, due to a shortage of legal experts in space legal education, only two public universities are currently able to offer space legal courses.

---

[432] UTeM's official website is at http://www.utem.edu.my/, accessed: 13 May 2014.
[433] The Faculty was established in 2001. Its official website is at http://www.utem.edu.my/fkekk/, accessed: 13 May 2014.
[434] See http://www.utem.edu.my/fkekk/index.php?option=com_content&task=view&id=74&Itemid=83, accessed: 5 May 2012; The latest research shows the degree of Bachelor of Electronics Engineering with Honours in Wireless Communication is not mention anymore in the Faculty's website, however it states a degree of Bachelor of Electronics Engineering with Honour only. Refer http://www.utem.edu.my/fkekk/index.php?option=com_content&task=view&id=100&Itemid=124, accessed: 13 May 2014.
[435] See http://www.utem.edu.my/fkekk/index.php?option=com_content&task=view&id=73&Itemid=82, accessed: 5 May 2012. The latest research however shows the degree of Bachelor of Electronic Engineering with Honours in Telecommunication Electronics is not stated anymore in the Faculty's website. However it mentions a Diploma in Electronics Engineering. Refer http://www.utem.edu.my/fkekk/index.php?option=com_content&task=view&id=100&Itemid=124, accessed: 13 May 2014.
[436] For more information, see http://www.utem.edu.my/fkekk/index.php?option=com_content&task=view&id=128&Itemid=139, accessed: 5 May 2012; http://www.utem.edu.my/fkekk/index.php?option=com_content&task=view&id=126&Itemid=139, accessed: 13 May 2014.

(i) University of Malaya (UM):[437]

The University of Malaya's (UM) Faculty of Law,[438] one of the earliest law faculties in Malaysia, offers a number of undergraduate and postgraduate law programmes. For the undergraduate programme, the Faculty offers Bachelor of Law (LL.B) and Bachelor of Jurisprudence (External).[439] For postgraduate study, it offers Master of Law (LLM), Master of Criminal Justice, and Doctor of Philosophy. The LLM can be attained either by coursework or by a combination of coursework and dissertation.[440] The Doctor of Philosophy is a full research programme that involves writing a thesis over a period of between 2 and 6 years.

At this Faculty, the space law course was offered initially in 1996 and continued until 1998. It was introduced under the course title 'Air and Space Law'.[441] This course was offered only at the postgraduate level as one of the courses approved for obtaining a Master of Law (LLM). As its name suggests, the contents of the subject are mainly divided into two major parts: air law and space law. This was the first Faculty of Law in the country to offer both areas of law to law students. In respect of the course contents, the air law part discusses the concept of delimitation of airspace and outer space, contracts between passengers and airlines, liability of airlines for injury caused to passengers, issues of flight delays, aircraft financing, cabotage, and others. However, in the space law part the discussion touches on, for example, space exploration and the legal implications, the concept of common heritage of mankind, satellite communications and ITU procedure, space tourism, liability issues, space debris and others. At present, even though the course is still listed as one of the Faculty's subjects, it has been

[437] See *supra* note 391.
[438] The Faculty of Law (UM) was established in 1972. Its official website is available at http://law.um.edu.my/, accessed: 13 May 2014.
[439] These programmes entitle the holder to be an advocate and solicitor of the High Court of Malaya after undergoing a 9-month period of pupillage. The duration of the programme is 4 years. *Id*.
[440] This LLM degree consists of three programmes: by full dissertation, or dissertation and coursework, or by coursework only. See http://ips.um.edu.my/?modul=Programmes_Offered&pilihan=Faculties&subpilihan=Master_of_Laws_(LLM), accessed: 20 June 2012; http://law.um.edu.my/?modul=Academic_Programmes&pilihan=MCJ_and_LLM, accessed: 13 May 2014.
[441] Abu Bakar Munir, "Air and Space Law Subject, Faculty of Law (UM)", email to author, 16 December 2009.

observed that it is no longer offered to students.[442] In terms of research supervision, there is only one professor of law at the Faculty whose research interest is in air and space law.[443]

(ii) National University of Malaysia (UKM):[444]

The Faculty of Law[445] of the National University of Malaysia (UKM) designed its academic programmes based on a combination of three laws: civil law, *syariah*,[446] and customary law. The Faculty offers a Bachelor of Law (LLB) with Honours. With respect to postgraduate study, the Faculty offers Master of Law (LLM), Master of Intellectual Property (MIP), Master of Business Law (MBL), and Doctor of Philosophy.[447] Space law, as it was named, is one of the optional subjects offered in the undergraduate programme. Nevertheless, the subject is offered depending on the availability of the teaching staff of the Faculty. It was first offered in the year 2000 as an elective paper. The course contents include introduction to space law and policy, international space law and the United Nations, legal principles of space law, legal status of space objects, legal status of astronauts, space aircraft, space objects, telecommunications, dispute settlement in space law and others.[448]

Based on the foregoing presentation, it is concluded that space technological education is becoming more common and gaining more attention in the public higher educational institutions in Malaysia than space legal education. This remark is made based on the current practices of the Malaysian public universities in that only two public universities offer space legal courses. Moreover, it is noticed that space legal education has been provided with a very limited scope. Therefore, such a situation indeed demonstrates how space legal

---

[442] See *id*, and http://ips.um.edu.my/?modul=Programmes_Offered&pilihan=Faculties&subpilihan=Master_of_Laws_%28LLM%29, accessed: 13 May 2014.

[443] The academic staff member referred to is Professor Abu Bakar Munir. See http://law.um.edu.my/?modul=Staff&pilihan=Academic_Staff, accessed: 13 May 2014.

[444] See *supra* note 401.

[445] The Faculty of Law (UKM) was established in 1984. Its official website is at http://www.ukm.my/fuu/, accessed: 13 May 2014.

[446] *Sharia* is an Arabic word literally meaning 'way' or 'path' or 'way to the water'. It is the law of Islam based on the teachings of the *Quran* and *Sunna* (practices of Prophet Muhammad). As Islam makes no distinction between religion and life, the Islamic law covers not only ritual but all aspects of life. See also http://www.answers.com.topic/sharia, accessed: 13 May 2014.

[447] For Master of Law (LLM), the Faculty offers three types of programme: by thesis only, coursework and thesis, and coursework only. Doctor of philosophy is attained by thesis only. See http://www.ukm.my/fuu/, accessed: 13 May 2014.

[448] See Aishah Bidin, "Space Law Subject, Faculty of Law (UKM)", email to author, 17 December 2009; Professor Dr Aishah Bidin is a Dean of Faculty of Law, UKM. See also http://www.ukm.my/fuu/, accessed: 13 May 2014.

education contrasts with space technological education in that it is viewed as still being in the infancy stage in Malaysia.

1.4. APPLICATIONS AND ACTIVITIES

At present, the space sector is one of the emerging sectors in Malaysia that holds considerable promise for those wishing to venture therein. In fact, the application of space technology in Malaysia dates back to the 1960s. Currently, there are a variety of space-related applications and activities in Malaysia. This part will discuss the space applications and activities in Malaysia. Those applications and activities are as follows: telecommunications and broadcasting, remote sensing, meteorology, navigation, satellite manufacturing and launching, the *Angkasawan* Programme, scientific research, suborbital space planes, and also commercial spaceport projects.

1.4.1. Telecommunications and Broadcasting

Telecommunications and broadcasting are among the most significant space applications in Malaysia. Such applications were among the earliest space applications to gain the attention of the Government of Malaysia over the past 52 years. This was evidenced in 1960 when *Jabatan Penyiaran Malaysia* (Malaysian Broadcasting Department) constructed its first earth satellite station in Kuantan, Pahang.[449] The station functioned as a ground receiving station for the communication satellite *Palapa-B*.[450]

In respect of communication satellites, Malaysia might be deemed an active player in launching such satellites. Over the past 16 years, four communication satellites have been successfully launched into orbit, with the expected launch of a new satellite called MEASAT 3B by the end of 2014.[451] The first communication satellite, namely MEASAT-1, was launched in January 1996. This opened up investment in the communication and multimedia

[449] Kuantan is the state capital of Pahang, one of the states on the east coast of Peninsular Malaysia.
[450] *Palapa-B* is one of the Indonesian PALAPA communication systems, the first regional telecommunication system in ASEAN countries. The system was first introduced in 1976 by Indonesia and was used by its neighbouring countries, including Malaysia, the Philippines, Cambodia, Vietnam, and Australia. For further details, read Kantaatmadja, Mieke Komar, "Development of Broadcasting Laws Related to Satellite Television in the ASEAN Countries", (1997) 39 *IISL Colloquium on the Law of Outer Space* 194.
[451] For more details, read Chapter 1 of the thesis (1.3.2(a) MEASAT Satellite System Sdn Bhd.). Refer also http://www.measat.com/satellite_91e_measat3b.html; and http://www.satlaunch.net/p/launch-schedule-2013.html, all accessed: 13 May 2014.

technologies in Malaysia. The second Malaysian communication satellite, MEASAT-2, was put into orbit ten months later in November 1996. In this regard, whilst MEASAT-1 provides coverage over the Asian Pacific Regions, Malaysia, the Philippines and India, MEASAT-2 has a wider coverage to include Australia, Hawaii, Vietnam, Indo-China, and Taiwan.[452] With such launches the communication and multimedia industries in Malaysia have burgeoned. This led to the formulation of the Malaysian Communications and Multimedia Act 1998.[453] In December 2006, the third Malaysian communication satellite, namely MEASAT-3, was launched to back up those earlier satellites, and its coverage extended to Africa, the Middle East and Eastern Europe. Next, in June 2009, a fourth satellite, namely MEASAT-3a, was launched to increase the capacity of internet, direct-to-home, broadcasting, and telecommunication services for the coverage areas.

Utilizing the MEASAT satellite fleet, space applications in Malaysia are employed in two major services: telecommunications services and broadcasting services. A number of telecommunications services have resulted from the space application of the MEASAT fleet. To name but a few, they include the very small aperture terminal (VSAT) service, remote telephony, and disaster recovery.[454] Such telecommunications services are provided by companies such as Celcom, Telekom Malaysia, DiGi, and Maxis.[455] The service remains the largest satellite-related business activity in Malaysia.[456] As for the broadcasting services, they include direct-to-home (DTH) television, satellite news gathering (SNG), and video playout/uplink.[457] The broadcasting service, which includes direct-to-home service, is offered by ASTRO, Malaysia's leading broadcaster.[458]

---

[452] N.N. Mahmood, "Report on the Development of Space Technology and Applications in Malaysia", http://aprsaf.nasda.go.jp/members/updated/malaysia/macres/main.html, accessed: 28 March 2013.

[453] For more information, read Chapter 1 of the thesis (1.2.3. The Malaysian Communications and Multimedia Act 1998 (Act 588).

[454] VSAT service is a two-way satellite ground station with a small dish antenna (mostly ranging from 75 cm to 1.2 metres). It is commonly used to transmit narrowband data, such as point-of-sale transactions with credit cards, or broadband data for satellite internet access to remote areas; Remote telephony service is a service to provide communication services to remote areas for basic voice and data services, in which the connectivity is provided based on local, national or regional scales; Disaster recovery service is a service which includes equipment co-location, up-linking, satellite transponder and fibre connectivity, and it can be pre-arranged at short notice when necessary. See http://en.wikipedia.org/wiki/Very_small_aperture_terminal; The MEASAT Global Berhad Annual Report 2008 and 2009 are available at http://www.measat.com/investor_bod_annual.html, accessed: 13 May 2014.

[455] Besides MEASAT, the companies also subscribe to other satellite systems such as Palapa, Iridium, InMarsat and Intelsat. See Ahmad Sabirin Arshad, "Satellite Technology Potentials in Malaysia", *International Conference on Information Technology*, Kuala Lumpur, September 8-10, 1999, Vol.1, Paper 4.

[456] *Id*.

[457] Direct-to-home (DTH) television service is a service that allows viewers to receive a wide selection of local and international television programming via a small satellite dish on the roof. The satellite news gathering

Since communication satellites are capable of transmitting information from one point to another without connecting to any ground network, Malaysia utilises her satellite communication services extensively, especially to the remote villages,[459] to ships on the high seas, and to places where the ground infrastructure areas have been damaged by natural disasters such as monsoon floods and landslides. With the communication satellites application, valuable information can be passed on and decision-making can be executed faster and more effectively for the public, especially when it involves tsunami warnings, earthquakes, storm, typhoons, haze and other natural disaster warnings. The Malaysian Meteorological Department (MMD), for instance, has installed a video conferencing system to conduct face-to-face communications among weather forecasters in different places. Through this system, they are able to communicate, discuss, and share their experience, knowledge and understanding effectively.[460] Government-linked companies, such as Telekom Malaysia, have introduced a Fixed-line Alert System (FLAS) or Disaster Alert System (DAS) for the dissemination of disaster alerts which enable the messages to be communicated and disseminated in a timely manner, quickly and effectively.[461] The space applications of Malaysian telecommunication and broadcasting services have undoubtedly contributed to the sustainable development of the country by improving the education, health services and standard of living of the nation.

1.4.2. Remote Sensing

Remote sensing is another important area of space application in Malaysia. Remote sensing satellites are used to monitor the changes in land surfaces, the ocean, and even the atmosphere. These satellites view the same area over a long period of time, thus enabling the observer to detect, observe, and monitor the environmental changes. Such circumstances

---

(SNG) service is a service that allows broadcasters to connect remote news-gathering television crews directly to their television studios without any terrestrial networks. Video play-out/uplink service is a service to provide a complete play-out solution including advertisement insertion, subtitling, dubbing, encryption, up-linking and satellite distribution. See *id*.

[458] For more information, read Chapter 1 of the thesis (1.3.2(c) Astro Holdings Sdn Bhd.).

[459] 58.2 per cent of the geographical area of Malaysia is still covered by forest. See http://en.wikipedia.org/wiki/Geography_of_Malaysia#Forests, accessed: 13 May 2014.

[460] See also Malaysian Meteorological Department, Report for Typhoon Committee, 40th Session, Macao, China, 21-26 November 2007, http://severe.worldweather.org/tcc/creport.htm, accessed: 13 May 2014.

[461] Mohd Najib Tun Abdul Razak, speech delivered during the *Third Asian Ministerial Conference on Disaster Risk Reduction,* Putra World Trade Centre, Kuala Lumpur, 2nd December 2008, http://www.pmo.gov.my/?menu=speech&page=1677&news_id=87&speech_cat=11, accessed: 13 May 2014. See also Malaysian Meteorological Department, Report for Typhoon Committee, *id.*

became feasible since the collection of data occurred in a mode of consistency. Furthermore, the satellites can provide data rapidly in urgent cases as the images can assist the rescue efforts by providing updated landscape and infrastructure views that have been affected by the disaster, such as in the Haiti earthquake.[462] These types of satellites are essential for the Malaysian earth observation programme, such as in marine exploration, water and ocean monitoring and forecasting, seismic activity and tsunami monitoring, meteorology-oceanographic interaction, and sun-earth relationship.[463]

The current active Malaysian Earth observation or remote sensing satellite launched into orbit is the RazakSAT satellite.[464] It is operated and controlled through the Malaysian National Space Agency's Ground Stations in Banting, and also in Shah Alam, Selangor; these consist of a Mission Control Station (MCS) and Image Receiving and Processing Station (IRPS).Those stations will receive and archive images for post-processing and distribution to the users. Their main role is to provide higher imaging opportunities for Malaysia by alleviating the constraint of cloud and lack of timeliness of satellite imagery provided by other Satellite Operating Agencies (SOAs) upon which Malaysia has been dependent. The imaging opportunity increases when the satellite is placed into a Low Earth Near Equatorial Orbit (NEqO).[465]

The Government agency responsible for Malaysian remote sensing activities is the Malaysian Remote Sensing Agency (MRSA)[466]. Its ground station, namely the Remote Sensing

[462] On 12 January 2010, a major 7.0 magnitude earthquake struck the Haitian capital of Port-au-Prince which caused major casualties and damage. Through the International Charter on Space Major Disasters, a free of charge satellite data was acquired from various satellites after the event and the satellite imageries are used to generate emergency maps to provide rescue services. By using this technology, the rescuers can overview the current state of the area and able to identify the major ground changes caused by the disaster. These can further help them to identify possible routes for relief and rescue workers as well as identify areas that are suitable for setting up aid camps. See http://www.spacemart.com/reports/First_Satellite_Map_Of_Haiti_Earthquake_999.html, accessed: 13 May 2014.

[463] Mustafa Din Subari, "MALAYSIA REPORT TO GEOSS AP SYMPOSIUM: Working Together towards a Secure and Prosperous Society", at 2, http://www.restec.or.jp/geoss_ap1/materials/PDF/plenary/11_Malaysia_Subari.pdf, accessed: 13 May 2014.

[464] It was launched on July 2009. More information on RazakSAT is available in Chapter 1 of the thesis (1.3.1(c) Astronautic Technology (M) Sdn Bhd (ATSB) and (1.4.5. Satellite Manufacturing and Launching).

[465] Norhan Mat Yusoff and Norhizam Hamzah, "The Role of RazakSAT in Remote Sensing", *The Geospatial Resource Portal,* http://www.gisdevelopment.net/magazine/malaysia/2006/apr-jun/26_1.htm, accessed: 7 May 2012.

[466] Information on MRSA is available in Chapter 1 of the thesis (1.3.1(d) Malaysian Remote Sensing Agency (MRSA). Its official website is available at, http://www.remotesensing.gov.my/, accessed: 13 May 2014.

Malaysia Ground Receiving Station (MGRS), is located in Temerloh, Pahang.[467] Apart from the Malaysian National Space Agency's Ground Stations, the MGRS is also capable of receiving data from the RazakSAT satellite and other remote sensing satellites such as Spot 2, 4 and 5 (France), Radarsat-1 (Canada), IPS-P4 (India), NOAA, Langsat-7, and Terra/Aqua Satellites (USA).[468] Pursuing the Malaysian National Remote Sensing Programme, the objectives of which are to strengthen national capability, coordinate development activities and operationalize the use of remote sensing and related technology for development, the MRSA focuses on at least seven space application developments. These include agriculture and food production, disaster management, environment, forestry, health, geosciences and mapping.

The first is agriculture and food production. It is observed that the remote sensing technology has been applied significantly in this sector. For example, the rice monitoring and yield prediction system is based on the model of linear correlation between rice yield and radar backscattering coefficient of the remote sensing technology of RADARSAT satellite data.[469] Rice monitoring and yield prediction is vital to determine the total areas of rice plantation, estimate the yield, and verify the environmental impact of rice production. The estimation of advanced rice production is crucial, especially for Malaysia, a country where rice is an essential food staple, as it can provide an early warning of production shortfall. It has been found that the remote sensing technology makes it easier to identify paddy rice than other crops because of the way in which it is planted.[470] In Malaysia, this system, which has been verified as having up to 95 per cent accuracy, was developed by the MRSA with the collaboration of Multimedia University (MMU) and MUDA Agricultural Development

---

[467] Temerloh is one of towns in Pahang, a state that located in the east coast of Peninsular Malaysia. Pahang is the third largest state in Malaysia after Sarawak and Sabah.

[468] See http://www.remotesensing.gov.my/page.cfm?name=groundstation, accessed: 10 March 2014

[469] RADARSAT is Canada's earth observation satellite. RADARSAT-1 was launched in November 1995 and RADARSAT-2 in December 2007. The satellite provides images of the earth for both scientific and commercial applications. Its microwave technology can penetrate heavy clouds, snow, fog, haze, dust, and rain, even during the monsoon season, to record detailed land and water features. It is in exactly the same location and can take the same image every 24 days which is useful for detecting changes at that location. See http://en.wikipedia.org/wiki/Radarsat-2; also http://en.wikipedia.org/wiki/Radarsat-1, all accessed: 14 May 2014.

[470] The paddies are first planted under water, where the SAR (synthetic aperture radar) images appear very dark as the water generates no direct backscatters, or no microwave energy to the satellite's antenna. This image then becomes brighter as the rice grows, getting darker when it matures. For more details, see Twitchell, Karen, "Monitoring Rice Crops from Space", (09.01.1998), *The International Development Research Centre,* http://www.idrc.ca/en/ev-5530-201-1-DO_TOPIC.html, accessed: 28 December 2009; http://idl-bnc.idrc.ca/dspace/handle/10625/22471, accessed: 14 May 2014.

Authority (MADA).[471] Utilising the space technology in this system is a proven time-saving measure as it makes it possible to estimate the rice yield one month before harvest, compared to the conventional Malaysian method of a crop-cutting survey which was normally undertaken 6-12 months after harvest. Apart from that, the system has effectively assisted in reducing the cost and human resources needed for rice yield estimation.[472] In fact, this system is critical for the rice-exporting countries to estimate the production surplus for decision-making on distribution, storage, and price-setting.

In a similar sector, space technology is also utilised in precision farming. This is a farm management system that integrates remote sensing, geographic information system (GIS), global positioning system (GPS), and sensor technologies. The remote sensing technology of precision farming in Malaysia is currently applied to paddy fields and oil palms only. Such technology is applied mainly to increase the crop production. The system stresses the concept of 'the right input, the right amount, the right time, and the right place'.[473] By employing technology such as remote sensing satellite navigation systems, GIS, automatic yield recording system, automatic soil sensor, and an integrated database, the concept of the right input of fertilizers, pesticides, and water, in the right amount, at the right time and place is feasible for boosting Malaysian crop production. Apart from the involvement of Remote Sensing Malaysia, other agencies are engaged such as Malaysian Agricultural Research and Development Institute (MARDI) and Universiti Putra Malaysia (UPM).[474]

The next example is a system to identify fishing zones. This space technology application is vital for Malaysian fishermen, since a large portion of Malaysia is surrounded by water.[475]

---

[471] MMU website is available at, http://www.mmu.edu.my/, and MADA is at http://www.mada.gov.my/, accessed: 14 May 2014.

[472] Malaysian Remote Sensing Agency, Annual Report 2007, at 17; see also http://www.remotesensing.gov.my/articlePrint.cfm?id=389, accessed: 14 May 2014.

[473] http://www.remotesensing.gov.my/article.cfm?id=348, accessed: 7 December 2009.

[474] MARDI is a Malaysian statutory body that has been mandated to conduct research in agriculture, food, and agro-based industries. Its official website is at http://www.mardi.gov.my/; UPM is a Malaysian public university that initially started as an agricultural-based university and is currently expanding in various disciplines such as engineering, medical sciences, pure sciences, economics, education, language and others. Its official website is at http://www.upm.edu.my/, all accessed: 14 May 2014.

[475] Malaysia has a total coastline of 4,675km, the 29th longest coastline in the world. It is surrounded by the South China Sea, the largest body of water around Malaysia (in between Peninsular Malaysia and East Malaysia), the Straits of Malacca (facing the western coast of Peninsular Malaysia towards the south), Andaman Sea (towards the north), Gulf of Thailand (a small area in the north of Peninsular Malaysia), Straits of Johor (south of Peninsular Malaysia, acting as maritime border between Malaysia and Singapore), Sulu Sea (north coast of Sabah, East Malaysia), and Celebes Sea (southeast coast of Sabah, East Malaysia). See http://en.wikipedia.org/wiki/Geography_of_Malaysia, accessed: 14 May 2014.

Furthermore, fishing activity, besides agriculture and forestry, forms the basis of the Malaysian economy. Such technology was developed under a collaborative project between Remote Sensing Malaysia, Department of Fisheries Malaysia (DOF), National Fishermen Association (NEKMAT), Fisheries Development Authority of Malaysia (LKIM) and Malaysian Institute of Microelectronic Systems (MIMOS Berhad).[476] The first targeted area of the project is the east coast of Peninsular Malaysia. The project, which began in 2007, involves a first phase called 'now casting' which was successfully completed in 2009. The fishing location is identified using the extracted remote sensing satellite images from MODIS satellites, OCM and NOAA, based on sea surface temperature and phytoplankton parameters. The warmer temperature of the sea surface detected indicates the possibility of high fish volume in the surrounding areas. The higher chlorophyll concentration indicates a higher amount of algal blooms, the nutrient needed by the fish.[477] When the potential fishing zone map was produced, it was then distributed to the fishermen through their association office either by fax, e-mail, SMS, internet, or satellite phone. Such fishing locations are valid for one to three days. It has been reported that the accuracy of the locations is quite high. When the Fishing Zone Identification System is fully completed, it will be capable of producing a potential fishing zone map that is valid for one to two weeks.[478]

The second space application development is the natural disaster management application. Even though Malaysia is geographically located outside the 'Pacific Rim of Fire' and is relatively free of the severe destruction caused by natural disasters such as earthquakes, typhoons and volcanic eruptions, the country has nevertheless experienced other types of natural disaster that are not catastrophic in nature, such as monsoon or seasonal floods, landslides, forest fires and severe haze.[479] Natural disaster monitoring was introduced in the disaster management programme under the name of 'detection and monitoring' components.[480] It was carried out using data taken from the remote sensing satellites. For

---

[476] The DOF official website is available at www.dof.gov.my/; The NEKMAT, http://nekmat.com/; The LKIM, http://lkim.gov.my/; The MIMOS Berhad, http://www.mimos.my/, all accessed: 14 May 2014.

[477] The sea surface temperature is determined through the conversion of infrared emissions from the ocean detected by the USA Terra (MODIS) satellite. See "Outlook of Fish Forecasting in Malaysia Based on Sea-Surface Temperature (SST) and Chlorophyll Concentration (Period: 22-28 December 2009)", http://www.met.gov.my/pdf/agromet/sst_cc.pdf, accessed: 14 May 2014.

[478] http://www.remotesensing.gov.my/article.cfm?id=783, accessed: 14 May 2012.

[479] Mohd Najib Tun Abdul Razak, *supra* note 461; see also Country Report 2003: Malaysia, "The Malaysian Experience and Future Direction on Disaster Management", http://www.adrc.asia/countryreport/MYS/2003/page2.html, accessed: 13 May 2014.

[480] On 11th May 1997, the Government issued the National Security Council (NSC) Directive No.20 on "Policy and Mechanism on National Disaster and Relief Management" which aims to outline the policy on Disaster and

instance, detection of forest fire or hotspots occurrence is performed using the lower-resolution remote sensing satellites such as NOAA and MODIS, whereas the higher-resolution satellite images from SPOT and IKONOS are used to detect the exact locations where disasters happen.[481] At this juncture, space technology is significantly applied as it is capable of providing real-time data, which is a major key to the effectiveness of the disaster management programme. The data collection then leads to data processing; thus, the information gathered will be disseminated to the various users for various purposes. For instance, the MRSA disseminates the information on hotspots, open burning, and forest fire to the Malaysian National Security Council, Department of Environment, Fire and Rescue Department, Malaysian Meteorological Department and Forestry Department to assist them in their mission-planning for cloud-seeding, open burning and forest fire-monitoring, and fire suppression.

The third is the environmental management application. This involves monitoring environmentally sensitive areas. In this programme, the space technology of remote sensing is applied for the purpose of monitoring and observing any kind of activity that might possibly affect Malaysia's environmentally sensitive areas. These areas include the highlands, reserved forests, wetlands, and water catchments. It was reported that some of Malaysia's reserved forests have already been cleared for rubber plantations and other activities, and up to 80 per cent of the remaining forest is at risk.[482] The clear-cutting process, moreover, will cause soil erosion and increase the risk of fire. In view of the fact that the permanent forest reserves are classified as Environmentally Sensitive Areas Rank Two in the Malaysian National Physical Plan,[483] in which no development or agriculture is allowed, such

---

Relief Management based on the level of complexity of disaster, and to establish a management mechanism to determine the roles and responsibilities of various agencies in handling the disaster. See Country Report 2003, *id*. Che Moin Umar, "Policy and Mechanism on National Disaster and Relief Management", National Security Council, Putra Jaya, at http://spm.um.edu.my/news/disaster_management_23072008/talk02.pdf, accessed: 14 May 2014.

[481] Other components of the Disaster Management Programme are: early warning, and mitigation and relief. The early warning component involves producing a risk map that indicates areas vulnerable to disaster. Mitigation and relief involves the inter-agency activities performed under the coordination of the Malaysian National Security Council. See Malaysian Remote Sensing Agency's website, *id*.; see also Siti Atikah Mohamed Hashim, "National Disaster and Remote Sensing in Malaysia", 2nd JPTM Meeting, Bangkok, Thailand, http://www.aprsaf.org/data/jptm2_pdf/JPTM200606_12.pdf, accessed: 14 May 2014.

[482] Even though conversion of natural forest to plantations is not illegal under Malaysian law such replacement has significant ecological implications, such as reducing the number of plant and animal species; furthermore, the plantations store less carbon than natural forests.

[483] The National Physical Plan is a statement of strategic policies, approved on April 2006, on the physical development and conservation throughout Peninsular Malaysia. It was prepared based on the requirement of the Malaysian Town and Country Planning Act 1976. Among its themes is conservation of wildlife and natural

conversion therefore should not be allowed, for the sake of environmental security.[484] Under the aforesaid programme, the Malaysian Government assigns the MRSA to continuously monitor the development activities around these areas, and reports are submitted to the related authority on a regular basis. Conserving and monitoring these environmentally sensitive areas, especially the highlands, which are vital for the country's water-catchment areas, were also given special attention in the Malaysian East Coast Economic Region (ECER) master plan.[485]

At this point, the water catchments mapping and monitoring also became part of the MRSA's collaborative project with the Department of Irrigation and Drainage (DID).[486] Using high-resolution satellite images, the task was to map new proposed catchment areas and also monitor dam constructions and encroachment areas. The encroachment images and reports would be sent to the relevant authority for further action. Another space technology application is the islands development monitoring. Utilising the remote sensing and GIS technologies, a study was conducted on the status of islands development in Malaysia, and the impact on its environment.[487] Such technologies were used to provide the latest map of the land use and changes in the islands. This information is crucial to monitor the activities performed on the islands as it is important for their sustainable development.

The fourth is the forestry application. Realising the importance of remote sensing technology for forest management, the MRSA collaborated with the Forestry Department of Peninsular Malaysia (FDPM)[488] to develop the 'Logging Activity Monitoring System'. The aim of the system is to monitor and detect any illegal logging activities in selected logged areas such as Malaysian permanent forest reserve. There are a number of declared illegal activities such as

---

resources. See Department of Town and Country Planning, Peninsular Malaysia, http://www.townplan.gov.my/english/service_dev_npp.php, accessed: 25 June 2013.

[484] Tan Cheng Li, "Malaysia's Rainforests Being Insidiously Replaced with Plantations of Clones", *The Malaysian Star,* 7 July 2009, also published in mongabay.com, 20 July 2009, http://news.mongabay.com/2009/0719-rubber_malaysia.html, accessed: 14 May 2014.

[485] ECER covers the Malaysian east coast states such as Kelantan, Terengganu, Pahang, and district of Mersing in Johor. The main objective of the master plan is to accelerate the growth of the ECER in a viable, equitable and sustainable manner, undertaken via projects and programmes to raise income and reduce poverty in order to achieve developed status by the year 2020. See Consulate General of Malaysia Karachi, The Ministry of Foreign Affairs Wisma Putra, "East Coast Economic Region (ECER)-Part ½", http://www.kln.gov.my/perwakilan/karachi/event/1260, accessed: 25 June 2012.

[486] The Malaysian Department of Irrigation and Drainage website is available at http://www.water.gov.my/, accessed: 14 May 2014.

[487] Malaysian Remote Sensing Agency, Annual Report 2007, at 26.

[488] The Forestry Department of Peninsular Malaysia official website is available at www.forestry.gov.my/, accessed: 14 May 2014.

felling outside licensed areas, felling within protected areas, illegal road construction, and felling prohibited trees such as special species of trees that need to be monitored and observed.[489] Using the remote sensing technology, all these activities can be easily detected by the authority by monitoring the forest changes in their areas; thus, further enforcement mechanisms could be carried out effectively by the relevant authority.

The fifth is the environmental health application. In this sector, the space technology was used to identify the environmental factor that caused the dengue outbreak[490] in Malaysia. The MRSA developed a system called 'Dengue Out-Break Risk Area Mapping System' where the observation was performed from the remote sensing data derived from the Landsat TM image. It was discovered that the land surface temperature is highly correlated with the distribution of dengue cases in Malaysia. The finding was that most dengue cases occurred in the high land surface temperature areas, compared to the low land surface temperature areas. Such a discovery is useful to the Malaysian Ministry of Health to identify and control the dispersion of dengue outbreaks in the country. Under the same application, the MRSA worked in partnership with the University Science of Malaysia (USM) for the mapping of risk areas for children with malnutrition. Again the remote sensing data were used to obtain information needed to develop a GIS model for the risk mapping. The finding will be helpful to the Malaysian Ministry of Health to implement the food supplementary programme efficiently.[491]

The sixth is the geosciences application. Utilization of the remote sensing application in this area, which involves the collaboration of MRSA and Minerals and Geosciences Department, relates to the study of land subsidence due to non-sustainable groundwater extraction in selected areas. Such technology was applied to identify peat lands and map the land use changes. The peat lands are recognised, using the Landsat TM satellite image, by their smooth texture, homogeny and reduced structure compared to other surrounding lands. The project finding could be used by policy-makers to create better groundwater extraction plans. Apart from that, the application of the technology is essential to detect potential mineral areas in Malaysia by developing a potential mineral area detection system.

[489] Malaysian Remote Sensing Agency, Annual Report 2007, at 29.

[490] Dengue, also known as dengue fever, is an acute mosquito-born viral illness of sudden onset that usually produces headache, fever, prostration, severe joint and muscle pain, swollen glands and rash. It is transmitted to humans by aedes mosquito. It occurs widely in tropical countries. "Definition of Dengue", *MedicineNet.com*, http://www.medterms.com/script/main/art.asp?articlekey=6625, accessed: 14 May 2014.

[491] Malaysian Remote Sensing Agency, Annual Report 2007, at 28.

The seventh is the basic mapping application. Satellite Image Map (SIM), is another remote sensing application project that was developed by MRSA in a joint venture with Department of Surveying and Mapping Malaysia (JUPEM).[492] SIM consists of ortho-rectified satellite remote sensing images overlaid with topographic data, transportation and hydrological network, and administrative details. The project aims to furnish updated topographical features and complement the topographic maps produced by JUPEM, which consist of spatial information on roads, rivers, contours, and boundaries. Using the Landsat TM satellite data as a base layer, 177 map sheets on the scale of 1:50 000 were completed for the whole of Peninsular Malaysia; they will be updated using the higher-resolution SPOT data. These maps are stored in the SIM database and are available through the MRSA Data Service Section.[493]

Apart from the aforementioned space applications, the Integrated Geospatial Database and Planning System (IGDP system), formerly known as National Resources and Environmental Management (NAREM) System,[494] also utilised the remote sensing technology to produce data and geospatial information, geographic information system (GIS) analytical capabilities and global positioning system. The system was built to overcome the constraint of the absence of an integrated geospatial database experienced by agencies in planning and monitoring projects such as agricultural production management, natural resources, environment, disaster, security and land development in Malaysia. Using the remote sensing technology, the system provides an integrated database with standardized data concerning the format, scale and level of mapping accuracies; this was previously unavailable and only obtainable in different environments of various agencies.[495] Such application packages were developed for the agriculture sector, forestry, geology, marine environment, environmental management, hydrology, coastal areas, topography, and socio-economic areas.[496]

---

[492] JUPEM is a Malaysian Government agency that provides survey and mapping services as well as managing geospatial data. Its official website is at http://www.jupem.gov.my/, accessed: 14 May 2014.
[493] See Malaysian Remote Sensing Agency, Annual Report 2007, at 35. See also http://www.remotesensing.gov.my/articlePrint.cfm?id=454, accessed: 25 June 2012.
[494] Its objective is to establish and operate a system of integrated spatial database on national resources and the environment to support national development planning.
[495] The system comprises three major components: NaSAT, where an integrated database is developed using remote sensing as the main source of data input; NaMOS, where application packages employing a model-based technique are developed; NaDES, where a decision support system is developed by incorporating data and application query capabilities.
[496] http://www.remotesensing.gov.my/articlePrint.cfm?id=391, accessed: 7 December 2009.

1.4.3. Meteorology

Meteorology is another sphere that involves space technology application in Malaysia. It normally deals with the scientific study of the atmosphere and focuses on weather processes and forecasting. In Malaysia, the Malaysian Meteorological Department (MMD) was given the task of providing effective meteorological and seismological services.[497] A number of activities performed in Malaysia involve direct and indirect applications of meteorological satellite technology. They include weather observing and monitoring, forecasting, warnings, aviation meteorology, marine meteorological forecasting, and seasonal and long-range weather outlook.[498]

In weather observing and monitoring, the meteorological observation was executed via images from satellites such as MTSAT (Japan), FY-2E (China), NOAA (USA) and TERRA/AQUA (USA), as well as images from the radar. The high-resolution data from those satellites were received and processed by the meteorological ground station equipped with sophisticated multifunctional instruments. In this observation and monitoring process, the observers monitor, among others, the daily rainfall, the minimum and maximum temperature, the horizontal visibility, and the humidity of the major towns in Malaysia. Apart from that, the meteorological satellites are also used to collect other environmental information such as fires, effects of pollution, auroras, sand and dust storms, snow cover, ice mapping, boundaries of ocean currents, energy flows, city lights, and many others.[499]

In weather forecasting, the meteorological satellites are treated as the major source for daily weather forecasts. The data from those satellites are collected and used by trained observers to forecast the weather. Data on the current state of the atmosphere coupled with scientific understanding of atmospheric processes will produce predictions of the future atmosphere. In fact, the advantage of using these satellites is that they are more global and consistent in coverage. By utilising the visible light satellite images from MTSAT and FY-2E, the forecasters are able to see the development of clouds, particularly in South East Asian Countries and Asia. Moreover, the infra-red images are useful for providing information on the surface temperature and cloud tops. Individual clouds can also be traced by the forecaster

---

[497] Discussion on the MMD is available in Chapter 1 of the thesis (1.3.1(e) Malaysian Meteorological Department (MMD).

[498] See N.N. Mahmood, *supra* note 452, at 2.

[499] See http://en.wikipedia.org/wiki/Weather_satellite, accessed: 14 May 2014.

from time to time to access information on wind direction and cloud steering level.[500] The MMD provides an online general weather forecast service as well as forecasts for the major towns and tourist destinations in Malaysia.

One of the outcomes of weather forecasts is weather warnings. This service is crucial as it enables the protection of people and property. In Malaysia, the weather warning system is capable of providing early warnings to the public. These warnings include, for instance, notice of tropical cyclones, severe storms, strong winds, rough seas, heavy rain, and extreme temperatures. The system is also vital for the agriculture sector which is among the major income sources for Malaysia. The warning information and other guidance and advice from the authorities are updated daily in the MMD official portal. There are three stages in the severe weather warning system in Malaysia. They are categorised as yellow, orange, and red stages.[501] The rough seas warning involve three stages: the first category warning, second, and third.[502] Such weather warnings have proved to be very useful for the public to make appropriate preparations to deal with such situations.

Weather modification is another activity performed in Malaysia. It is worth mentioning as it is another outcome of space application of weather forecasts. In Malaysia, a cloud-seeding operation is a popular type of weather modification. It is conducted throughout the haze seasons. The haze seasons occasionally occur between July and October, Malaysia's dry season. Cloud-seeding is conducted in order to increase water levels in Malaysian dams. It is also an essential step to reduce the number of public health problems caused by haze. Apart from this, by utilising the space weather forecast technology, reports on seasonal and long-range weather outlooks are prepared. The latest updated seasonal predictions, long-range

[500] The current satellite images from MTSAT, FY-2E, NOAA and TERRA/AQUA are provided at http://www.met.gov.my/index.php?option=com_weatherimages&Itemid=866, accessed: 14 May 2014.

[501] The yellow warning refers to the possibility of monsoon rain occurring in the next 24 to 48 hours. The orange warning alerts that moderate monsoon rain is currently happening or will happen with an expected impact of flooding over low-lying areas and river banks. The red stage is the dangerous stage, when the heavy monsoon rain occurs with strong winds, and it warns that the water current is dangerous for children playing on the river banks. For details, see http://www.met.gov.my/index.php?option=com_content&task=view&id=739&Itemid=1129, accessed: 14 May 2014.

[502] The first warning category refers to strong winds detected at speeds of 40-50 km/h and wave height up to 3.5 metres. This warns that it is dangerous for small craft and recreational sea activities. The second category refers to the stage where there are winds with speeds of 50-60 km/h and the wave height is up to 4.5 metres. This is dangerous for all shipping activities and ferry services. The third category indicates winds with speeds of more than 60 km/h with waves higher than 5.5 metres. This warns that it is dangerous for all shipping activities, including workers on oil platforms. See *id*.

weather outlook for Malaysian states, the current el-Nino condition, and the sea surface temperature are also issued.[503]

Another application of meteorological satellite technology is marine meteorological forecasting. This is designed purposely for Malaysian fishermen. The forecast provides seven-day weather, wind, and wave forecasting, including tidal forecasts, for Malaysian territorial waters. Such forecasts are of tremendous help to fishermen in making decisions about their fishing activities. This is crucial as it involves the safety of life and property. In fact, Malaysian fishermen are highly dependent on this technology, especially during the monsoon season which occurs between November and January.

Aviation meteorology is another main field that utilises space meteorological technology. Such technology is useful since it involves aviation safety, especially during landing and take-off. The Kuala Lumpur International Airport (KLIA) weather forecast kiosk was designed to provide global and local forecast services via satellite images and radar. In this sector, the aviation briefing terminal, which consists of the KLIA pilot briefing package, was also introduced.[504]

Since the meteorological services play a vital role in contributing towards the improvement in the quality of public life, Malaysia chose to become a member of the World Meteorological Organization (WMO) in May 1958. It was noted that meteorological observation in Malaysia had inadvertently shifted towards a dependency on data derived from space-based platforms, as experienced by the Global Observation System of the World Weather Watch Programme, WMO.[505] It was alleged that shifting to such a strategy is a solution to the difficulties faced by conventional ground-based observation. Furthermore, it was motivated by the rapid changes in the related technology itself.[506]

---

[503] See http://www.met.gov.my/index.php?option=com_content&task=view&id=1590&Itemid=123, accessed: 26 June 2013.
[504] See http://www.met.gov.my/index.php?option=com_content&task=view&id=1381&Itemid=1147, accessed: 26 June 2013.
[505] World Weather Watch is a unique system linking institutions around the world, and collects, processes and transmits information on the weather. See United Nations Office at Vienna for Outer Space Affairs, *Space Solutions for the World's Problems: How the United Nations Family is Using Space Technology For Sustainable Development*, (Vienna: United Nations).
[506] *Id*.

1.4.4. Navigation

Navigation is another area of space utilisation that has successfully reached an operational level. The space technology of navigation is capable of accurately determining the location of people, vehicles, ships, planes, goods, and animals. In Malaysia, this is a new-ventured area compared to other areas mentioned earlier. The Global Navigation Satellite System (GNSS),[507] originally developed for military purposes, has become a global utility with increasing benefits and is used in various applications. With extremely high accuracy, global coverage, and all-weather operation, the system is becoming well-known in areas including aviation, maritime, land transportation, mapping and surveying, precision agriculture, power and telecommunications networks, disaster warning and emergency response.[508] There are four main GNSS: the United States' Global Positioning System (GPS), the Russian Global Navigation Satellite System (GLONASS), the European Galileo positioning system (Galileo), and the Chinese global BeiDou Compass navigation system (Compass). At present, the United States' GPS and Russian GLONASS are fully operational. However, the European Galileo and the China Compass are still under development and construction.[509] The United States' GPS has been in operation since 1978 and has been available globally since 1994. It is currently the world's most utilised satellite navigation system.[510] Meanwhile, the Russian GLONASS was recovered and restored in 2011.[511] As for the European Union's Galileo, it is the first satellite positioning and navigation system built for civil purposes. It is expected to become operational in 2014 but is unlikely to be in full service until at least 2020.[512] The Republic of China's global Compass navigation system is scheduled to be offering service

[507] The Global Navigation Satellite Systems (GNSS) is a standard generic term for satellite navigation systems which provide geo-spatial positioning with global coverage. They allow small electronic receivers to determine the location in terms of longitude, latitude, and altitude using time signals transmitted along a line-of-sight by radio from satellites. Refer http://en.wikipedia.org/wiki/Satellite_navigation, accessed: 14 May 2014.
[508] United Nations Office for Outer Space Affairs, *supra* note 505, at 1.
[509] See http://en.wikipedia.org/wiki/Satellite_navigation, accessed: 14 May 2014.
[510] See http://en.wikipedia.org/wiki/Satellite_navigation, accessed: 14 May 2014.
[511] GLONASS was, in fact, a fully functional navigation constellation from 1995, but it fell into disrepair with the collapse of the Russian economy. Beginning in 2001, the Russian Federation was committed to restoring the system to full global availability, introducing the Indian Government as a partner. Discussion on GPS and GLONASS is available in Liebig, Volker and Kai-Uwe Schrogl, *Space Applications and Policies for the New Century,* (Frankfurt: Peter Lang GmbH, Europäischer Verlag der Wissenschaften, 2000), at 95-100; see also http://en.wikipedia.org/wiki/GLONASS, accessed: 14 May 2014.
[512] For more details, refer to Wilson, Andrew, ed., *Galileo The European Programme for Global Navigation Services,* (Noordwijk: European Space Agency, 2005); see also http://en.wikipedia.org/wiki/Satellite_navigation#GPS, accessed: 14 May 2014.

globally by 2020. However, the service for the Asia Pacific region is expected to be available by the end of 2012.[513]

In general, the GNSS has been applied in Malaysia in three main sectors, namely the marine, aviation, and land navigation sectors. In the marine sector, the technology is crucial for safety reasons, particularly to determine the exact location and position of a vessel in order to avoid a collision. Dealing with the marine navigation sector, Marine Department Malaysia[514] provides a Differential Global Positioning System (DGPS) service called SISPELSAT (*Sistem Pelayaran Satelit*) [515] to all vessels navigating in Malaysian waters. It is a primary navigational aid for vessels navigating along the shore of Peninsular Malaysia. It has been operated and managed by the Marine Department Malaysia since April 2003. By utilising the DGPS technology, it increases the accuracy of positions derived from the GPS receivers to better than 5 metres at a 95 per cent reliability level.[516] This system has proved to be very useful to vessels navigate within the busiest Malaysian waters such as the Straits of Malacca as it is able to detect the location and movement of other vessels around them. Moreover, it manages to provide other information such as the names, sizes, lengths and type of the vessels and also receives warning alarms whenever a dangerous situation, such as a tsunami, is detected.[517]

The space technology of the GNSS is also vital in the aviation sector in that it can be used in various phases of flight including the en-route navigation, airport approach, landing, and

---

[513] Regional Beidou navigation system is a regional navigation system of the Republic of China. It covers the Republic of China and neighbouring regions. Other regional navigation systems include: DORIS (France), IRNSS (India), QZSS (Japan). See http://www.bbc.co.uk/worldservice/business/2010/01/100107_galileo_satellite_biz.shtml, accessed: 29 June 2012; http://en.wikipedia.org/wiki/Beidou_Navigation_Satellite_System, accessed: 14 May 2014.

[514] Marine Department Malaysia official website is available at http://www.marine.gov.my/, accessed: 14 May 2014.

[515] The SISPELSAT system consists of two beacon stations, the Lumut Reference Station (Lumut Integrity Monitoring Station/LRSIM) and the Kuantan Reference Station (Kuantan Integrity Monitoring Station/KRSIM). Those stations transmit the GPS differential corrections to the targeted area service, within a 250km radius of the Malacca Straits on the west coast and the South China Sea on the east coast. See Mustafa Din Subari and M. Saupi Che Awang, "GNSS Radio beacon Service Availability Study: The SISPELSAT", 3rd FIG Regional Conference, Jakarta, Indonesia, October 3-7, 2004, http://www.fig.net/pub/jakarta/papers/ts_15/ts_15_3_subari_chewang.pdf, accessed: 14 May 2014.

[516] See *id*.

[517] Azmi Hassan, "Faedah Pasang GPS di Batuan Tengah", *Utusan Online,* 19 June 2008, http://utusan.com.my/utusan/info.asp?y=2008&dt=0619&pub=Utusan_Malaysia&sec=Rencana&pg=re_05.htm, accessed: 2 October 2012; Mustafa Din Subari, M. Saupi Che Awang, *id*.; Mustafa Din Subari, "Update on Malaysian GNSS Infrastructure", *Third Meeting of the International Committee on Global Navigation Satellite System (ICG), Pasadena, California, United States of America, December 8-12, 2008,* http://www.oosa.unvienna.org/pdf/icg/2008/icg3/13.pdf, accessed: 14 May 2014.

ground guidance. The Malaysia Department of Civil Aviation is fully committed to complying with the timeline set by the International Civil Aviation Organization (ICAO) for the implementation of the GNSS application or Performance Based Navigation (PBN) Programme to enhance the capacity and efficiency of Malaysian airspace.[518] To this end, Malaysia has implemented Area Navigation (RNAV)[519] over the Bay of Bengal and South China Sea for the en-route segment. The RNAV Standard Instruments Departure (SIDs) and Standard Terminal Arrival Routes (STARs) together with GNSS RNAV Non-Precision Approach (NPA) will be completed soon at the Kuala Lumpur International Airport (KLIA). Apart from that, the Malaysia Department of Civil Aviation also plans to install additional infrastructure for the Ground-Based Augmentation System (GBAS)[520] at other major Malaysian international airports.[521]

In the land navigation sector, the GNSS technology is becoming popular among vehicle users in Malaysia. This is because satellite navigation is treated as a means of safely guiding a vehicle to its destination as well for tracking purposes. The benefit of using GNSS technology for taxi services, for instance, has been proved, especially in fast dispatching, as the GPS system helps to pinpoint the location of the taxi and the customer. The application of such technology will also cut the fuel consumption and decrease air pollution since it limits the taxi to the shortest route. Furthermore, it also involves safety features as the taxi can be tracked easily should it experience any problems or emergencies.[522] Regarding the consumer

---

[518] ICAO is the United Nations main agency that codifies the international air navigation principles and techniques, as well as fostering the planning and development of international air transport to ensure safety and orderly growth. Its programme, called the Performance Based Navigation (PBN) Programme, involves a concept representing a shift from sensor-based to performance-based navigation. Its website is available at http://www.icao.int; see also http://www2.icao.int/en/pbn/Pages/Introduction.aspx, accessed: 29 June 2012; and http://en.wikipedia.org/wiki/International_Civil_Aviation_Organization, accessed: 14 May 2014.

[519] RNAV is a method of navigation that permits an aircraft to choose any course within the coverage of station-referenced navigation signals or within the limits of self-contained system capability. This can conserve flight distance, reduce congestion and flight delay, decrease fuel consumption, and allow flights into airports without beacons. See http://en.wikipedia.org/wiki/Area_navigation, accessed: 14 May 2014.

[520] Ground-Based Augmentation System (GBAS) is a safety-critical system that augments the GPS standard positioning service and provides enhance level of service which supports all flight phases of approach landing, departure, and surface operation within its area of coverage. See http://www.eurocontrol.fr/Newsletter/2002/November/GBAS/GBASv0.32.htm, accessed: 14 May 2014.

[521] "Final Report of the Global Navigation Satellite System (GNSS) Implementation Team (GIT)", *The 13th Meeting of the Asia-Pacific Economic Cooperation (APEC), 27-19 July 2009, Singapore,* http://www.apec-tptwg.org.cn/new/Archives/tpt-wg32/Intermodal/GIT%20Final%20Report.pdf, accessed: 14 May 2014.

[522] Arellano, Vanessa, "Why GPS Navigators are Necessary for Todays Taxis", http://www.streetdirectory.com/travel_guide/52315/car_parts/why_gps_navigators_are_necessary_for_todays_taxis.html, accessed: 14 May 2014.

product application of GPS navigation devices,[523] a variety of devices offer GPS services is available in the market. Among the famous navigational devices on sale in Malaysia is the Garmin product.[524] Indeed, GPS navigation products have various purposes and designs, such as automotive, handheld, motorcycle, and cycling. The most widely used device in Malaysia is the automotive navigation system. This involves a satellite navigation system designed for automobiles. In such circumstances, the system uses a GPS navigational device to acquire positional data to locate the user on a road in a unit's map database. By using the road database, the unit can give directions to the other locations.[525] Such a system is, however, exposed to controversy especially in cases of misdirection, and it was reported that a number of accidents have occurred due to misdirection by the system. For instance, a man was reported to have driven down a steep mountain path after allegedly being misdirected by his GPS portable system.[526]

The space technology of GNSS also has potential for increasing the quality of agricultural production. It was confirmed by the Malaysian Agricultural Research and Development Institute (MARDI) that such technology was applied in Malaysian rice precision farming.[527] The GNNS technology is utilised to provide geographic references for yield data. An accurate topographic map can be produced since it is useful for interpreting yield and weed maps as well as for planning grassed waterways and field divisions. Field boundaries, roads, yards, tree stands and others can all be accurately mapped to aid the farm planning.[528] With satellite navigation technology, it is possible to apply fertilizers and pesticides according to the fertility of a particular part of the field.[529] Therefore, the plan stresses that the correct input of fertilizers, pesticides, and water, in the right amounts, at the right time and place can be carried out efficiently.

---

[523] GPS navigation device means a device that receives GPS signals for the purpose of determining the current location.

[524] Garmin products are produced by Garmin (Asia) Corporation, a subsidiary of Garmin Ltd. This is a company that develops consumer, aviation and maritime technologies for the GPS. Its website is at http://www.garmin.com/; see also http://en.wikipedia.org/wiki/Garmin, all accessed: 14 May 2014.

[525] See http://en.wikipedia.org/wiki/Automotive_navigation_system, accessed: 14 May 2014.

[526] See http://www.asylum.com/2009/03/26/gps-leads-driver-to-cliffs-edge/, accessed: 14 May 2014.

[527] For more information, read Chapter 1 of the thesis (1.4.2. Remote Sensing).

[528] Goddard, Tom, "What is Precision Farming?", *Proceedings of Precision Farming Conference, January 20-12, 1997, Taber, Alberta, Canada,* http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/sag1951, accessed: 14 May 2014.

[529] Liebig, Volker and Kai-Uwe Schrogl, *supra* note, 511, at 92.

Besides the Marine Department Malaysia and Malaysia Department of Civil Aviation, the Department Survey and Mapping Malaysia (JUPEM)[530] is another governmental agency that is directly involved with the GNSS technology. Since mapping and surveying are increasingly dependent on GPS coordinates, Malaysia has consequently applied such technology in these areas since 1989. In order to ensure full coverage of GNSS services throughout the country, JUPEM made an effort to develop a domestic GNSS infrastructure called Malaysia Real-Time Kinematic Network System (MyRTKnet). This is Malaysia's first and only nationwide GPS network developed for GPS users to provide DGPS services with accuracy and coverage for surveying and positioning applications throughout the country.[531] Its whole network consists of 50 reference stations in Peninsular Malaysia and 28 stations in Sabah and Sarawak. The network is available to users for static and real-time operations in Malaysia.

1.4.5. Satellite Manufacturing and Launching

Satellite manufacturing in a way leads to various space applications in Malaysia. It is among the Malaysian space-related activities that are predicted to earn profits for the country when they become profit-making businesses. Thus, at this juncture, it is worth briefly discussing this point in its own right. In general, the development of the space technological programme in Malaysia, particularly, in Research and Development (R&D) which stressed the indigenous design and development of systems and satellite subsystems, has intensified since the 1990s.[532] The technology of satellite manufacturing was acquired through a Malaysian wholly governmental-owned company called Astronautic Technology (M) Sdn Bhd (ATSB).[533] Such technology was indeed gained through the first ATSB first project, namely the TiungSAT-1 technology transfer programme.

Specifically, this technology transfer programme started in 1997, when the ATSB began a technical collaboration with Surrey Satellite Technology Ltd (SSTL)[534], a British satellite provider; this venture allowed the ATSB engineers to jointly develop a satellite with the

[530] JUPEM official website is at http://www.jupem.gov.my/, accessed: 14 May 2014.
[531] For more information on MyRTKnet see http://www.jupem.gov.my/index.php?action=geodetik_data_rinex, accessed: 29 June 2012.
[532] Ahmad Sabirin Arshad, "Satellite Technology Potentials in Malaysia", *supra* note 455.
[533] More discussion on ATSB is available in Chapter 1 of the thesis (1.3.1 (c): Astronautic Technology (M) Sdn Bhd).
[534] Read also *supra* note 232.

British engineers. In this programme, the technology partners shared advanced technology and expertise mainly in the construction, testing, launch, and orbital operations of the micro-satellite and its operation. The ATSB sent a team of seven Malaysian engineers to the SSTL from June 1997 until March 1998 to acquire knowledge and skill in the related technology. During the training, the engineers were exposed to direct first-hand practical experience and skills, and worked on an actual satellite fabrication project. They were also directly involved in the whole satellite life-cycle process including mission analysis, subsystem and payload design review, satellite manufacture, assembly, integration and testing, environmental testing, launch campaign and launch, and in-orbit commissioning and operation.[535]

The second major project of ATSB in satellite manufacturing was the development of RazakSAT, the second Malaysian remote sensing satellite.[536] In the RazakSAT satellite development programme, the ATSB worked on a bilateral collaborative development with a South Korean company, Satrec Initiative Co. Ltd. In this collaboration, the ATSB worked on upgrading the resolution of the satellite from the 78m spatial resolution of TiungSAT-1 to a higher resolution of 2.5m of RazakSAT.[537] The development of the satellite started in 2000 and was completed in 2004[538] and it was indeed designed and built by Malaysian local engineers with the joint cooperation of Satrec Initiative Co. Ltd, while its satellite bus was jointly developed by both.[539]

Besides the aforementioned programmes, there have also been a number of other small satellite projects jointly conducted with the Malaysian local universities. These programmes include CubeSAT, InnoSAT, and CanSAT. The CubeSAT and InnoSAT are small satellites that were built for educational and research purposes. They also function to stabilise

---

[535] Ahmad Sabirin Arshad, "TiungSAT-1 Technology Transfer Programme", *TiungSAT-1, From Inception to Inauguration,* Eds., Mazlan Othman and Ahmad Sabirin Arshad, (Kuala Lumpur: Astronautic Technology (M) Sdn Bhd, 2001), at 8.

[536] More information on RazakSAT is available in Chapter 1 of the thesis (1.3.1(c): Astronautic Technology (M) Sdn Bhd).

[537] See Norhan Mat Yusoff, "RazakSAT-Technology Advent in High Resolution Imaging System for Small Satellite", http://www.a-a-r-s.org/acrs/proceeding/ACRS2005/Papers/ANS-5.pdf, accessed: 5 July 2012; http://www.researchgate.net/publication/228978232_RazakSATTechnology_Advent_in_High_Resolution_Imaging_System_for_Small_Satellite, accessed: 14 May 2014; read also Chapter 1 of the thesis (1.3.1(c): Astronautic Technology (M) Sdn Bhd).

[538] Amree Ahmad, Norhayati Yahya, "RazakSAT Sensitif Suhu", *Kosmo Online*, 19 April 2009, http://www.kosmo.com.my/kosmo/content.asp?y=2009&dt=0419&pub=Kosmo&sec=Rencana_Utama&pg=ru_05.htm, accessed: 14 May 2014.

[539] Satellite bus is a general model on which multiple-production satellite spacecraft are often based. The RazakSAT satellite bus was marketed as 'SI-200'. See http://www.satreci.com/eng/products/products_01.htm, accessed: 21 January 2010; http://en.wikipedia.org/wiki/Satellite_bus, accessed: 14 May 2014.

RazakSAT's position in orbit. The CubeSAT was developed by the ATSB, while the InnoSAT was built by three Malaysian public local universities, namely Universiti Sains Malaysia (USM), Universiti Teknologi Malaysia (UTM) and Universiti Malaysia Perlis (UniMAP). The project was carried out with a research grant funded by the MOSTI.[540] The CanSAT, it is a nano-scale satellite model. It provides excellent training opportunities for those who wish to pursue careers in satellite design, fabrication, and operation. In regard to this project, the Malaysian National Space Agency (ANGKASA),[541] among others, organized the CanSAT competition in order to encourage the Malaysian higher education institutions to actively participate in space activities and to expose the students to the satellite development process.[542]

In respect of satellite launch activities, it is observed that Malaysia performs such activities through other countries' facilities. At present, Malaysia does not have her own launch facility to launch her satellites from her territory into orbit. Thus, Malaysia takes the initiative to launch her satellites through other countries' launch sites and facilities. For instance, TiungSAT-1 was successfully launched from Kazakhstan. It was launched into orbit on 26 September 2000 from Tyuratam, Baikonur Cosmodrome Launching Centre.[543] The launch vehicle used to carry TiungSAT-1 was a Russian-Ukrainian launch vehicle called the Dnepr rocket.[544] However, the RazakSAT satellite was successfully launched from Omelek Island[545] in the Republic of the Marshall Islands. After several delays, the RazakSAT was finally launched on 14 July 2009[546] from a launch site called the U.S. Army Kwajalein Atoll

540 See ATSB official website, *supra* note 226.

541 Information on ANGKASA is available in Chapter 1 of the thesis (1.3.1(b): Malaysian National Space Agency (ANGKASA).

542 Malaysia National Space Agency (ANGKASA), "CanSAT- Malaysian Plan", http://www.angkasa.gov.my/siswasat/document/ICW-16)MSA.pdf, accessed: 7 July 2012.

543 TiungSAT-1 was launched together with two micro-satellites from Italy, MegSAT-1, and UniSAT, and two from Saudi Arabia, SaudiSAT-A, and SaudiSAT-B. See *infra* note 544

544 The Dnepr launch vehicle was initially designed as an Intercontinental Guided Ballistic Missile (ICBM SS-18) which had been modified as an Expendable Launch Vehicle (EL) for use in space missions. For details on the TiungSAT-1 pre-launch activities, read Norhizam Hamzah and Mohd Fadhil Sayuti, "TiungSAT-1 Pre-Launch Activities", *TiungSAT-1, From Inception to Inauguration,* Eds., Mazlan Othman and Ahmad Sabirin Arshad, (Kuala Lumpur: Astronautic Technology (M) Sdn Bhd, 2001), at 93. See also Mohamed Haikal Isa, "Malaysia's First Micro-Satellite, TiungSAT-1 Launched", *Bernama,* 26 September 2000, http://www.zdnetasia.com/news/hardware/0,39042972,13029638,00.htm, accessed: 14 May 2014.

545 The Omelek Island is part of Kwajalein Atoll in the Republic of the Marshall Islands. It is controlled by the United States military under a long-term lease. See http://en.wikipedia.org/wiki/Omelek_Island, accessed: 14 May 2014.

546 On 21 March 2009, the RazakSAT was sent to the United States military base, Bucholz Army Airfield, using the Royal Malaysian Air Force (RMAF) C-130 aircraft. It was then sent to a launch site on Omelek Island by Great Bridge, a transport craft of the United States Navy.

(USAKA).[547] The launch vehicle used for the RazakSAT satellite was the United States launch vehicle Falcon-1.[548] It is owned by Space Exploration Technologies Corporation (SpaceX)[549]. CubeSAT and InnoSAT were launched together with the RazakSAT satellite on 14 July 2009 using the Falcon-1 vehicle; their function, apart from their research purpose, is to stabilise the position of the RazakSAT in its orbit.

In respect of Malaysia's current project to build a new satellite, a special budget for the earth observation programme has already been requested from the Malaysian Government.[550] This has been done in order to ensure further growth of the country's satellite manufacturing industry. This new programme involves building another new operational remote sensing satellite called RazakSAT-2. It is expected to produce a better quality of image acquisition compared to RazakSAT. The project was started in 2011 and is expected to be completed in 2014. It is presumed that the satellite will be ready to launch in late 2015, and its operational life is expected to be three to four years.[551]

Relying on the successful development of these earlier satellite programmes, Malaysia is believed to have the capacity to venture further into satellite development technology, especially with regard to the satellite manufacturing industry. In fact, trust was placed in Malaysia by another country, South Africa, when one of its companies asked the Malaysian Government- owned company ATSB, to develop a satellite component as well to collaborate in the satellite technology area.[552] Furthermore, the satellite technology business can be

---

[547] The U.S. Army Kwajalein Atoll (USAKA) is the Space Exploration Technologies Corporation's (SpaceX) launch site on Omelek Island.

[548] The Falcon 1 is a small, partially reusable rocket capable of placing several hundred kilograms into low earth orbit. See http://en.wikipedia.org/wiki/SpaceX, accessed: 30 March 2012.

[549] SpaceX is an American space-transportation company which is developing a partially reusable launch vehicle, namely Falcon 1 and Falcon 9 and a series of space capsules. It operates from its headquarters at Hawthorne, California. On 28 September 2008, SpaceX made history when its Falcon 1 Flight 4 became the first privately-developed liquid fuel rocket to orbit the Earth. See SPACEX website at http://www.spacex.com/, accessed: 14 May 2014.

[550]Interview with Mr Maszlan Ismail, ANGKASA, held on October 2009, http://www.aprsaf.org/interview/interview_37.html, accessed: 21 January 2010.

[551] See Statement by Colonel Nazari Abd Hadi, Representative of Malaysia, on Agenda Item 51: International Cooperation in the Peaceful Uses of Outer Space, at the Fourth Committee of the 67th Session of the United Nations General Assembly, New York, 18 October 2012, http://www.un.int/malaysia/GA/67/2012-10-18%20Outer%20Space.pdf; and also, Mustafa Din Subari, "Malaysia Space Related Activities 2011: Country Report", http://www.aprsaf.org/annual_meetings/aprsaf18/pdf/program/day3/11_Malaysia%20Country%20Report.pdf, accessed: 14 May 2014.

[552] Laupa Junus, "ATSB Peneraju Teknologi Satelit", *Estidotmy*, January 2007, http://www.akademisains.gov.my/download/estidotmy/2007/JAN%202007/estipg04.pdf, accessed: 14 May 2014.

considered a good opportunity to create business in Malaysia based on its considerable future profitability. However, the main challenge faced by Malaysia in this area is obtaining certification for the products manufactured, since it requires high degrees of reliability and efficiency.[553] It was reported that Malaysia is poised to become the hub for satellite manufacturing service provider for Southeast Asian region with the completion of its Assembly, Integration and Testing (AIT) facility located at Malaysia Space Centre.[554]

In respect of the non-governmental sector, Malaysia has 'Malaysia East Asia Satellite' (MEASAT), the country's first communication satellite project owned and operated by MEASAT Satellite System Sdn. Bhd. It comprises four communication satellites: (1) MEASAT-1/AFRICASAT-1 (launched: 12 January 1996); (2) MEASAT-2 (launched: 13 November 1996); (3) MEASAT-3 (launched: 11 December 2006); and (4) MEASAT-3a (launched: 21 June 2009). These satellites were launched through other countries' launch sites and facilities: MEASAT-1/AFRICASAT-1 and MEASAT-2 were launched from Centre Spatial Guyanais at Kourou in French Guyana, using the Ariane 44L rocket vehicle; MEASAT-3 was launched from Baikonur Cosmodrome, Kazakhstan, aboard the Proton Breeze M launch vehicle; and MEASAT-3a was launched from Baikonur Cosmodrome, Kazakhstan also, aboard the Land Launch Zenit-3SLB launch vehicle.

MEASAT-1/AFRICASAT-1, MEASAT-2, and MEASAT-3 were designed and built by Boeing Satellite Development Centre through its Hughes Space and Communications Company (HSC). However, MEASAT-3a was built by Orbital Sciences Corporation. The next satellite will be MEASAT-3b. It was constructed by EADS Astrium and its expected launch date is on 29 May 2014. The information regarding MEASAT satellites fleet has been further discussed in: 1.3.2 (a) MEASAT Satellite System Sdn Bhd, of the thesis.

---

[553] Ahmad Sabirin Arshad, "Satellite Technology Potentials in Malaysia", *supra* note 455, at 7.

[554] The 20 million USD of AIT facility building was recently completed, but the installation of its equipment is in progress. It is expected to be fully operational by end of 2013. Upon the completion of the facility, Malaysia would be able to provide the regional and global space community the services of: (a) vibration test system; (b) thermal vacuum chamber; (c) mass property measurement system; (d) electromagnetic compatibility chamber; (e) reverberation acoustic test facility, and; (f) alignment measurement system. More information on other facilities available at Malaysia Space Centre, read Chapter 1 of the thesis (1.3.1(b) Malaysian National Space Agency (ANGKASA). Refer also Statement by Colonel Nazari Abd Hadi, Representative of Malaysia, on Agenda Item 51: International Cooperation in the Peaceful Uses of Outer Space, at the Fourth Committee of the 67th Session of the United Nations General Assembly, New York, 18 October 2012, http://www.un.int/malaysia/GA/67/2012-10-18%20Outer%20Space.pdf; and also Malaysia Space Centre Brochure, "A Passage to Space", http://www.angkasa.gov.my/sites/default/files/artikel/Bahasa%20Melayu/Menu/Mengenai%20Kami/Kampus/Pusat%20Angkasa%20Negara/pusat%2520angkasa%2520cover%2520BI.jpg, both accessed: 21 April 2013.

1.4.6. *Program Angkasawan Negara*

Program Angkasawan Negara is an essential programme introduced by the Malaysian National Space Agency (ANGKASA). It is an initiative by the Malaysian Government to send a Malaysian into outer space. The idea of sending a Malaysian into outer space was, in fact, raised by the Malaysian Government in early 2003. Later, the Government declared that it would send an astronaut to the International Space Station by the end of 2007.[555] This was then officially announced by the former Prime Minister of Malaysia, Tun Dr Mahathir Mohamad, as a joint programme with the Russian Federation. It was a project identified as an offset agreement between Malaysia and Russia through the purchase of Sukhoi SU-30MKM fighter jets for the Royal Malaysian Air Force. Through this package, the Russian Government bore the cost of training and sending a Malaysian astronaut to the International Space Station, inclusive of a backup candidate, to conduct scientific research, life sciences, physical science, earth observation, education, and technology.[556] This programme was named after a Malay word *angkasawan* which means astronaut.

Program Angkasawan Negara has its own philosophy, vision, and objective. Its philosophy is education which is the core mission enabling ANGKASA to explore the frontiers of education in science, technology, and engineering, in ways never before envisaged by Malaysians. Since this programme is designed for Malaysian people, it thus aims to involve Malaysian scientists, educationists, parents, the general public, and students. This is done in multiple and inspirational ways particularly during the phases of selecting the astronaut, training, and flight process.[557] The programme's visions and objectives are, among others, to inspire Malaysians to strive for excellence and a unity of purpose. It also aims to instil a sense of identity that will promote national resolve and enrich their lives. The programme is, in fact, designed to stimulate the interest of young Malaysians to explore new areas of science

---

[555] Norul Ridzuan Zakaria, *et al.*, "The Symbiotic Relationship between Astronaut Program and Space Tourism Development – A Third World Perspective", 2nd IAASS Conference, Chicago, 14 May 2007, *Space Future,* http://www.spacefuture.com/archive/the_symbiotic_relationship_between_astronaut_program_and_space_tourism_development_a_third_world_perspective.shtml, accessed: 14 May 2014.

[556] See National Space Agency official website at http://www.angkasa.gov.my; see also http://en.wikipedia.org/wiki/Angkasawan, both accessed: 14 May 2014.

[557] See http://www.angkasa.gov.my/index.php?option=com_content&task=view&id=191&Itemid=259, accessed: 9 July 2012.

and technology which are crucial for sustaining a long-term national competitiveness in the globalization era.[558]

In the selection of *angkasawan*, the Malaysian Government gave trust and responsibility to the ANGKASA and the Ministry of Science, Technology and Innovations (MOSTI) to commission the process of selecting the national *angkasawan*. The registration for selection of the national *angkasawan* began in October 2003 when about 10,000 applicants registered online. The general criteria for such application were as follows: the applicants had to be over 21 years of age, degree holders, or professional pilots. To be selected as *angkasawan*, the candidates had to undergo various levels of screening process inclusive of physical fitness screening. Of 435 candidates who were screened at the early stage, only two candidates qualified at the final stage after passing through various levels of screening.[559] Those candidates were Dr. Sheikh Muszaphar Shukor[560] and Dr. Faiz Khaleed.[561] They were

---

[558] See *id.*

[559] In the screening for physical fitness, 435 candidates took part in the 3.5 km run that had to be completed within 20 minutes. From the above test, 199 participants qualified for the screening II which involved basic medical screening including gross physical abnormalities, pulse, ear, heart, chest, lungs, limbs, nervous system examination, and urine test. From the above, 59 qualified for the screening III in which the participants had to undergo other specific tests such as urine test for drugs, and blood test for full blood count, for serum biochemistry, for HIV/Hep B, physical body measurement, i.e. to fit into cockpit configuration. From this test, 27 candidates qualified for the screening IV which involved stool sample test, full blood picture, abdomen ultrasound, human centrifuge test, bone densitometry balance test etc. From here, 18 participants qualified for the screening V which was called the survival test. The test included psychiatric evaluation, and general health questionnaire, psychological group work, sea and land survival tests, Russian language class and test, technical competency including medical research competency and communication skills. From the above, 10 were short-listed for screening VI (in-depth medical tests). These tests included CT scan brain, mammogram, blood test haemoglobin analysis, and liver function. From these, 8 candidates were short-listed. From the 8, four were selected: Dr. Sheikh Muszaphar Shukor (34 years old, an Orthopaedic Surgeon), Vanarajah Siva (35, a Senior Quality Engineer), Dr. Faiz Khaleed (26, an Armed Forces Dental Surgeon), Mohammed Faiz Kamaludin (34, Malaysia Airlines Pilot). The ANGKASA website, *id.*; See also International Astronautical Federation: Connecting People to Space, http://www.iafastro.com/, accessed: 14 May 2014.

[560] Sheikh Muszaphar is an orthopaedic surgeon and a university lecturer in medicine at the Universiti Kebangsaan Malaysia. Since he blasted off to the International Space Station during the month of Ramadhan, the Muslim fasting month, he was declared the first Muslim to perform fasting in space and the ninth Muslim to cross the 100-km boundary above the earth. As a result, the Malaysian Islamic National Fatwa Council made an initiative drawing up the first comprehensive guidebook for Muslims in space. The 18-page book entitled "Guidelines for Performing Islamic Rites at the International Space Station" details issues such as how to pray in a low-gravity environment, determination of *qiblah* (direction a Muslim takes during prayers) determination of prayer times, and issues surrounding fasting. For his personal details, see ANGKASA website, *id.*; See "Malaysian Guide for Muslim Astronauts", 1 May 2007, IslamOnline.net & Newspapers, http://staging.onislam.net/english/index.php, accessed: 1 October 2012; "Malaysian Guide for Muslim Astronauts", *Turks.US Daily World EU News,* 2 May 2007, http://www.turks.us/article.php?story=20070502064845245; "Malaysia Mulls Prayer Guidelines for Muslim Astronauts", 25 April 2006, TMCnet, http://pgoh13.com/muslim_astronauts.php; http://en.wikipedia.org/wiki/Sheikh_Muszaphar_Shukor, accessed: 14 May 2014.

[561] Dr. Faiz Khaleed is a dental surgeon in the Royal Malaysian Armed Forces. See http://www.angkasa.gov.my/index.php?option=com_content&task=view&id=189&Itemid=257, accessed: 10 July 2012; http://en.wikipedia.org/wiki/Faiz_Khaleed, accessed: 14 May 2014.

selected after completing an initial training course in Russia. Next, they had to undergo an 18-month astronaut training programme at the Cosmonaut Training Programme in Star City, Russia. Finally, on 4 September 2006, the Malaysian Government unveiled its first astronaut: Dr. Sheikh Muszaphar Shukor, as the prime crew member, will blast off in a Russian Soyuz spacecraft, while Dr. Faiz Khaleed will serve as backup.[562]

On 10th October 2007, Dr Sheikh Muszaphar Shukor made his way to the International Space Station on board Soyuz TMA-II. He was, in fact, launched to the International Space Station in the company of the Expedition 16 crew.[563] This event thus resulted in Dr Sheikh Muszaphar Shukor becoming the first Malaysian in space. After nine days on board the International Space Station, Dr Sheikh Muzaphar then returned to Earth on 21 October 2007, aboard Soyuz TMA-10. This time he returned with the Expedition 15 crew members.[564] It was remarked that, as well as becoming the first Malaysian in space, Dr Sheikh Muszaphar was accepted as a fully-fledge cosmonaut[565].

---

[562] M. Jegathesan, "Malaysia Unveils Two Final Male Astronaut Candidates", 4 September 2006, *Space Daily Your Portal to Space,* http://www.spacedaily.com/reports/Malaysia_Unveils_Two_Final_Male_Astronaut_Candidates_999.html, accessed: 14 May 2014.

[563] Dr Sheikh Muszaphar, along with the Russian cosmonaut Yury Malenchenko and the American Peggy Whitson, the space station's new commander, blasted off into space from the launch site Baikonur Cosmodrome in Kazakhstan and circled the earth before docking at the International Space Station. Mrs Whitson and Mr Malenchenko will remain on the station for six months, replacing two astronauts with whom Sheikh Muszaphar will return. It was a historic journey which Malaysia celebrated on Thursday (10 October 2007) as he hurtled through space in a landmark for the nation which is marking 50 years of independence. See **"**Malaysia Astronaut Set to Launch", *BBC News,* 10 October 2007, http://news.bbc.co.uk/2/hi/asia-pacific/7036933.stm, accessed: 14 May 2014.

[564] Sheikh Muszaphar returned to Earth with the Expedition 15 crew: Commander Fyodor Yurchikhin and Soyuz Commander and Flight Engineer, Oleg Kotov. See International Astronautical Federation: Connecting People to Space website, *id.*; see also "NASA TV Coverage Set For Space Station Crew Exchange", *NASA News Releases,* 24 September 2007, http://www.nasa.gov/home/hqnews/2007/sep/HQ_M07122_Exp_15_and_16_crew_exchange_prt.htm, accessed*:* 14 May 2014.

[565] The Russian ambassador to Malaysia, Alexander Karchava, and a former American Shuttle astronaut, Captain Robert Hoot Gibson, said that the Malaysian *angkasawan*, Dr Sheikh Muszaphar, is no passenger or tourist but a fully-fledged cosmonaut. Russia does not see him as a mere passenger to the International Space Station but a researcher who carried out the experiments that were discussed between Russia and Malaysia. A cosmonaut or an astronaut is a person trained by a human spaceflight programme to command, pilot, or serve as a crew member of a spacecraft. While generally reserved for professional space travellers, the term is sometimes applied to anyone who travels into space, including scientists, politicians, journalists, and tourists. See Ritikos, Jane, "Russian Envoy Confirms That Malaysian Is Not A 'Mere Passenger", *The Star Online,* 4 October 2007, http://thestar.com.my/news/story.asp?file=/2007/10/4/nation/19072942&sec=nation; "Malaysian a Full-Fledged Cosmonaut, Says Ex-Astronaut", *The Star Online,* 11 October 2007, http://thestar.com.my/news/story.asp?file=/2007/10/11/nation/19142225&sec=nation, all accessed: 14 May 2014; see also NASA, *Astronaut Fact Book (Information Summaries),* (U.S: National Aeronautics and Space Administration, January 2005).

Program Angkasawan Negara is regarded as a pioneering programme for the country to cater for the next generation for the purpose of exploring new technologies in outer space. In fact, this Programme offers various benefits, especially in the field of science and technology, including space medicine, aviation medicine, life science, environmental science, and physics.[566] Indeed, the programme is regarded as significant since it has increased the Malaysian public interest and awareness of the importance of space science and technology, as well as cultivating a sense of pride in all Malaysians.[567] Apart from that, all the space scientific research has demonstrated inspiring outcomes. However, most importantly of all, the Programme has successfully proved that it is not a dream to send a Malaysian into outer space. Thus, there is a strong prospect of it happening again in the future. This assertion is indeed supported by the Malaysian Government's contention that the Government has agreed to proceed with the Second National *Angkasawan* Programme as a continuation of the first programme. This initiative is regarded as vital for the country since it can ensure the continuity and development of national capability in the space sector and other related fields.[568]

1.4.7. Scientific Research

Conducting scientific research in space is another Malaysian space-related activity worth mentioning. Space scientific research is an area that has the potential to develop in the future. Corresponding to the objective of the *Program Angkasawan Negara*,[569] which is to inspire and stimulate the interest of the Malaysian young generation to explore new areas of science and technology,[570] conducting space scientific research can be viewed as an appropriate step towards fulfilling those objectives.

---

[566] The discussion on the experiments done by the Malaysian *angkasawan* is available in Chapter 1 of the thesis (1.4.7. Scientific Research).

[567] See http://www.angkasa.gov.my/index.php?option=com_content&task=view&id=469&Itemid=103&lang=english, accessed: 11 July 2012; Azmy Mohamed, "Teruskan Program Angkasawan Negara", *Utusan Online,* 6 February 2012, refer http://www.utusan.com.my/utusan/info.asp?y=2012&dt=0206&pub=Utusan_Malaysia&sec=Pendidikan&pg=pe_01.htm, accessed: 14 May 2014.

[568] See http://www.angkasa.gov.my/index.php?option=com_content&task=view&id=469&Itemid=103, accessed: 11 July 2012; "Program Angkasawan Negara Kedua Diteruskan", *Utusan Online,* 4 January 2012, http://www.utusan.com.my/utusan/info.asp?y=2012&dt=0104&pub=Utusan_Malaysia&sec=Terkini&pg=bt_19.htm, accessed: 14 May 2014.

[569] Discussion on this Programme is available in Chapter 1 of the thesis (1.4.6. *Program Angkasawan Negara*).

[570] See http://www.angkasa.gov.my/index.php?option=com_content&task=view&id=192&Itemid=260, accessed: 10 July 2012.

Thus, the Malaysian Government, through its *Angkasawan* programme, commenced a number of scientific researches in space. Various steps were taken to ensure that a number of experiments would be conducted in outer space through this programme. Those experiments were carried out by a Malaysian *angkasawan,* namely Dr Sheikh Muszaphar. These were conducted during his mission to the International Space Station that took place for 11 days from 10 to 21 October 2007. A number of experiments were performed in the International Space Station including work on liver cancer and leukaemia cells, microbes in space, and crystallisation of protein in space. The experiments conducted on liver cancer and leukaemia cells, as well as microbes, will indeed benefit general science and medical research. However, the research on protein crystallisation and lipases will directly benefit the local industry. [571]

Among the aforementioned research and experiments carried out in space, one in particular is related to cells. This experiment involves a study of the effects of microgravity and space radiation on cancer cells; it concentrates on structural changes and functions at the cellular and molecular level. This experiment also aims to reveal more about the cell behaviour, activity, and tissue repair. Another experiment is related to microbes in space. This experiment is intended to discover the effects of microgravity and space radiation on motility of bacteria, drug resistances, and the genetic mechanisms controlling them. It was done using the microarray approach. Another experiment is on protein crystallisation in space. In this experiment, the aim is to crystallise two proteins and study their molecular structures, compare the crystal growth of lipases on Earth with that grown in microgravity. In this experiment, several test conditions will be tested to improve the protein crystallisation process on Earth as well as in space for the sake of future industrial applications.[572] Another experiment involves the study of spinning motions in a microgravity environment. This experiment is a physics demonstration to show the effect of microgravity on the motions of a spinning object using a top.[573]

It was reported that the above research programme was then continuously performed by a team of researchers from various Malaysian public universities including National University

[571] Sim Leoi Leoi, "Tapping into Space Research", *The Star Online,* 22 September 2007, http://thestar.com.my/news/story.asp?file=/2007/9/22/nation/18514133&sec=nation; see also http://en.wikipedia.org/wiki/Sheikh_Muszaphar_Shukor#Space_experiments, all accessed: 14 May 2014.

[572] "Mission in Space", *The Star Online,* 11 October 2007, http://thestar.com.my/news/story.asp?file=/2007/10/11/nation/19136025&sec=nation, accessed: 10 July 2012.

[573] See http://en.wikipedia.org/wiki/Angkasawan_program, accessed: 14 May 2014.

of Malaysia (UKM),[574] University of Malaya (UM),[575] Universiti Putra Malaysia (UPM),[576] and University of Technology Mara (UiTM),[577] and by research institutes such as the Malaysian Agricultural Research and Development Institute (MARDI).[578] It is testified that the results from those microgravity science research programmes are impressive and some of the findings are reported to have produced a number of patent applications that have been filed in Europe, the United States, and Japan. It was also affirmed that at least one spin-off technology will be further commercialised.[579] It seems that the research conducted in space by the Malaysian *angkasawan* has received international recognition. This is a consequence of the request by the international space agencies such as JAXA and ESA for him to conduct some scientific experiments.[580]

Since the space scientific research can generate a good return for the country, the Malaysian Government stresses that the content of the Second National *Angkasawan* Programme should be well-designed to provide further returns to the country, especially in the area of scientific discovery. Apart from that, the Programme will be designed to generate new knowledge and contribute to the nation's economy.[581] Therefore, to meet such targets, it is suggested that a longer scientific mission at the international space station is required for the next Programme.

1.4.8. Suborbital Space Plane

Apart from the various space-related activities accomplished by the Malaysian public sector, some activities have also been performed by the Malaysian private sector.[582] The first activity to gain attention was the development of a suborbital space plane. The suborbital space plane

[574] For UKM official website, see *supra* note 401.
[575] For UM official website, see *supra* note 391.
[576] For UPM official website, see *supra* note 420.
[577] For UiTM official website, see *supra* note 394.
[578] MARDI is a Malaysian Government research and development institute under the Malaysian Ministry of Agriculture & Agro-Based Industry which focuses on development and research in the areas of food, agriculture and biology-based industry. Its official website is available at http://www.mardi.gov.my/, accessed: 14 May 2014.
[579] See http://www.angkasa.gov.my/index.php?option=com_content&task=view&id=469&Itemid=103&lang=english, accessed: 2 October 2012.
[580] *Id*.
[581] See http://www.angkasa.gov.my/index.php?option=com_content&task=view&id=469&Itemid=103, accessed: 2 October 2012.
[582] It was reported that there was an illustration of the Malaysian suborbital space plane on a published and exhibited poster of 5th IAASS Conference in Versailles, Paris. Norul Ridzuan Zakaria, "Malaysian Spaceplane and Spaceport at 5th IAASS", email to author, 23 October 2011.

project was introduced by a Malaysian private organization called Space Tourism Society Malaysia Chapter (STS-MC),[583] a Chapter of the Space Tourism Society[584] that was established in Malaysia. The project is known as Malaysian Research for Rocket Plane Design & Development or 'M-R2D2'.

The M-R2D2 project was launched in October 2008. It aims to design and develop a prototype of a suborbital space plane. The project was, in fact, designed to meet the NASA requirement of developing a suborbital space plane.[585] This project is treated as an independent project of the STS-MC.[586] Specifically, the M-R2D2 project is being conducted in partnership with the Swiss Propulsion Laboratory (SPL), as the major partner, and also with Project Enterprise.[587] Apart from this, prior to the launch of this project, it was established that the STS-MC had already signed an agreement with the SPL. This earlier agreement is related to the development of the carbon-neutral rocket propulsion system for the suborbital space plane prototype. This agreement was executed in February 2008, which is seven months before the launch of the M-R2D2 project.

For the purpose of cooperation as partners in the M-R2D2 project, the STS-MC signed a memorandum of understanding in May 2009 with SPL, and the Talis Institute, which is owner of the Project Enterprise. This took place in Langenthal, Switzerland, seven months after the M-R2D2 project launch date.[588] Then in July 2009, that is two months after signing the memorandum of understanding, the STS-MC succeeded in publishing its own conceptual design of a suborbital space plane. This design is completed by a propulsion system, designed by the SPL, consisting of a hybrid system of jet and rocket propulsion. The space plane is in fact intended to carry two passengers for zero-gravity experience, earth viewing, and to

[583] For more information on STS-MC, read Chapter 1 of the thesis (1.3.2 (b): Malaysian Institute of Aero and Space Studies (IKAM) and Space Tourism Society Malaysian Chapter (STS-MC).
[584] Read also *supra* note 335
[585] Norul Ridzuan Zakaria, "Vehicle Capability by NASA", email to author, 14 June 2009. See also http://suborbitalex.arc.nasa.gov/node/31, accessed: 11 July 2012.
[586] At the time when the facts were received, it was reported that the STS-MC did not receive any kind of assistance from the Government of Malaysia in terms of financial and technical support. Norul Ridzuan Zakaria, "IKAM & Space Tourism Society Malaysia Chapter (STS-MC)", email to author, 10 October 2009.
[587] Norul Ridzuan Zakaria, "An Aviation Approach to Space Transportation", email to author, 24 August 2009. See *id*., "IKAM & Space Tourism Society Malaysia Chapter (STS-MC)", email to author, 6 June 2009.
[588] See http://web.mac.com/spacemansam//STS_Events/2009-04-24_STS_Malaysia_signs_rocketplane_agreement.html, accessed: 26 October 2009.

conduct zero-gravity experiments at 120km above sea level. This was called the 'Prototype 10'.[589]

In the same month, July 2009, the STS-MC launched the M-R2D2 subprogram for a suborbital hidro-space plane project called Suborbital Water-Aero N'Spaceplane (SWANS). This project aims to study, design and develop a prototype suborbital space plane capable of taking off from and landing on water.[590]

Apart from the above, another conceptual design for a suborbital space plane that is worth mentioning is *Langkasa* (Space Eagle). This was the first conceptual design for a suborbital space plane and was produced and published in Malaysia as early as 2003. It is a unique twin-boom design with a passenger's cockpit in each boom.[591] In 2008, the STS-MC published a conceptual suborbital space plane design called MX (M-10). It carries a pilot and two passengers who sit side by side behind the pilot. It is powered by a jet engine and 3 rocket engines. This commemorated the 10th anniversary of the establishment of the STS-MC.[592]

Next, in February 2010, the STS-MC produced another conceptual design for a suborbital space plane called MXI (M-11). It was also designed to carry two passengers, or three if unpiloted, to over 100km above sea level. There are two types of MXI: types R and V. Type R is a rocket plane powered by a set of four liquid rocket engines for horizontal take-off, flight orientation, and vertical ascent into space. Its dimensions are 16.2m in length and 3.6m in height, with a wingspan of 8.6m. It is a low-cost small suborbital space plane. However, type V is a type of vertical take-off and landing (VTOL) craft but with the same dimensions as type R. It does not require a complex liquid rocket propulsion system as it uses its turbo shaft and turbo fan for take-off, flight orientation, and landing. It uses its solid rocket engine only for a short time during vertical ascent into space. This VTOL small suborbital space

---

[589] It is called 'Prototype 10' to commemorate the 10th anniversary of STS-MC's establishment. See Space Tourism Society Malaysia Chapter, "A Brief History of Malaysian International Space Tourism Initiative (July 1999 – 2011)," *supra* note 324, at 3.
[590] Norul Ridzuan Zakaria, "Chronology of Important Events in 10 Years", email to author, 3 August 2009.
[591] Norul Ridzuan Zakaria, "MXI 1st Brochure (New & Improved)", email to author, 19 July 2010. See also Norul Ridzuan Zakaria, et al., "Human Factors Engineering In Designing the Passengers' Cockpit of the Malaysian Commercial Suborbital SpacePlane", 4th International Association for the Advancement of Space Safety Conference, Huntsville, USA, 19-21 May 2010, http://www.re-entry.com.my/pdf/PAPERHUNTSVILL%202010.pdf, accessed: 14 May 2014.
[592] *Id*.

plane has since become known as Langkasa 2.[593] In October 2011, the Langkasa 2 programme was reported in the New Space Global.[594] It was noted as one of the world's first suborbital tourism space plane conceptual designs capable of vertical take-off and landing.[595] The V type is expected to revolutionize the space tourism industry as it can operate from exotic locations without runways and luxury ocean liners. Both MX and MXI rocket propulsion systems were designed and developed by the SPL. Their conceptual designs maintain the application of jet propulsion besides rocket propulsion. Having jet propulsion as well as rocket propulsion is more useful and safer for landing. Indeed, it is projected that the future suborbital space plane concept will explore the use of a bio-fuel-powered rocket engine and electric propulsion powering a retractable propeller for safe horizontal landing.[596] All those developments, in fact, are certainly significant not only for the space tourism industry but also for effective zero-gravity research, atmospheric research, high-altitude observation, photography, and astronaut training.[597]

1.4.9. Commercial Spaceport

Another project that is gaining attention is the building of a Malaysian spaceport.[598] This is also a private sector project. The idea of developing Spaceport Malaysia is not a recent one as it was first highlighted 13 years ago. The notion of building Spaceport Malaysia was indeed initially reported in one of the Malaysian local newspapers, the *Sunday Star*, on 4 July 1999.[599] It described the possibility of turning the Kuala Lumpur International Airport (KLIA) into a Malaysian spaceport. A month later, on 24 August 1999, this idea was then transformed into a caricature which again stressed the prospect of KLIA becoming the first spaceport in Asia by 2020.[600] Then, five years later, in November 2004, there was another

---

[593]Norul Ridzuan Zakaria, "Langkasa 2 Malaysian 53rd Independence Day Edition", email to author, 30 August 2010.

[594] See http://www.newspaceglobal.com/Pages/aboutus.aspx, accessed: 1 November 2011. Norul Ridzuan Zakaria, "Spaceport S.E.A & Langkasa 2 Reported by New Space Global", email to author, 1 November 2011.

[595] See http://www.newspaceglobal.com/Pages/aboutus.aspx, accessed: 1 November 2011.

[596] Norul Ridzuan Zakaria, "New Idea for Suborbital Spaceplane Propulsion", email to author, 5 November 2011.

[597] Norul Ridzuan Zakaria, "MXI 1st Brochure (New & Improved)", email to author, 19 July 2010. See also Norul Ridzuan Zakaria, et al., "Human Factors Engineering in Designing the Passengers' Cockpit of the Malaysian Commercial Suborbital SpacePlane", *supra* note 591.

[598] See official website of Malaysia spaceport project at http://spaceportmalaysia.com/v2/, accessed: 14 May 2014.

[599]"KLIA can be turned into Space Port", *Sunday Star*, 4 July 1999.

[600] "Senyum Kambing" Column, *Utusan Malaysia,* 24 August 1999.

proposal for the development of a spaceport at Sultan Azlan Shah Airport in Ipoh.[601] Unfortunately, there was not much support for this as most people regarded the idea of developing Malaysian airports into spaceports as impractical.[602]

In July 2011, a programme to develop a commercial spaceport for tourism in South East Asia (SEA) was proposed by the STS-MC. Hence, the proposed project was called 'SpaceportSEA'. This programme was then transformed into an international programme owned by the Space Tourism Society, in which the STS-MC is the programme manager.[603] Indeed, the idea of developing spaceport Malaysia was gaining in currency when, during the fifth IAASS Conference held in Paris on 17-19 October 2011, the IAASS published and exhibited a poster for the 'Suborbital Safety Technical Committee'. This poster featured an illustration of Spaceport Malaysia.[604] Thus, the poster had indirectly promoted and recognised Malaysia as one of the world's major players in spaceport development, especially since Spaceport Malaysia was illustrated together with Spaceport America.[605]

On 3 December 2011, the STS-MC signed a Memorandum of Understanding (MOU) with Perbadanan Kemajuan Negeri Selangor (PKNS) or Selangor State Development Corporation.[606] This MOU is concerned with the planning, designing, development, and operation of Spaceport Malaysia.[607] The first location suggested for the development of the spaceport was Bernam Jaya, a new Malaysian township built by the PKNS in Northern Selangor.[608] Several meetings later, the final location suggested for Spaceport Malaysia was

---

[601] Malaysia has 58 airports. Sultan Azlan Shah Airport is a public national airport located in Ipoh. Ipoh is the capital city of Perak, one of the states of Malaysia. See http://en.wikipedia.org/wiki/List_of_airports_in_Malaysia, accessed: 14 May 2014.

[602] Norul Ridzuan Zakaria, "Caribbean Spaceport", email to author, 12 July 2010.

[603] See Space Tourism Society Malaysia Chapter, "A Brief History of Malaysian International Space Tourism Initiative (July 1999 – 2011)," *supra* note 324, at 4.

[604] Apart from the Malaysian spaceport, there was also an illustration of a Malaysian suborbital space plane. This illustration was also provided in the Space Safety magazines (Issue 1, Fall Edition, 2011) on page 17, which were distributed to the Board Members of IAASS. See IAASS poster on 'Suborbital Safety Technical Committee' at 5th IAASS Conference in Paris on 17-19 October 2011. See also Norul Ridzuan Zakaria, "Malaysian Spaceplane & Spaceport at 5th IAASS", email to author, 23 October 2011. See also, http://www.spacesafetymagazine.com/wp-content/uploads/2011/10/Space_Safety_Magazine_-_Issue_1_-_Fall_2011.pdf, accessed: 14 May 2014.

[605] See *id*.

[606] PKNS is a state development corporation in Selangor, Malaysia.

[607] There was a suggestion that the name 'SpaceportSEA' be changed to 'MARS' or Malaysian Asian Regional Spaceport after the PKNS General Manager proposed that the spaceport should be indicative of Asia, rather than just South East Asia. See Norul Ridzuan Zakaria, "Signing of MOU with PKNS & ASEA", email to author, 3 December 2011.

[608] Langkawi Island in the state of Kedah was one of the locations mentioned earlier as suitable for development as a Spacepark Langkawi. See N Laupa Junus, "Melancong ke Angkasa Melalui Malaysia", *Utusan Online,* 31

Bandar Jasin Bestari[609] in the state of Malacca.[610] There are several unique reasons for selecting the state of Malacca as the location for the development of Spaceport Malaysia. Primarily, the state of Malacca is the most famous historic tourist destination in Malaysia and has always been called 'the historic state of Malacca'. The town of Malacca was listed as a UNESCO World Heritage Site on 7 July 2008. Malacca had become an empire that had occupied the whole of Peninsular Malaysia and most of Sumatra, Indonesia, by the end of the fifteenth century. This period was followed by many other historical episodes.[611] Indeed, these historical facts will form part of the philosophy in the project planning and design of Spaceport Malaysia.[612]

The development project of Spaceport Malaysia occupies an area of 150 acres. This project consists of two geographical areas: Malacca Space Centre and Spaceflight Terminal. The Malacca Space Centre comprises, among others, a university, a space plane and astronaut hall of fame, bungalows with a lunar architectural concept, a space resort, a space park, and many more.[613] In this project, a university to be called Space University will be built on 16 acres of land and is scheduled to have a zero-gravity laboratory. The University will provide opportunities and facilities for researchers to conduct zero-gravity research in the form of collaborations between Malaysian local universities and the University of Zurich.[614] Apart from that, among the significant projects is the space plane development project. This project will produce space planes that will take astronauts, space tourists, space researchers and scientific payloads into space. The astronaut hall of fame is a unique centre of space activities that offers a space camp, a space education workshop, a 360-degree Digital Dome Theatre, and a Space Flight Gallery that exhibits flight carriers.[615] The project also offers the

August 2002, available at http://www.utusan.com.my/utusan/info.asp?y=2002&dt=0831&pub=utusan_malaysia&sec=rencana&pg=re_06.htm&arc=hive, accessed: 14 May 2014.

609 Bandar Jasin Bestari is a smart modern township that is being developed by the Malacca state government.

610 It was reported that Selangor will be a backup site as it will not be ready for development for another two years. See Norul Ridzuan Zakaria, "New Space Facility in Muslims Heavyweight Country: Malaysia Spaceport Project", *Onislam,* 24 May 2012, at, http://www.onislam.net/english/health-and-science/science/457187-spaceport-malaysia-project.html; Azriel, Merryl, "Spaceport to be Built in Malacca", *Space Safety Magazine,* 10 May 2012, at http://www.spacesafetymagazine.com/2012/05/10/spaceport-malaysia-built-malacca/, both accessed: 14 May 2014. See also http://en.wikipedia.org/wiki/Malacca, accessed: 14 May 2014.

611 Other historical facts include the following: the Government of Malacca was founded in 1400 with the establishment of the Malacca Sultanate. Malacca was occupied by various powers starting from 1511when it was occupied by Portugal; in 1641 it was occupied by the Dutch and in 1824 by the British. See Norul Ridzuan Zakaria, *id.*

612 See Norul Ridzuan Zakaria, *id*.

613 See Norul Ridzuan Zakaria, *id*.

614 See http://spaceportmalaysia.com/v2/, accessed: 14 May 2014.

615 *Id*.

development of bungalows with a lunar architectural concept. This is a unique residential unit that has a moon living-related concept.[616] A space resort is a six-star resort that will accommodate astronauts, space tourists, space scientists, space researchers, space enthusiasts, and general visitors. It will also be the official venue for international high-profile space conferences and meetings. The space park is a theme park designed and equipped with space travel-themed rides including space travel simulators and coasters.[617]

However, the Spaceflight Terminal is located at the Malacca international airport, which is 20km to the north of the Malacca Space Centre. This Terminal will be physically connected to the Malacca Space Centre via a light rail system. The Spaceflight Terminal will be the last stop for astronauts and space tourists before they are carried into outer space by the suborbital space plane.[618]

There are seven partners in this project, namely Talis Enterprise of Germany, University of Zurich, the IAASS, Swiss Propulsion Laboratory (SPL), Bristol Spaceplanes Ltd, Saturn SMS, and Space Future. Talis Enterprise of Germany is a project partner in the development and operation of Spaceport Malaysia. It is developing a space plane called 'Enterprise'. The Enterprise will be an official suborbital space plane of Spaceport Malaysia. It will be operated from Malacca international airport with its administration centre at the Spaceflight Terminal. It will carry six passengers to 130km above sea level, and passengers will experience a few minutes of zero gravity. The flight passengers will be trained, certified and prepared for a few days at the Malacca Space Centre prior to the flight. The cost of the whole package for one passenger is expected to be around euro 150 000.[619] The University of Zurich is a project partner providing advice on zero-gravity activities related to the operation of Spaceport Malaysia. A zero-gravity laboratory at the Malacca Space Centre will enable the Malaysian local universities to conduct research in the related field in collaboration with the University of Zurich. The IAASS is the consulting partner with respect to space safety for the planning, designing, development and operation of Spaceport Malaysia.[620] However, the Swiss Propulsion Laboratory (SPL) is the designer and developer of the rocket propulsion system. It is involved in the design and development of the Enterprise rocket plane and the

[616] For more details, refer to *id*.
[617] *Id*.
[618] See Norul Ridzuan Zakaria, *supra* note 610.
[619] See Norul Ridzuan Zakaria, *supra* note 610. See also http://spaceportmalaysia.com/v2/, accessed: 14 May 2014.
[620] Refer to http://spaceportmalaysia.com/v2/, accessed: 14 May 2014.

operation of Spaceport Malaysia and the Malaysian local suborbital space plane programme.[621] Bristol Spaceplanes Ltd.'s Ascender Project was in fact the original reference in the creation of the Malaysian local suborbital space plane programme. This indeed led to the authorities' understanding of the significance of the space industry and resulted in the emergence of the Spaceport Malaysia project. Meanwhile, the Saturn SMS is a renowned consulting agency in aerospace safety. It provides safety consultancy services not only for the planning and design of Spaceport Malaysia but also for its development and operation. As for Space Future, the concept of Spaceport Malaysia was pioneered by Prof. Patrick Collins and Space Future in 2002, and both remain stakeholders in the project.[622]

Apart from the above, the STS-MC is also conducting research and promoting the idea of a seaborne spaceport.[623] This idea involves a mobile spaceport where the space plane can take off or land from a suborbital space plane carrier ship. This is an interesting idea since the spaceport can be moved to different beautiful locations in order to realise the space tourists' dreams of flying into space while viewing the various beautiful panoramas surrounding the port, as well as viewing the earth from outer space.[624] The seaborne spaceport is also more practical for a suborbital space plane's vertical take-off and landing criteria as the planes can operate from those ships without runways.

1.5. CONCLUDING REMARKS

In this chapter, the discussion concentrates on Malaysian space experiences and activities with respect to the past, present and future. It elaborates on three major subject matters: policy and laws, space technological development and research, and space applications and activities.

From the foregoing discussion, a number of conclusions can be drawn. The first concerns outer space policy and laws with regard to Malaysia's outer space activities. In this respect, it is evident that Malaysia, at present, has a number of laws specifically dealing with telecommunications and multimedia activities. However, it still lacks a conclusive space

[621] *Id*.
[622] *Id*.
[623] See Pamphlet "Seaborne Spaceport", by STS-MC. Norul Ridzuan Zakaria, "Seaborne Spaceport by STS-MC", email to author, 7 August 2010.
[624] *Id*.

policy as well as a convincing domestic space law. Although it was reported that such a policy and law are in the development process, progress is very slow for several reasons, especially the shortage of legal experts on the drafting of space law. Moreover it must be noted that, since Malaysia is a federal country governed by the Malaysian Federal Constitution, all existing and future domestic laws and legislation will have to be in accordance with the Malaysian Federal Constitution. It is observed that in pursuance to Article 74 and the Federal List (Item 1(a) and (b) of the Malaysian Federal Constitution, the Federal Parliament has the exclusive power to make laws relating to the state's external affairs including matters in respect of space treaties, agreements, and conventions. Furthermore, there are a number of subject matters listed under the Federal List that seem to correspond with outer space-related activities, which provides strong grounds for believing that the legislative jurisdiction and power in regard to outer space law, policy and activities is mainly a competence of the Federal Government.

Secondly, Malaysia's involvement in space and technological research is quite encouraging in both the governmental and non-governmental sectors as well as in the higher educational institutions. The governmental sector is likely to focus more on space activities such as launching and manufacturing satellites, remote sensing and meteorological activities, and promoting space technology education programmes in schools and higher educational institutions. The non-governmental sector, on the other hand, is likely to focus on telecommunications and broadcasting activities, launching communication satellites, as well as on the space tourism sector. With regard to the higher educational institutions, the study shows that courses in space technology programmes are offered by various Malaysian universities and this will contribute tremendously to the growth of Malaysian outer space activities. However, the situation is different with regard to space legal education, the development of which seems to have fallen well behind. This educational gap should indeed merit special attention from the higher educational institutions in Malaysia.

Thirdly, there are nine major areas of space applications and activities in Malaysia: telecommunications and broadcasting, remote sensing, meteorology, navigation, satellite manufacturing and launching, the *Angkasawan Negara* Programme, scientific research, suborbital space planes, and commercial spaceports. The first three areas, namely telecommunications and broadcasting, remote sensing, and meteorology, can be considered the most active areas of application in Malaysia. However, the navigation area of application seems to have recently attracted the attention of users. However, such applications are becoming more common every day. For the satellite manufacturing and launching areas, the study finds that this is an emerging opportunity for space technology with which Malaysia is likely to engage, especially after considering the benefits and profits that could be earned for the country. As for the *Program* A*ngkasawan Negara*, the activity is viewed as a promotional tool to inspire the Malaysian community, especially students, to become aware of the significance of space technological developments and research. The study also finds that the scientific research conducted in outer space via this Programme and the results thereof are viewed as a catalyst for other future scientific space research. In regard to the suborbital space plane and spaceport development activities, the study finds that the major involvements are from the non-governmental sector. Thus, it is realised that there is a strong possibility that the non-governmental sector, besides the governmental sector, will also play a significant role and contribute tremendously towards the development and progress of Malaysian space activities.

From the above conclusion, it is submitted that there is a need for Malaysia to have a reliable domestic space policy as well as legislation to regulate and govern the country's space activities. In view of the strong prospects for development of the above-mentioned activities, which will rapidly develop and grow further in the coming years, it is clear that this phenomenon will require a domestic space law to cope with the development, as well as to guide the smooth running of the industry. Thus, in order to finally propose the said law, this study will move on to discuss the Malaysian involvement and cooperation at the international level with respect to the international space laws, agreements, and organizations. This will be presented in the next chapter.

2 Malaysia, International Space Activities, and Laws

2.1. INTRODUCTION

Space activities have become global in nature. A state's engagement in international relations is definite when dealing with space affairs. Such worldwide relationships may, among other things, inspire the local and international space activities of a country and influence its space-related domestic legal framework. In general, states can be either participants or non-participants in space activities. There are various levels of participation involved in space activities, including sending personnel into outer space, launching and building satellites or other space objects, and being direct or indirect users of space technology. At this juncture, it is worth presenting an overview of the world's space activities including Malaysia's level of participation and engagement in the related activities, and the country's acceptance of outer space laws. Furthermore, this part will also concentrate on Malaysia's involvement with the world space organizations, as all these factors at certain levels may affect the future perspective of Malaysian space law.

Hence, the chapter will begin with a summary of a number of world space activities and indicate Malaysia's participation in such activities as well as the level of its engagement. The discussion will then focus on international space law including its historical background, meaning and sources. Next, it will explore Malaysia's position in regard to the five outer space conventions and the international outer space principles. Finally, it ends with a discussion on Malaysia's membership of the international and regional space organizations.

2.2. WORLD SPACE ACTIVITIES

The evolution of space activities originated from the technological evolution of rocketry and a space transportation system.[1] Due to the rapid development in science and technology, outer space activities are currently among the major concerns of many states, including the developing countries. Moreover, as states have realised that space exploration is obviously a great breakthrough in human knowledge and civilization, many have taken dynamic actions

---

[1] For an excellent discussion on the evolution of space activities, see Matte, Nicolas Mateesco, ed. *Space Activities and Emerging International Law,* (Canada: Centre for Research of Air & Space Law, 1984), at 13.

to utilise its benefits, ranging from exploratory, experimental space operations to commercial utilisation. This section presents an overview of past, present, and future global space-related activities conducted by the space-faring nations[2] as well as developing countries.

One of the most interesting world space activities is the construction[3] of the International Space Station (ISS) which is a symbol of international cooperation in space activities among the space-faring nations. It is a collaborative project between the United States National Aeronautics and Space Administration (NASA), the Russian Federal Space Agency, Roskosmos (RKA), the Japan Aerospace Exploration Agency (JAXA), the Canadian Space Agency (CSA), and the European Space Agency (ESA). As of May 2014, it is the largest spacecraft ever built and is currently being assembled in Low Earth Orbit. The assembly of the ISS started on 20 November 1998.[4] The ISS serves primarily as a research laboratory which conducts experiments in biology, human biology, physics, astronomy and meteorology. It is funded until 2020, and may remain in operation until 2028.[5]

Concerning the exploration of Mars, it was reported that, in October 2009, NASA and ESA signed an agreement to expand their collective capabilities, resources, and expertise to explore Mars.[6] However, in the 2011 budget blueprint, the United States President Barack Obama proposed to abandon the United States astronaut programme to return to the moon by

---

[2] The term ‘space-faring nations’ refers to those capable of independently building and launching vehicles into space. In a stricter sense, it refers to those that can build, launch and recover the spaceflight missions. According to Prasad’s research of 2006, the six top space-faring agencies are the National Aeronautics and Space Administration or NASA (USA), European Space Agency or ESA (Europe), CNSA (China), Japan Aerospace Exploration Agency or JAXA (Japan), Russia, and the Indian Space Research Organization or ISRO (India). However, when the United States Government ceased manned space missions in July 2011, there was a claim that the country was no longer a space-faring nation. Rivkin, David and Diana McCaffrey, “U.S. No Longer A Space-Faring Nation”, *The Hill’s Global Affairs Blog,* 22 February 2010, http://thehill.com/opinion/op-ed/82727-us-no-longer-a-space-faring-nation, accessed: 14 May 2014; Top Space Faring Nations, International Space Agencies, Prasad’s Research, Jan 2006, http://home.att.net/~s-prasad/TSFN.htm, accessed: 17 October 2012; see also, http://en.wikipedia.org/wiki/Spacefaring; Belfiore, Michael, “International Space Dominance: 7 Nations Launching the Next Space Race”, *Popular Mechanics,* 1 October 2009, http://www.popularmechanics.com/science/space/4307281, accessed: 13 May 2014.

[3] The ISS construction stages are available at, “Spacecraft: Manned: ISS: Chronology”, http://www.russianspaceweb.com/iss_chronology.html, accessed: 13 May 2014.

[4] See http://en.wikipedia.org/wiki/International_Space_Station#Station_structure, accessed: 13 May 2014.

[5] Smith, Marcia, “ESA Formally Agrees to Continue ISS Through 2020”, *spacepolicyonline*.com, 27 April 2011, http://www.spacepolicyonline.com/news/esa-formally-agrees-to-continue-iss-through-2020; Clark, Stephen, ‘Space Station Partners Set 2028 as Certification Goal’, *Spaceflight Now,* 11 March 2010, http://spaceflightnow.com/news/n1003/11station/; http://en.wikipedia.org/wiki/International_Space_Station; all accessed: 13 May 2014.

[6] India also will be a part of this international consortium for the manned mission by 2030. See http://www.space-travel.com/reports/Human_Flight_To_Mars_Will_Be_A_Global_Mission_999.html, accessed: 1 February 2010.

2020.[7] He then called on private industry to take on the role of building space vehicles to take humans to the ISS, while NASA focuses on research and development. With regard to Russia's intention to keep up with the United States in the space race, it has successfully launched Cosmos-2479, a new geostationary early warning satellite, on 30 March 2012 from Baikonur space centre. It is the last of the family of Russian satellites designed to detect missile launches around the world. On 28 July 2012, it launched Cosmos-2481, a military communications satellite, together with two Gonets-M (M-13 and M-15), civilian communications satellites.[8] The country also announced the launch of a new manned spacecraft by 2017.[9]

China is one of the space-faring nations that have developed an independent satellite navigation system. Its present Beidou-1 system, the launch of which took place from 30 October 2000 until 2 March 2007, comprises four satellites: Beidou-1A, Beidou-1B, Beidou-1C, and Beidou-1D. The system is, however, experimental and has limited coverage and application. Therefore, China plans to continue setting up Beidou-2 (Compass) navigation satellite system for global operation with a constellation of 35 satellites. As of May 2014, 16 satellites for Beidou-2 have been launched.[10] This system became operational in the China region in December 2011.[11] The system began offering services for the Asia-Pacific region in

---

[7] The moon is in fact expected to be a base for manned expeditions to Mars. In this situation, the White House was reported as saying that the United States would not be ready to ferry humans to the moon before 2028, since it would be too costly. Halvorson, Todd, and Bart Jansen, "President Obama to Propose Abandoning NASA's Moon Plan", *SPACE.COM,* 28 January 2010, http://www.space.com/7834-president-obama-propose-abandoning-nasa-moon-plan.html; Chang, Kenneth, "Obama Calls for End to NASA's Moon Program", *The New York Times,* 1 February 2010, http://www.nytimes.com/2010/02/02/science/02nasa.html?_r=0, both accessed: 13 May 2014.

[8] "Cosmos-2479- New Geostationary Early Warning Satellite", *Russian Strategic Nuclear Forces,* 30 March 2012, http://russianforces.org/blog/2012/03/cosmos-2479_-_the_last_geostat.shtml; and also http://www.russianspaceweb.com/oko.html#last; http://satellites.findthebest.com/, both accessed: 13 May 2014.

[9] Writers, Staff, "Russia Set to Launch Manned Spacecraft In 2017", *Space Travel,* 27 January 2010, http://www.space-travel.com/reports/Russia_Set_To_Launch_Manned_Spacecraft_In_2017_999.html, accessed: 13 May 2014.

[10] See http://en.wikipedia.org/wiki/Beidou_Navigation_Satellite_System#Global_system_.28BeiDou_Navigation_Satellite_System_or_BeiDou-2.29, accessed: 13 May 2014.

[11] "China GPS Rival Beidou Starts Offering Navigation Data", *BBC News Technology,* 27 December 2011, http://www.bbc.co.uk/news/technology-16337648, accessed: 13 May 2014.

December 2012.[12] It is planned to also offer services to global customers upon its completion in 2020.[13]

Following in China's footsteps in joining the Asian space race, India launched its first unmanned mission, Chandrayaan-1, on 22 October 2008. In 312 days, Chandrayaan-1 completed more than 3,400 orbits but was finally aborted 10 months after it launched. It met most of its scientific objectives, one of which was to find water molecules over the moon's surface.[14] The mission was seen as the 21st century Asian version of the space race between the United States and the USSR.[15] The success of Chandrayaan-1 strengthened India's claim to be a global space power. India's future project is to launch Chandrayaan-2 by 2014.[16] This is a joint effort between the Indian Space Research Organization (ISRO)[17] and Russia. The tasks of Chandrayaan-2 are to repeat some of the experiments carried out by Chandrayaan-1, and continue its uncompleted mission. India also announced its first manned space mission as it plans to send astronauts into space in 2016 with a mission cost estimated at $4.8 billion.[18]

Space tourism[19] is another attractive space activity. Currently, orbital space tourism[20] opportunities are limited and expensive, with only the Russian Space Agency providing

---

[12] Xin Dingding, "China Aiming to have Its Own GPS In Place by 2012", *GPS Daily, 18 January 2010,* http://www.gpsdaily.com/reports/China_Aiming_To_Have_Its_Own_GPS_In_Place_By_2012_999.html; "China's Beidou GPS-Substitute Opens to Public in Asia", BBC News, 27 December 2012, accessed: 13 May 2014.

[13] Experts said that the Beidou system would rival the US-developed GPS, the EU's Galileo and Russia's Global Navigation Satellite System. *Id*.

[14]See http://www.moondaily.com/reports/India_To_Launch_Chandrayaan_2_By_2013_999.html e moon's surface, accessed: 1 February 2010.

[15]Writers, Staff, "India Plans Manned Space Mission in 2016", 27 January 2010, *Space Travel,* http://www.space-travel.com/reports/India_plans_manned_space_mission_in_2016_999.html, accessed: 13 May 2014.

[16] "ISRO Puts on Hold Moon Mission Chandrayaan 2", *India Today,* 15 May 2011, http://www.bharat-rakshak.com/NEWS/newsrf.php?newsid=14750, accessed: 13 May 2014.

[17] ISRO is a primary body for space research under the control of the Government of India. It is one of the leading space research organizations in the world. For more information see its official website at http://www.isro.gov.in/; and http://en.wikipedia.org/wiki/Indian_Space_Research_Organisation, both accessed: 13 May 2014.

[18] See Writers, Staff, "India Plans Manned Space Mission in 2016", *Space Travel,* 27 January 2010, http://www.space-travel.com/reports/India_plans_manned_space_mission_in_2016_999.html, accessed: 13 May 2014.

[19]Space tourism is a phenomenon of tourists paying for flights into space. See http://en.wikipedia.org/wiki/Space_tourism, accessed: 13 May 2014.

[20] Orbital space tourism occurs when a space tourist travels to space via an orbital spaceflight. It happens when a spacecraft is placed on a trajectory where it could remain in space with the tourist for at least one orbit. See http://en.wikipedia.org/wiki/Orbital_spaceflight, accessed: 13 May 2014.

transport. The price for a flight to the ISS aboard a Soyuz spacecraft is US$20 to 35 million.[21] To date, seven space tourists have flown to and from the ISS on Soyuz spacecraft through the space tourism company named Space Adventure.[22] The space tourists are as follows:[23] First, Dennis Tito, an American businessman (flight duration: 28 April - 6 May 2001); second, Mark Shuttleworth, a South African computer millionaire (flight duration: 25 April – 5 May 2002); third, Gregory Olsen, an American (flight duration: 1 – 11 October 2005); fourth, Anousheh Ansari, an Iranian American (flight duration: 18 – 29 September 2006); fifth, Charles Simonyi, a Hungarian American billionaire (flight duration: 7 – 21 April 2007, and 26 March – 8 April 2009); sixth, Richard Garriott, American British (flight duration: 12 – 23 October 2008); and, seventh, Guy Laliberte, a Canadian circus tycoon (flight duration: 30 September – 11 October 2009).

Suborbital space tourism[24], however, attracted global attention after the success of SpaceShipOne. On 4 October 2004, SpaceShipOne, designed by Burt Rutan of Scaled Composites, won the $10,000,000 Ansari X Prize. The prize was offered to the first private company that could reach and surpass an altitude of 62 miles (100km) twice within two weeks. Virgin Galactic, one of the leading space tourism companies[25] and headed by Sir Richard Branson, plans to provide sub-orbital spaceflights to convey the paying public via SpaceShipTwo (a scaled-up version of SpaceShipOne), also designed by Burt Rutan.[26] During testing, the SpaceShipTwo craft will take off from Mojave Air and Spaceport in

[21] See http://en.wikipedia.org/wiki/Space_tourism, accessed: 13 May 2014.

[22] Space Adventure is a private space tourism company that provides human space mission opportunities. It was founded in 1998 and is headquartered in Virginia, United States of America. See *id*., and http://en.wikipedia.org/wiki/Space_Adventures, accessed: 13 May 2014.

[23] Writers, Staff, "Circus Tycoon Recalls 'Amazing Ride' in Space", *Space Travel,* 13 October 2009, http://www.space-travel.com/reports/Circus_tycoon_recalls_amazing_ride_in_space_999.html; and http://en.wikipedia.org/wiki/Space_tourism; and http://en.wikipedia.org/wiki/Space_Adventures, all accessed: 13 May 2014.

[24] Suborbital space tourism occurs when a space tourist travels into space via a sub-orbital spaceflight. It happens when the spacecraft reaches space, but its trajectory intersects the atmosphere or surface of the gravitating body from which it was launched, so that it does not complete one orbital revolution. See http://en.wikipedia.org/wiki/Sub-orbital_spaceflight, accessed: 13 May 2014.

[25] Besides Virgin Galactic, there are other space tourism companies such as Space Adventure, Armadillo Aerospace, XCOR Aerospace, and EADS Astrium. See http://en.wikipedia.org/wiki/List_of_private_spaceflight_companies, accessed: 13 May 2014.

[26] SpaceShipTwo is a sub-orbital space plane for carrying space tourists developed by the Spaceship Company, a spacecraft manufacturing company formed by Burt Rutan and Sir Richard Branson in mid-2005 and jointly owned by Virgin Group and Scaled Composites. See http://www.spaceshiptwo.net/; and also http://en.wikipedia.org/wiki/The_Spaceship_Company, both accessed: 13 May 2014.

California.[27] However, Spaceport America in New Mexico will be its commercial operation launch site.[28] The spacecraft will travel to a height of 360 000 feet (109.73 km/ 68.18 miles). The spaceflights will last for two and a half hours and the passengers will experience six minutes of weightlessness. SpaceShipTwo can carry two pilots and six passengers. On 29 April 2013 the spacecraft successfully performed its powered test flight. The first paying customers are expected to fly aboard the craft in 2014.[29] The initial seat price is 200,000 dollars with a refundable deposit starting from 20,000 dollars, but the price is expected to eventually fall to 20,000 dollars. It was reported that around 500-530 people have bought tickets.[30]

Since suborbital space tourism is viewed as a money-making proposition by several companies, the infrastructure for the industry is being developed in many locations including California, Oklahoma, New Mexico, Florida, Virginia, Alaska, Wisconsin, Esrange in Sweden, and the United Arab Emirates.[31] A number of companies have also shown interest in constructing space hotels[32] including Bigelow Aerospace, Excalibur Almaz, Hilton International, and Space Island Group. Bigelow Aerospace has already launched two inflatable habitat modules, namely 'Genesis I', launched on 12 July 2006, and 'Genesis II', launched on 28 June 2007.[33] They also plan to officially launch their first commercial space

---

[27] The aircraft has been undergoing active testing since 2010, and has conducted 22 successful gliding flight tests as of September 2012. "Virgin Galactic Successfully Completes SpaceShipTwo Glide Flight Test and Rocket Motor Firing on the Same Day", *SpaceRef.Com,* 28 June 2012, http://www.spaceref.com/news/viewpr.html?pid=37626; David, Leonard, "Virgin Galactic's Private Spaceship Makes Safe Landing After Tense Test Flight", *Space.com,* 17 October 2011, http://www.space.com/13297-virgin-galactic-spaceshiptwo-test-flight-glitch.html, both accessed: 13 May 2014.

[28] Coppinger, Rob, "PICTURES: Virgin Galactic Unveils Dyna-Soar Style SpaceShipTwo Design and Twin-Fuselage White Knight II Configuration", *Flightglobal.com,* 23 January 2008, http://www.flightglobal.com/news/articles/pictures-virgin-galactic-unveils-dyna-soar-style-spaceshiptwo-design-and-twin-fuselage-white-knight-221031/; http://en.wikipedia.org/wiki/SpaceShipTwo#cite_note-flightglobal-unveil-9, both accessed: 13 May 2014.

[29] See Amos, Jonathan, "Sir Richard Branson's Virgin Galactic Spaceship Ignites in Flight", *BBC,* 23 April 2013, http://www.bbc.com/news/science-environment-22344398; Mayer, Steven, "Space Ship Completes 24th Test Flight in Mojave", *HispanicBusiness.com.,* 4 April 2013, http://www.hispanicbusiness.com/2013/4/4/space_ship_completes_24th_test_flight.htm, both accessed: 13 May 2014.

[30] See *id;* and http://www.virgingalactic.com/, accessed: 13 May 2014.

[31] See http://en.wikipedia.org/wiki/List_of_space_tourism_companies, accessed: 13 May 2014.

[32] Information on the possibility of constructing lunar hotel was discussed in, Hilton, Barron, "Hotels in Space", *Space Future*, http://www.spacefuture.com/archive/hotels_in _space.shtml, accessed: 13 May 2014.

[33] Keuser, Sigurd De, "Launch of Genesis I Pathfinder Ushers in a New Era of Commercial Space Development", *SpaceFellowship.com,* 15 July 2006, http://spacefellowship.com/news/art1616/launch-of-genesis-i-pathfinder-ushers-in-a-new-era-of-commercial-space-development.html; "Genesis II Successfully Launched", *BigelowAerospace.com,* 28 June 2007,

station by 2014, with portions of the station becoming available for lease as early as 2015.[34] In their business plan, published in February 2010, the company offered a price of $23 million for a 30-day orbital stay on their Bigelow habitat inclusive of transport, training and consumables.[35] The Space Island Group, on the other hand, plans to have 20,000 people on their 'space island' by 2020.[36] Among other interesting developments, a Japanese fashion designer, Eri Matsui, has designed clothing, including a wedding gown, to look best in a weightless environment.[37]

With regard to its level of involvement and participation in world space activities, Malaysia can be viewed as one of the potential active space participants and contributors. Malaysia does not yet have its own launching capability; however, as a direct contributor to space technology, Malaysia has managed to prove to the world that it is capable of building and manufacturing its own satellites, a capability regarded as a new venture area of business for Malaysia.[38] This situation, indeed, signifies that Malaysia is among the continuing direct contributors influencing and contributing to the growth and development of current world space technologies and activities. Moreover, it was evident that Malaysia had also succeeded in sending one of its citizens into outer space in 2007.[39] During this venture into outer space, the country had carried out numerous scientific researches and experiments in an outer space environment which then contributed to the development of world space scientific research.[40] Apart from those activities, the Malaysian governmental and non-governmental agencies are also verified as direct users of space technologies and applications. This is particularly the case with various space-related applications such as telecommunications, broadcasting, remote sensing, meteorology, and navigation.[41]

---

http://web.archive.org/web/20080206080325/http://www.bigelowaerospace.com/news/?Genesis_II_Launched; and http://www.space.com/news/businessmonday_040524.html, all accessed: 13 May 2014.

[34] See http://bigelowaerospace.com/orbital-complex-construction.php, accessed: 13 May 2014.

[35] See http://en.wikipedia.org/wiki/Bigelow_Aerospace#cite_note-15, accessed: 13 May 2014.

[36] The Space Island Group website is available at http://www.spaceislandgroup.com/company-info.html, accessed: 13 May 2014.

[37] See Moskowitz, Clara, Staff Writer, "First Weightless Wedding Planned", *SPACE.COM*, 2 June 2009, http://www.space.com/6786-weightless-wedding-planned.html, accessed: 13 May 2014.

[38] For more information, read Chapter 1 of the thesis (1.4.5. Satellite Manufacturing and Launching).

[39] For more information, read Chapter 1 of the thesis (1.4.6. *Program Angkasawan Negara*).

[40] For more information, read Chapter 1 of the thesis (1.4.7. Scientific Research).

[41] For details, read Chapter 1 of the thesis (1.4.1. Telecommunication and Broadcasting); (1.4.2. Remote Sensing); (1.4.3. Meteorology); and (1.4.4. Navigation).

Space tourism is another potential area of space activity that is predicted to grow in Malaysia in the future. This claim is made on the basis of the fact that various efforts have been made by the Malaysian non-governmental sectors to develop numerous space tourism projects in the future.[42] This, in fact, will certainly contribute to the development of world space activities. Taking into account Malaysia's engagement with and participation in space activities in the past and the present, it can be clearly established that Malaysia is one of the Asian developing countries that has shown great interest in participating in the growth of world space activities. Such an assertion is proved by the fact that the country's participation began as early as 1960 and has continuously developed and grown over time. Thus, it is concluded that the country's level of engagement with and contribution to world space activities is quite encouraging especially since Malaysia has managed to send her own man into outer space and also manufactures space objects.

2.3. INTERNATIONAL SPACE LAW

2.3.1. The Historical Background

This section presents the historical background of international space law in the light of three related areas. They are: (1) the evolution of space law early literature; (2) the role and involvement of the United Nations; and (3) the space law institutions and social organizations. These aspects have a direct influence on the evolution and development of space law.

The first aspect is in regard to the evolution of space law's early literature. The historical evolution of space law is, indeed, closely related to the evolution of space activities.[43] It started in the late 1950s with the beginning of the space age when the Soviet Union launched the first artificial satellite, Sputnik-1[44], although there is much evidence to indicate that space

---

[42] For more information, read Chapter 1 of the thesis (1.3.2(b) Malaysian Institute of Aero and Space Studies (IKAM) and Space Tourism Society Malaysia Chapter (STS-MC); (1.4.8. Suborbital Space Plane); and (1.4.9. Commercial Spaceport).

[43] There are three types of evolutions in space activities: technological, economic, and policy and law. For details, see Matte, Nicolas Mateesco, ed. *Space Activities and Emerging International Law,* (Canada: Centre for Research of Air & Space Law, 1984), at 13-71.

[44] For an excellent account of various world space explorations, see Davies, J.K., *Space Exploration*, Chambers Encyclopaedic Guides Series, (Edinburgh: W & R Chambers, 1992).

law ideas originated long before then.[45] In fact, the basic concepts in the early United Nations declaration of principles were already known in the early literature. Furthermore, such ideas had already been stressed in the air law works as early as 1910 by a Belgian lawyer, Emile Laude. Laude noted that there was a need for a new law for gaseous layers and Hertzian (radio) waves.[46] Prior to this, in 1903 a Russian space pioneer, Konstantin Tsiolkovsky, had predicted human expansion in outer space via liquid fuelled-rockets.[47] In the middle of the 19th century, Jules Verne, the founding father of science fiction, caught the world's imagination with his remarkable story of a voyage to the moon which was expressed in the form of travel books published in 1865, entitled *De la Terre à la Lune* (From the Earth to the Moon).[48]

Other early air law work relating to the question of space law includes that of V.A. Zarzar's. In 1927, Zarzar mentioned the need for a separate legal regime to deal with the area beyond the upper limits of a state's sovereignty.[49] The first conscious elaboration of space law as a new branch of science was, however, conveyed by the father of space law, Vladimir Mandl[50], in his book *Das Weltraum-Recht: Ein Problem der Raumfahrt* (The Law of Outer Space: A Problem of Space-Flight), published in Czechoslovakia at his own expense in 1932.[51] In another book, *The Future*, Mandl stressed that state sovereignty should be restricted in its vertical dimension, and the areas beyond state sovereignty there be open to all.[52]

---

[45] Examples of the early ideas include the question of the need to define the space law, issues of international cooperation in the use of outer space, determining the upper limit of national sovereignty, regulating the use of outer space for military purposes, regulation of space telecommunications, liability for damage caused by spaceflight, legal status of outer space, rescue and return of space objects, and many others. For details, read Doyle, Stephen E., "Concepts of Space Law before Sputnik", (1998) 40 *IISL Colloquium on the Law of Outer Space* 3.

[46] Comment s'appellera le droit qui régira la vie de 1'air? *Revue Juridique Internationale de la Locomotion Aérienne* 1910, vol.1, at 16-8, as cited in Gál, Gyula, *Space Law,* Trans. Móra, (Leiden: A.W. Sijthoff, 1969), at 23; read also Lyall, Francis and Paul B. Larsen, *Space Law: A Treatise,* (Surrey: Asgate, 2009), at 5.

[47] Diederiks-Verschoor, I.H.Ph. and V. Kopal, *An Introduction to Space Law*, 3rd Revised Edition, (The Netherlands: Kluwer Law International, 2008), at 1.

[48] Verne's other books are: *A Journey to the Center of the Earth* (1864) and *Around the World in Eighty Days (*1873), his best known classic adventure story. See Jules Gabriel Verne (1828-1905), http://www.kirjasto.sci.fi/verne.htm, accessed: 13 May 2014.

[49] *Mezhdunarodnoye publichnoye vozdushnoye pravo* (Public International Air Law) In: *Voprosy Vozdushnogo Prava* 1927, vol.1, at 89-103, as cited in Gál, Gyula, *supra* note 46, at 23; Lyall, Francis, *supra* note 46, at 5.

[50] V. Kopal, "Vladimir Mandl-Founder of Space Law" (1968) 11 *IISL Colloquium on the Law of Outer Space* 357-361; G. Reintanz, 'Vladimir Mandl-the Father of Space Law' (1968), *id*., at 362-365, as cited in Lyall, Francis, *supra* note 46, at 5.

[51] Mandl (1909-1940) was born in Plzen and worked as a barrister there. It was reported that, of 500 copies of his book, 25 were sold and most of the rest he presented to the *Gesellschaft für Fortschrittliche Verkehrstechnik* in Berlin. Gál, Gyula, *supra* note 46, at 23; see also Lyall, Francis, *supra* note 46, at 6.

[52] Lyall, Francis, *supra* note 46, at 6.

In 1933, the idea of space law was also mentioned by a Russian, E. Korovin, in his paper 'Conquest of the Stratosphere and International Law' delivered to an air law conference and published in France a year later.[53] In 1953, the first space law doctoral thesis, entitled *Luftrecht und Weltraum*, was submitted by Welf Heinrich, Prince of Hanover, to the Faculty of Law and Political Science, Georg-August University, Germany.[54] Other air law authors who contributed significantly to early literature on space law, to name a few, include J.C. Cooper,[55] A. Meyer,[56] C. Berezowski,[57] B. Cheng,[58] D. Goedhuis,[59] and E.Pepin.[60] Moreover, many other space law works were written during this pre-Sputnik age, such as *Earth Satellites and the Law* by M. Aaronson,[61] *Les Voyages Interplanétaires et le Droit* by E. Danier,[62] *The Law of Space'* by C. Horsford[63] and *International Law and Activities in Space* by W. Jenks.[64]

The idea of space law was then further developed during the Sputnik age. Many major works emerged, such as John Cobb Cooper's *The Russian Satellite – Legal and Political Problems.* This was written two weeks after the Soviet Union launched Sputnik 1 and was presented at the American Rocket Society's annual meeting on 2 December 1957. The article highlighted the possible legal and political problems that might arise from the launching of objects into outer space, such as issues of boundaries of air and outer space, the need for the United Nations to serve as a forum for international discussion on outer space-related matters, and the necessity to ensure that outer space objects were used exclusively for peaceful and

[53] La conquête de la Stratosphère et le droit international*, Revue Général De Droit International Public* (*RGDIP*) 1934, at 675-86, as cited in *id*.
[54] Jasentuliyana, Nandasiri, *International Space Law and the United Nations,* (The Hague: Kluwer Law International, 1999), at 2.
[55] High Altitude Flight and National Sovereignty*, International Law Quarterly* (*ILQ*), 1951, as cited in Gál**,** Gyula, *supra* note 46, at 24.
[56] Rechtliche Probleme des Weltraumfluges*, Zeitschrift für Luftrecht* (*ZLR*), 1953, vol.2, no.1, at 31-42, as cited in *id*.
[57] Remarks on the Limitations of Air Sovereignty, *International Law Association* (*ILA*) Space Law Rep. Dubrovnik, 1956, at 167-168, as cited in *id*.
[58] Recent Developments in Air Law, *Current Legal Problems* (*CLP*), 1956, at 208-234; International Law and High Altitude Flights: Balloons, Rockets and Man-Made Satellites, *International and Comparative Law Quarterly* (ICLQ), 1957, at 487-505, as cited in *id*.
[59] Air Law: The Limitations of Air Sovereignty, *International Law Association* (*ILA*) Space Law Rep. Dubrovnik, 1956, at 196-207, as cited in *id*.
[60] Study and Research on Legal Problems Posed by Space-Flight, *Proceedings of the Seventh IAF Congress, Rome 1956*, at 17-22, as cited in *id*.
[61] *Law Times* 1955, vol. 220, at 115-116, as cited in *id*. at 25
[62] *Revue Général de l'air* (*RGA*), 1952, vol.15, at 422-425, as cited in *id*.
[63] *Journal of British Interplanetary Society* (*JBIS*), 1955, vol.14, at 144-150, as cited in *id*.
[64] ICLQ, 1956, vol.5, at 99-114, as cited in *id*.

scientific purposes. The article also suggested the need for a treaty to resolve outer space related-problems.[65] In 1957, a Latin American author, A.A. Cocca, wrote the 250-page *Teoria del Derecho Interplanetario* (Theory of Interplanetary Law) published in Buenos Aires, and in 1961 M. Seara Vázquez published *Introducción al Derecho Internacional Cosmico* (Introduction to International Space Law) in Mexico City. Later on, American authors P.C. Jessup and H.J. Taubenfeld published their 379-page book entitled *Controls for Outer Space and the Antarctic Analogy* in New York in 1959.[66] Then in 1960, Jean Rivoire, a member of the Permanent Legal Committee of International Astronautic Federation, wrote an article on 'How to Introduce the Law into Space'.[67] Such encouraging progress continued until the new age with the appearance of other works such as W.C. Jenks's *Space Law,* published in London in 1965, and E. Fasan's *Weltraumrecht*, published in Mainz in the same year.[68] Some other excellent works include Judge Manfred Lachs's *The Law of Outer Space: An Experience in Contemporary Law-Making*, published in Leiden in 1972, and *Studies in Aerospace Law: From Competition to Cooperation* by S. Bhatt, published in New Delhi in 1974.

The second aspect is the historical background of international space law in relation to the role and involvement of the United Nations. With respect to the United Nations involvement in the evolution of space law,[69] evidence demonstrates that the direct involvement occurred just after the Soviet Union launched Sputnik 1 on 4 October 1957 and the United States launched Explorer 1 on 31 January 1958. From that point, the international community realised that it was essential to formulate international rules and regulations to govern human activities in outer space. With the launch of those satellites, the world community was concerned that such new technology might lead to the colonization of space, and the arms race might be exported to this new frontier.[70] Therefore, in the late 1950s, the United Nations

---

[65] Cooper, John Cobb, "The Russian Satellite - Legal and Political Problems", *Explorations in Aerospace Law,* Ed., Vlasic, Ivan A. (Montreal: McGill University Press, 1968), at 280. The article was originally published in the Journal of Air Law and Commerce 379 (1957).
[66] Gál, Gyula, *supra* note 46, at 26.
[67] Rivoire, Jean, "How to Introduce the Law into the Space', (1960) 2 *IISL Colloquium on the Law of Outer Space* 9.
[68] Gál, Gyula, *supra* note 46, at 26.
[69] For more discussion on evolution of space law, read Goldman, Nathan C., "Space Law", *Space Politics and Policy: An Evolutionary Perspective,* Ed., Sadeh, Eligar, (Dordrecht: Kluwer Academic Publishers, 2002), at 164-172.
[70] Jasentuliyana, *supra* note 54, at 22.

took a significant step, fulfilling its tasks to maintain international peace and security[71] and encourage the progressive development of international law and its codification[72] by establishing the ‘Committee on the Peaceful Uses of Outer Space’ (hereinafter, ‘COPUOS’ or ‘UNCOPUOS’) in order to ensure international cooperation in outer space and the development of international space law.

The establishment of COPUOS in 1958 marked the birth of the space law-making process in the United Nations. This happened shortly after the first space launch when the United States Permanent Representative to the United Nations addressed a letter to the Secretary-General[73] requesting that an item called ‘Programme for International Cooperation in the Field of Outer Space’ be placed on the General Assembly[74] agenda at its thirteenth session in 1958. The letter called for the establishment of a specific Committee to conduct the necessary studies and propose recommendations for the Assembly in order to ensure that outer space would be used for the benefit of all mankind.[75] As a result, the General Assembly set up an *ad hoc* COPUOS with 18 members.[76] The Committee’s tasks, among others, were to report to the General Assembly on all the activities of the agencies and international bodies relating to the uses of outer space, and also to study the nature of legal problems that might arise from such activities.[77] One year later, the *ad hoc* COPUOS was made permanent with its membership increased to 24 states.[78]

The COPUOS at its second session in 1962 formed two sub-committees: (1) the Scientific and Technical Sub-Committee; and (2) the Legal Sub-Committee.[79] Prior to that, in

---

[71] UN Charter, San Francisco, 26 June 1945, entered into force 24 October 1945, 24 UST 2225, TIAS No. 7739, TS 993, at Art.1, para. 1.
[72] *Id.,* Art.13, para. 1(a).
[73] Secretary-General is the head of the Secretariat of the United Nations. He acts as the *de facto* spokesman and leader of the United Nations. The current Secretary-General is Ban Ki-Moon, from South Korea. See http://www.un.org/; and, http://en.wikipedia.org/wiki/Secretary-General_of_the_United_Nations, accessed: 13 May 2014.
[74] General Assembly is one of the United Nations’ principal organs. It is the main deliberative assembly which is composed of all United Nations member states. It meets in regular yearly sessions under a president elected from the member states. The first session convened on 10 January 1946 in Westminster Central Hall, London. See *id*.
[75] UN Doc. A/3902 of 2 September 1958. Jasentuliyana, *supra* note 54, at 2.
[76] *Question of the Peaceful Uses of Outer Space*, UNGA Res. 1348 (XIII), 13 December 1958. See *id.*, at 23.
[77] See http://www.oosa.unvienna.org/oosa/en/COPUOS/cop_overview.html, accessed: 13 May 2014.
[78] UNGA Res. 1472 (XIV) of 12 December 1959. See *id*. For more information, read Chapter 2 of the thesis (2.4.1(a) United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS).
[79] *Report of the Committee on the Peaceful Uses of Outer Space on the Work of its First Session,* UN Doc. A/5109, 1962, para.4. See *id.*, at 3.

December 1961, the General Assembly had taken a significant step in the history of the development of space law by adopting a guiding principle stressing that outer space and celestial bodies would be 'free for exploration and use by all states in conformity with international law and would not be subject to national appropriation'.[80] And, in December 1963, it was further elaborated with the adoption of the 'Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space',[81] which then formed the basis of the Outer Space Treaty of 1967.[82] The COPUOS also developed, besides the legal principles governing space activities, four other multilateral treaties to regulate human activities in space. They are the Rescue Agreement of 1968,[83] the Liability Convention of 1972,[84] the Registration Convention of 1975,[85] and the Moon Agreement 1979.[86] These United Nations international treaties established the core regime for international space law. Thus far, the United Nations has been playing a primary role in developing the international space law, particularly through COPUOS, which is considered the most obvious forum for the growth of space law.[87]

The third aspect is in relation to the space law institutions and social organizations. In this respect, of the institutions and organizations that have played an important role in the evolution of space law from its initial stage, the best example is the International Astronautical Federation (IAF).[88] Its emergence in 1951 served as an international forum for

---

[80] UNGA Res. 1721 A (XVI), on the 'International Co-operation in the Peaceful uses of Outer Space' adopted on 20 December 1961. Matte, Nicolas Mateesco, "Space Law", *Encyclopaedia of Public International Law: Law of the Sea, Air and Space Law,* Published under the Auspices of the Max Planck Institute For Comparative Public Law and International Law Under the Direction of Rudolf Bernhardt, (Amsterdam: North-Holland, 1989), at 304.
[81] UNGA Res. 1962 (XVIII), on the 'Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space,' adopted on 13 December 1963; *id*.
[82] For more information, read Chapter 2 of the thesis (2.3.3 (a) The Outer Space Treaty 1967). See also *infra* note 161.
[83] For more information, read Chapter 2 of the thesis (2.3.3 (b) The Rescue Agreement 1968). See also *infra* note 180.
[84] For more information, read Chapter 2 of the thesis (2.3.3 (c) The Liability Convention 1972). See also *infra* note 196.
[85] For more information, read Chapter 2 of the thesis (2.3.3 (d) The Registration Convention 1975). See also *infra* note 212.
[86] For more information, read Chapter 2 of the thesis (2.3.3 (e) The Moon Agreement 1979). See also *infra* note 231.
[87] Matte, "Space Law", *supra* note 80, at 304; see also, Lyall, Francis, *supra* note 46, at 17.
[88] IAF is an international non-governmental and non-profit organization that is based in Paris and works closely with the United Nations. Among its missions are the promotion of public awareness and appreciation of space activities, and the exchange of information on space programme developments and plans. It has 206 members from 58 countries. IAF has a permanent observer status with the United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS). Prof. Dr. Berndt Feuerbacher of Germany is the current President. Its website is available at http://www.iafastro.com/, accessed: 31 October 2012.

exchanging views and information on all aspects of astronautics, including space law.[89] This was achieved through its meetings, the series of *Acta Astronautica*,[90] and the Proceedings of the International Institute of Space Law. In 1960 the IAF established the International Academy of Astronautics (IAA) which convenes experts to exchange ideas and experience to contribute to the advancement of space and astronautics.[91] Four days after the launch of Sputnik, the Eighth IAF International Congress on Astronautics was held in October 1957. In 1958, The Hague Colloquium decided that a 'Permanent Legal Committee' should be established within the IAF to study the problem of space law and this was accepted by the IAF Congress in the same year. In 1960, the IAF founded the 'International Institute of Space Law (IISL)'[92] replacing the 'Permanent Legal Committee'. This Institute continues to organize the famous annual colloquia during the Congresses of the IAF. Its colloquia proceedings have made a significant contribution to the corpus of space law.[93]

Another active non-governmental organization is the International Law Association (ILA),[94] founded in Brussels in 1873 and consisting of an international group of lawyers. ILA studies and helps to clarify the international law as well as producing a number of reports on space law. In 1958, ILA Space Law Committee was set up in New York. The Committee submitted its fifth report addressing the 'Legal aspects of the privatization and commercialization of space activities: remote sensing and national space legislation' at the Sofia Conference (the 75th ILA Conference held in Sofia on 26-30 August 2012). It was adopted by the Conference without dissent. There are two parts of the report: Part I (remote sensing and satellite data in court, dispute settlement and space debris); and Part II (national space legislation – 'the Sofia

[89] Doyle, *supra* note 45, at 3.
[90] *Acta Astronautica* is a monthly journal publication of the International Academy of Astronautics (IAA) that covers developments in space science technology. See http://www.iafastro.net/?id=457, accessed: 13 May 2014.
[91] IAA was founded on 16 August 1960 in Stockholm, Sweden. It is an independent non-governmental organization working closely with United Nations. Its aims, among others, are to foster development of astronautics for peaceful purposes, and to provide a program by which members can contribute to international endeavour. It has 899 full members and 277 corresponding members from 84 countries. It was originally led by Theodore Von Karman, a prominent figure in the evolution of rocketry. IAA has a permanent observer status with the UNCOPUOS. The current president is Dr. Madhavan G. Nair of India. Its website is available at http://iaaweb.org/, accessed: 31 October 2012. Lyall, Francis, *supra* note 46, at 9.
[92] Among the objectives of the IISL are to cooperate with international organizations and national institutions in the space law sphere, and to foster the development of space law. Its current president is Mrs Tanja L. Masson-Zwaan of Netherlands. Its website is available at http://www.iislweb.org/, accessed: 13 May 2014.
[93] Lyall, Francis, *supra* note 46, at 10.
[94] ILA is a non-profit organization, headquartered in London. Its aim is to promote the study, clarification and development of international law, including space law. It membership ranges from lawyers, academics, government and judiciary. Its current president is Professor Ruth Wedgwood. Its website is available at http://www.ila-hq.org/, accessed: 13 May 2014; read also UN Doc. A/AC.105/C.2/103, 1 February 2013.

Guidelines for a Model Law on National Space Legislation') (hereinafter, 'the Sofia Guidelines'). This report is contained in UN Doc. A/AC.105/C.2/103 (1 February 2013). The Committee has indeed contributed significantly in the drafting of the Sofia Guidelines, available in French and English with explanatory notes. The Sofia Guidelines were adopted by the 75th ILA Conference on 30 August 2012 as resolution 6/2012, and available in UN Doc. A/AC.105/C.2/2013/CRP.6 (26 March 2013). It is the first of their kind of international instrument laying down a proposal for a Model Law dealing with national space legislation. The Committee also takes part in the work of the expert group on the development of an education curriculum in space law.[95]

Among other main early institutions is McGill University of Montreal, which established the Institute of International Air Law in September 1951 headed by Professor John Cobb Cooper. At present, it bears the name of 'Institute of Air and Space Law (IASL)'.[96] Its renowned journal, *Annals of Air and Space Law*, which was been published since 1976, has contributed significantly to the corpus of space law. The Institute of Air and Space Law (*Institut für Luft- und Weltraumrecht*)[97] of Cologne University was founded in 1925. It is the oldest of its kind in the world, and its famous journal, *Zeitschrift für Luft- und Weltraumrecht (ZLW)* (The German Journal of Air and Space Law)[98], has played the same role. Another example is the University of Mississippi's School of Law, with its publication *Journal of Space Law*,[99] founded in 1973 by Professor Stephen Gorove. In Holland, Leiden University initiated air law studies following the appointment of Professor Daniel Goedhuis in 1938, with the establishment of a chair in 1947. It then introduced space law in 1961. These endeavours were continued by Professor Henri Wassenbergh who, in 1985, founded the Leiden Institute of Air and Space Law, currently known as International Institute of Air and Space Law

[95] The current officers of the ILA Space Law Committee are Professor Maureen Williams (headquarters - London) as Chair, and Professor Stephan Hobe (Germany) as General Rapporteur. The Committee has a permanent observer status with the UNCOPUOS. See *Id*. The full text of the Sofia Guidelines for a Model Law is available in the UN Doc. A/AC.105/C.2/2013/CRP.6, 26 March 2013; read also the fifth ILA Report in the UN Doc. A/AC.105/C.2/103, 1 February 2013; Lyall, Francis, *supra* note 46, at 10.
[96] IASL official website is available at http://www.mcgill.ca/iasl/, accessed: 13 May 2014.
[97] Its official website is at http://www.ilwr.de/index.php?lang=eng, accessed: 13 May 2014.
[98] The *ZLW* was first published by Prof. Alex Meyer under the name of *Zeitschrift für Luftrecht* (Journal of Air Law) in 1951/1952. For an excellent account of its history, refer "The History of the "Zeitschrift für Luft- und Weltraumrecht, ZLW" (German Journal of Air and Space Law), available at http://www.uni-koeln.de/jur-fak/instluft/geschichte/01_08.pdf, accessed: 13 May 2014.
[99] For more information, refer to http://www.spacelaw.olemiss.edu/jsl/index.html, accessed: 13 May 2013.

(IIASL).[100] Among other universities, the University of el Salvador in Buenos Aires, Argentina established a chair of Air and Space Law in 1960, and also a National Institute of Air and Space Law in 1962.[101] In 1990, the European Centre for Space Law (ECSL)[102] was established under the leadership of Dr G. Lafferanderie. It is also worth mentioning the David Davies Memorial Institute of International Studies (United Kingdom), which has contributed to the Draft Code of Rules on the Exploration and Uses of Outer Space of 1963.[103]

2.3.2. Meaning and Sources of International Space Law: An Overview

The increase in world space activities and the complexity of their nature may lead to a variety of space legal problems. To deal with such situations, a body of legal norms came into existence to regulate the relations between states, international organizations, and private persons arising from the exploration and use of outer space.[104] With respect to the meaning of space law, in practical terms it refers to a body of norms governing the legal relations arising in connection with space exploration. In a wider sense, it covers all the national rules including the constitutional law, state-administrative law, and civil, criminal, and private international law that relates to space activities or their effects. And, in a narrower sense, it regulates the international relations connected with space exploration and the use of outer space.[105] There are also some other meanings proposed by publicists such as Münch. He referred to international space law as a legal system that is applied to a zone adjacent to the air region which carries traditional aircraft.[106] Meanwhile, Homburg claimed that it is a system of rules of navigation beyond the Earth's atmosphere.[107] Lachs, however, wrote that it refers to law intended to regulate relations between states to determine their rights and duties resulting from all activities directed towards outer space and within it, and to do so in the interest of mankind as a whole, to offer protection to life, terrestrial and non-terrestrial,

---

[100] The IIASL official website is available at http://law.leiden.edu/organisation/publiclaw/iiasl/, accessed: 13 May 2014.
[101] Lyall, Francis, *supra* note 46, at 13.
[102] The ECSL official website is available at http://www.esa.int/SPECIALS/ECSL/, accessed: 13 May 2014.
[103] Lyall, Francis, *supra* note 46, at 11-15; see also Gál, Gyula, *supra* note 46, at 27.
[104] Bogaert, E.R.C. van, *Aspects of Space Law,* (Deventer: Kluwer Law and Taxation, 1986), at 6.
[105] Gál, Gyula, *supra* note 46, at 35-37.
[106] Münch, I.von, "Grundfragen des Weltraumrechts", *Archiv des Völkerrechts,* (1959), at 156, as cited in Bogaert, E.R.C. van, *supra* note 104, at 7.
[107] Homburg, R., "Droit Astronautique et Droit Aerien", *Revue Générale de 1'air,* (1958), at 11-16, as cited in *id*.

wherever it may exist.[108] Despite those numerous meanings prescribed by scholars, it is stipulated that the international space law denotes rules governing the outer space area.

Since the international space law has been regarded as part of international law, in principal it follows the sources of international law. A source of law refers to the basis or source to which one refers while determining or drafting the law on a particular matter.[109] There are two types of sources of international law: material sources and formal sources. The material source refers to the place in which the terms of the rule are set out, such as in treaties, United Nations General Assembly resolutions, proposals of the United Nations International Law Commission, judicial decisions, and even statements in textbooks. However, formal sources in fact determine the question of the authority as a rule of law which is binding on states.[110] The sources are established based on Article 38, Statute of the International Court of Justice[111]. The order of arrangement of the sources was not stated to represent a hierarchy, but does represent an order of importance which, in practice the court may be expected to observe.[112] Relying on this, the international space law sources may incorporate the following:

(a) International Treaty and Convention

The circumstances of the natural global tasks of outer space undoubtedly necessitated early international regulations by treaty. A treaty is defined as 'an international agreement concluded between states in written forms and governed by international law, whether

---

[108] Lachs, M., "The International Law of Outer Space", (1964-III) 113 *Recueil des Cours,* at 33; Diederiks-Verschoor, I.H.Ph. and V.Kopal, *supra* note 47, at 7.
[109] Lyall, Francis, *supra* note 46, at 31.
[110] It is said that the material source supplies the substance of the rule to which the formal source gives the force and nature of the law. For more information, read Thirlway, Hugh, "The Sources of International Law", *International Law,* Ed., Evans, Malcolm D., (New York: Oxford University Press Inc., 2003), at 117-120; MacLean, Robert M., ed., *Public International Law Textbook,14th Edition,* (London: HLT Publications, 1992), at 8.
[111] Article 38, Statute of the International Court of Justice (hereinafter, 'Statute of the ICJ') stipulates: *'The Court, whose function is to decide in accordance with international law such disputes as are submitted to it, shall apply:*

- *(a) International conventions, whether general or particular, establishing rules expressly recognised by the contesting states;*
- *(b) International custom, as evidence of a general practice accepted as law;*
- *(c) The general principles of law recognised by civilised nations;*
- *(d) Subject to the provisions of Article 59, judicial decisions and the teachings of the most highly qualified publicists of the various nations, as subsidiary means for the determination of rules of law.'*

[112] MacLean, Robert M., *supra* note 110, at 7.

embodied in a single instrument or in two or more related instruments, and whatever its particular designation'.[113] These agreements are given numerous names such as conventions, pacts, declarations, charters, concordats, protocols, and covenants.[114] To qualify as treaties, they must satisfy certain criteria.[115]

In comparison with the process of law creation through custom, treaties are considered a more modern and more deliberated method.[116] Indeed, they were preferred to customary law.[117] In practice, treaties are seen as the most important source of international law as they need the express consent of the parties.[118] Furthermore, they can be used as an instrument of anticipatory legal regulation of future activities which do not exist at the time when the treaty is concluded.[119] The treaty's binding nature is, in fact, based on the *pacta sunt servanda* principle.[120] Article 26 of the Vienna Convention on the Law of Treaties 1969 affirms that 'every treaty is binding upon the parties to it and must be performed by them in good faith'. The first and earliest space treaty is the 'Treaty on the Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies' (also known as the 'Outer Space Treaty 1967')[121]. This treaty serves as a foundation for the exploration and use of outer space. There are four other major corpuses of United Nations outer space treaties: (1) the Agreement on the Rescue of Astronauts, the Return of Astronauts, and the Return of Objects Launched into Outer Space (also known as 'the Rescue Agreement 1968');[122] (2) the Convention on International Liability for Damage Caused by

---

[113] Article 2(1)(a), Vienna Convention on the Law of Treaties 1969. This is a multilateral convention that codified the law of treaties. It was adopted in 1969 and accepted by a large number of states.
[114] MacLean, Robert M., *supra* note 110, at 157.
[115] Those criteria are: (a) It should be a written instrument or instruments between two or more parties; (b) Parties must be endowed with international personality; (c) It must be governed by international law; (d) It should be intended to create legal obligations. See *id*.
[116] Shaw, Malcolm N., *International Law,* (United Kingdom: Cambridge University Press, 2004), at 88.
[117] Matte, Nicolas Mateesco, ed. *Space Activities and Emerging International Law,* (Canada: Centre for Research of Air & Space Law, 1984), at 73.
[118] Shaw, Malcolm N., *supra* note 116, at 87.
[119] Vereshchetin, V.S. and Danilenko, Gennady M., "Custom as a Source of International Law of Outer Space", (1985) 13 *Journal of Space Law* 22, at 23.
[120] The principle means that agreements must be kept, or treaties observed. Martin, Elizabeth A. And Jonathan Law, eds., Oxford Dictionary of Law, (New York: Oxford University Press Inc., 2006), at 378; Thirlway, Hugh, *supra* note 110, at 122.
[121] It was accepted by UNGA Res. No. 2222 (XXI), 19 December 1966, opened for signature in Moscow on 27 January 1967, and entered into force on 10 October 1967. For more information, read Chapter 2 of the thesis (2.3.3(a) The Outer Space Treaty 1967).
[122] It was accepted by UNGA Res. No. 2345 (XXII), adopted on 19 December 1967, opened for signature on 22 April 1968, and entered into force on 3 December 1968. For more information, read Chapter 2 of the thesis (2.3.3(b) The Rescue Agreement 1968).

Space Objects (also known as ‘the Liability Convention 1972’);[123] (3) the Convention on Registration of Objects Launched into Outer Space (also known as ‘the Registration Convention 1975’);[124] and (4) the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (also known as the ‘Moon Agreement 1979’).[125]

Space law does not consist solely of United Nations-made law; it is complemented by law resulting from other multilateral and bilateral agreements,[126] e.g. agreements entered into by the space-faring nations to govern matters such as cooperation in space science, research and space development, satellite communication, remote sensing, earth observation, space launching, and many others.[127] Such multilateral agreements include the Convention on the Transfer and Use of Data of Remote Sensing of the Earth from Outer Space (19 May 1978), and the Agreement establishing the Asia-Pacific Institute for Broadcasting Development (12 August 1977). Meanwhile, bilateral legal instruments include the Agreement between Argentina and China on Cooperation in Research and Development in the Field of Aerospace Science (16 May 1988) and the Agreement between the United States and Ukraine Regarding the International Trade in Commercial Space Launch Service (21 February 1996).[128] Space law also consists of the multilateral agreements and arrangements established by inter-governmental organizations such as INTELSAT,[129] EUMETSAT,[130] and ARABSAT.[131]

---

[123] It was accepted by UNGA Res. No. 2777 (XXVI), adopted on 29 November 1971, opened for signature on 29 March 1972, and entered into force on 1 September 1972. For more information, read Chapter 2 of the thesis (2.3.3(c) The Liability Convention 1972).

[124] It was accepted by UNGA Res. No. 3235 (XXIX), adopted on 12 November 1974, opened for signature on 14 January 1975, and entered into force on 15 September 1976. For more information, read Chapter 2 of the thesis (2.3.3(d) The Registration Convention 1975).

[125] It was accepted by UNGA Res. No. 34/68, adopted on 5 December 1979, opened for signature on 18 December 1979, and entered into force on 11 July 1984. For more information, read Chapter 2 of the thesis (2.3.3(e) The Moon Agreement 1979).

[126] The reasons behind the multilateral and bilateral agreements are, inter alia, to overcome the problems of certain projects that are too complicated and costly to be conducted by a single space power, to acquire space techniques and conduct space activities, and to exchange space information and experience, particularly for the small space nations. Matte, Nicolas Mateesco, *Aerospace Law: From Scientific Exploration to Commercial Utilization,* (Canada: The Carswell Company Limited, 1977), at 71.

[127] Jasentuliyana, Nandasiri, *supra* note 54, at 7-11.

[128] For a list of its agreements and legal documents, see United Nations for Outer Space Affairs, *International Agreements, and Other Available Legal Documents Relevant to Space-related Activities: A List of International Agreements and Other Available Legal Documents Relevant to Space-Related Activities,* (New York: United Nations, 1999).

[129] International Telecommunications Satellite Organization (INTELSAT), 20 August 1971, is a major communication satellite service provider. It owns and manages a constellation of communications satellites providing international broadcast services. Its website is at http://www.intelsat.com/; refer also http://en.wikipedia.org/wiki/Intelsat, accessed: 1 November 2012.

[130] European Organization for the Exploitation of Meteorological Satellites (EUMETSAT), 24 May 1983 (1990 UKTS 32), is an intergovernmental organization established through an international convention agreed by at

(b) Customary International Law

International custom is the next source for consideration after the treaty, particularly in the absence of the treaty or convention. Historically, evidence shows that custom was the first source of the international outer space law before the conclusion of the Outer Space Treaty 1967.[132] Its existence can be deduced from the practice and behaviour of states.[133] Article 38, Statute of the ICJ, refers to 'international custom, as evidence of a general practice accepted as law'.[134] The international custom has two main roles: firstly, it serves as a source of legal rights and obligations of states in their mutual relations whenever the treaty regulation is absent. Secondly, it regulates the relations of states when both or either are/is parties or non-parties to a codifying convention.[135] The validity of the source depends on certain requirements including consistency of a practice.[136] However, proof of a long-lasting or an immemorial practice is unnecessary when the rules, in certain circumstances, can emerge from fairly quick maturing of practice.[137] This 'instant' customary law can prescribe valid rules without having to undergo a long period of gestation.[138] The foregoing considerations on the instant development of space law do not necessarily have their counterpart in other branches of public international law, but this question goes beyond the scope of this dissertation.

---

least 26 European Member States. Its aims are to establish, maintain and exploit European systems of operational meteorological satellites. Its website is available at http://www.eumetsat.int/; see also http://en.wikipedia.org/wiki/European_Organisation_for_the_Exploitation_of_Meteorological_Satellites, accessed: 1 November 2012.

[131] Arab Corporation for Space Communication (ARABSAT), 14 April 1976, is the main communication satellite operator in the Arab world. It aims to deliver satellite-based, public and private telecommunications services to the Arab States. At present, it has more than 20 member countries. Its website is available at http://www.arabsat.com/; refer also http://en.wikipedia.org/wiki/Arab_Satellite_Communications_Organization#History, accessed: 2 November 2012.

[132] Vereshchetin, V.S., *supra* note 119, at 25.

[133] Shaw, Malcolm N, *supra* note 116, at 69.

[134] Article 38, Statute of the ICJ, *supra* note 111.

[135] Vereshchetin, V.S., *supra* note 119, at 24.

[136] The elements of custom are discussed in Brownlie, Ian, *Principles of Public International Law,* (United States: Oxford University Press, 2008), at 7-8.

[137] See *id*., at 7; Shaw, Malcolm N, *supra* note 116, at 70

[138] Judge Lachs (International Court of Justice) emphasized that a short period of time is not itself a bar to the formation of rule of customary law; 'Bogaert feels there is no need for a practice to be long lasting, provided recognition is properly signalled. He further notes it might be logical to consider approval by the UNGA as an expression of such recognition', as quoted from Diederiks-Verschoor, *supra* note 47, at 11; Shaw, Malcolm N, *supra* note 116, at 70; Bogaert, E.R.C. van, *supra* note 104, at 20.

Some instances of customary international rules of outer space include the following: outer space is open and free for exploration and use by all states; outer space is not subject to national appropriation; the national sovereignty of states does not extend to outer space; and states retain jurisdiction and control over space objects launched into outer space.[139]

(c) General Principles of Law

The general principles of law may derive from international treaties or customary law rules. To qualify under such a category, a legal rule must be recognised by a fair number of nations.[140] The first general principle of international space law to be established was 'outer space and celestial bodies are free for exploration and use by all states in conformity with international law and are not subject to national appropriation', which was laid down in the UNGA Resolution 1721.[141] This principle, with a number of other principles, was declared in the Resolution of 1962 entitled 'Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space'.[142] This declaration then formed the basis of the Outer Space Treaty 1967. However, many United Nations member states do not consider resolutions, which contained the principles therein, binding except when such principles are reproduced in treaties.[143] This is reflected in Article 10 of the United Nations Charter, which established that the General Assembly can make recommendations on subjects discussed but has no legislative power.

Even though space resolutions have no constitutive effect, it is agreed that such resolutions must be respected based on the principle of good faith. This claim is based on the evidence that resolutions play an important role in the process of forming new principles and norms of international law, as well as corroborating, consolidating and interpreting the existing principles and norm of the international law. Indeed, UNGA Resolutions on space carry extra weight because of the consensus rule in COPUOS. In fact, violating the resolutions would

---

[139] Vereshchetin, V.S., *supra* note 119, at 25; Matte, Nicolas Mateesco, *supra* note 117, at 81; Gál, Gyula, *supra* note 46, at 44.
[140] Matte, Nicolas Mateesco, *supra* note 117, at 87.
[141] UNGA Res. 1721 A (XVI), on the 'International Co-operation in the Peaceful uses of Outer Space' adopted on 20 December 1961.
[142] UNGA Res. 1962 (XVIII), *supra* note 81.
[143] Matte, Nicolas Mateesco, *supra* note 117, at 86. For the legal effect of UN Resolution, read Ogunbanwo, Ogunsola B., *International Law and Outer Space Activities,* (The Hague: Martinus Nijhoff Publishers, 1975), at 15-16.

amount to contempt of the legal conviction declared by the members of the United Nations. Additionally, it would be treated as a violation of the *bona fide* undertaken by the act of signing the Charter and accepting the obligations therein.[144]

(d) Other Subsidiary Material Sources

Other informal sources may include judicial decisions, and the teaching of the most qualified publicists. The decisions of international tribunals and national courts dealing with international outer space matters are also regarded as authoritative evidence. The same is true for the highly qualified publicists who contribute to the formation and development of international space law through their published works.[145]

2.3.3. Malaysia and the Five Outer Space Conventions

In Malaysia, jurisdiction and power in respect of international treaties, agreements, and conventions is a competence of the Malaysian Federal Government and not the State Government. This is construed from Article 74(1) read together with Item 1(a) and (b) of the Federal List, the Malaysian Federal Constitution.[146] By virtue of this Article, the Federal Government has power to deal with matters enumerated in the Federal List and also the Concurrent List of the Federal Constitution.[147] In this context, one of the significant matters listed under the Federal List is 'external affairs'. This term has been further described to include: '*(a) treaties, agreements and conventions with other countries* ..., and also *(b) implementation of treaties, agreements and conventions with other countries'*.[148] Thus, it is submitted that the Federal Government has exclusive jurisdiction and power in regard to outer space treaties, agreements, and conventions.[149]

[144] Some argued that the resolutions are binding in the sense that they are evidence of international customary law. See Matte, Nicolas Mateesco, *supra* note 117, at 85; Gál, Gyula, *supra* note 46, at 44-46.
[145] Matte, Nicolas Mateesco, *supra* note 117, at 90.
[146] For detail of Article 74 of the Federal Constitution, see Chapter 1, *supra* note 107. For Item 1(a) and (b), List I – Federal List, see Chapter 1, *supra* note 115.
[147] See Annex 1: List I-Federal List, under the Ninth Schedule, Malaysian Federal Constitution. See also Annex 3: List III – Concurrent List under the Ninth Schedule, Malaysian Federal Constitution.
[148] See Item 1(a) and (b), List I – Federal List. For detail refer Chapter 1, *supra* note 115.
[149] For more information, read Chapter 1 of the thesis (1.2.2(c) The Malaysian Federal Constitution).

Article 80(1) of the Federal Constitution prescribes: *'… the executive authority of the Federation extends to all matters with respect to which Parliament may make laws …'*[150] Hence, it is construed that the Federation's executive authority has extended to the making or conclusion of the international treaties, agreements, and conventions with other countries including the treaties, agreements and conventions in relation to outer space related-matters. At this juncture, by virtue of this Article and Item 1 of the Federal List, it is noted that the treaty-making power in Malaysia is vested in the executive authority of the Federal Government.[151] Meanwhile, Article 39 of the Federal Constitution further explains that the executive authority of the Federation shall, in fact, be vested in the Yang di-Pertuan Agong (the King) and exercisable by him or Cabinet or any Minister authorised by the Cabinet.[152] Such circumstance is then re-affirmed in the case of *the Government of the State of Kelantan v. the Government of the Federation of Malaya and Tunku Abdul Rahman Putra Al-Haj*.[153]

Regarding the international space treaties and conventions, there are five major regimes of space treaties and conventions formulated by the UNCOPUOS[154] and approved by the United Nations General Assembly. These space treaties are: (1) the Outer Space Treaty 1967;[155] (2) the Rescue Agreement 1968;[156] (3) the Liability Convention 1972;[157] (4) the Registration

[150] See Article 80 (Distribution of Executive Powers), sub clause 1 of the Federal Constitution.
[151] Abdul Ghafur Hamid @ Khin Maung Sein, "Treaty-Making Power in Federal States with Special Reference to the Malaysian Position", (2003) 30 *Journal of Malaysian and Comparative Law (JMCL)*, 65-88. See also Abdul Ghafur Hamid @ Khin Maung Sein, "Judicial Application of International Law in Malaysia: An Analysis", *The Malaysian Bar,* 31 March 2006, http://www.malaysianbar.org.my/international_law/judicial_application_of_international_law_in_malaysia_an_analysis.html, accessed: 13 May 2014.
[152] According to Article 39 of the Malaysian Federal Constitution, the executive authority of Federation shall be vested in the Yang di-Pertuan Agong and exercisable … by him or by Cabinet or any Minister authorised by the Cabinet. See also Abdul Ghafur Hamid @ Khin Maung Sein, "Judicial Application of International Law in Malaysia: An Analysis", *id.*
[153] [1963] MLJ 355 (Federation of Malaya High Court). In this case, Kelantan, one of states in the Federation of Malaya, challenged the constitutionality of Malaysia Agreement, an international treaty signed by the United Kingdom, the Federation of Malaya, Singapore, Sabah and Sarawak. The Federation of Malaya was represented by the Prime Minister, the Deputy Prime Minister, and four other members of the Cabinet. The state of Kelantan argued that the consent of the individual States of the Federation of Malaya should have been obtained before the arrangements for Malaysia can be lawfully implemented. By virtue of Article 39 and 80(1) of the Federal Constitution, Court affirms the constitutionality of the Malaysia Agreement. See also Abdul Ghafur Hamid @ Khin Maung Sein, "Judicial Application of International Law in Malaysia: An Analysis", *supra* note 151.
[154] The UNCOPUOS was established on 12 December 1959 by the UNGA Res. 1472 (XIV). For further elaboration read Chapter 2 of the thesis (2.4.1 (a) United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS).
[155] The Outer Space Treaty 1967, *infra* note 161.
[156] The Rescue Agreement 1968, *infra* note 180.
[157] The Liability Convention 1972, *infra* note 196.

Convention 1975;[158] and (5) the Moon Agreement 1979.[159] These treaties serve as the basis of the international space law. They principally support the idea of maintaining international peace and security, as well promoting international cooperation and understanding in the exploration and use of outer space.[160] This section will present an overview of each of these treaties and highlight the position of Malaysia in relation to signature and ratification of the treaties.

(a) The Outer Space Treaty 1967

The treaty on Principles Governing the Activities of States in the Exploration and Use of the Outer Space, Including the Moon and Other Celestial Bodies, commonly known as the 'Outer Space Treaty 1967'[161], was adopted by the United Nations General Assembly in its Resolution 2222 (XXI) on 19 December 1966. It was opened for signature on 27 January 1967 in London, Moscow, and Washington D.C., and entered into force on 10 October 1967.[162] As a cornerstone of the international space law, the Outer Space Treaty provides the foundation of the international legal order in outer space by laying down the general principles and rules of the law of outer space.

The origins of the Treaty date back to the 1950s and are closely related to the development of space science and technology and the wide range of legal issues related to the exploration and use of outer space.[163] A major concern arose specifically after the launch of Sputnik-1 on 4 October 1957 by the Soviet Union and Explorer-1 on 31 January 1958 by the United

---

[158] The Registration Convention 1975, *infra* note 212.
[159] The Moon Agreement 1979, *infra* note 231.
[160] Jasentuliyana, Nandasiri, *supra* note 54, at 4.
[161] Treaty on Principles Governing the Activities of States in the Exploration and Use of the Outer Space, Including the Moon and Other Celestial Bodies (1967) (Resolution 2222 (XXI)). (1967) 610 UNTS 205, 18 UST 2410, TIAS 6347; (1967) 6 ILM 386; (1967) 61 AJIL 644. In this section, all Articles, unless specified otherwise, refer to those in the Outer Space Treaty 1967. The full text of the treaty is available at United Nations, *United Nations Treaties and Principles on Outer Space: Text of Treaties and Principles Governing the Activities of States in the Exploration and Use of Outer Space, Adopted by the United Nations General Assembly,* (New York: United Nations, 2002), at 3, http://www.oosa.unvienna.org/pdf/publications/STSPACE11E.pdf, accessed: 13 May 2014.
[162] The depositories of the Outer Space Treaty are: Russian Federation, United Kingdom of Great Britain and Northern Ireland, and United States of America. United Nations, *United Nations Treaties and Principles on Outer Space and Related General Assembly Resolutions: Status of International Agreements Relating to Activities in Outer Space as at 1 January 2009*, Addendum, Ref.: Sales No. E.08.1.10, ST/SPACE/11/Rev.2/Add.2 (Vienna: United Nations, 2009), at 2.
[163] He, Qizhi, "The Outer Space Treaty in Perspective", (1998) 40 *IISL Colloquium on the Law of Outer Space* 51.

States.[164] This accessibility of outer space to mankind was troubling to the international community for there was a great possibility of the area being misused in the arms race between the space superpowers. This situation prompted the United Nations to respond quickly and accordingly by setting up an *ad hoc* Committee on COPUOS in 1958 based on Resolution 1348 (XIII).[165] The Committee then became permanent in 1959 based on Resolution 1472 (XIV).[166] The Committee was entrusted with studying the legal problems that could possibly arise from the space activities. Since then, the COPUOS has continued with its tasks by adopting numerous resolutions including Resolution 1721 (XVI)[167] and Resolution 1962 (XVIII)[168] which later led to the formation of the Outer Space Treaty in 1967. Guided by the basic articles established in the Outer Space Treaty, the COPUOS afterwards developed the legal rules in more detail, later incorporated in four other outer space treaties.[169] By common consent, the Outer Space Treaty is regarded as the basic charter for all space activities, and the four additional treaties, which will be discussed in the next section, are elaborations of specific principles set forth in the Outer Space Treaty.[170]

Malaysia is currently a signatory state to the Outer Space Treaty but without ratification.[171] Malaysia signed the Treaty on three different dates and at three different places. They were on 20 February 1967 in Washington D.C., on 21 February 1967 in London, and on 3 May 1967 in Moscow.[172] By signing a treaty, a state signifies its preliminary consent to be bound by such treaty.[173] This is evidenced by Article 11 of the Vienna Convention on the Law of

---

[164] For more details of the event, read Davies, J.K., *Space Exploration*, Chambers Encyclopaedic Guides Series, (Edinburgh: W & R Chambers, 1992), at 46-49, 221-224.

[165] UNGA Res. 1348 (XIII), on the 'Question of the Peaceful Use of Outer Space', adopted on 13 December 1958.

[166] UNGA Res. 1472 (XIV), on the 'International Co-operation in the Peaceful uses of Outer Space', adopted on 12 December 1959.

[167] UNGA Res. 1721 (XVI), on the 'International Co-operation in the Peaceful uses of Outer Space' adopted on 20 December 1961.

[168] UNGA Res. 1962 (XVIII), *supra* note 81.

[169] For instance: Articles V and VIII established the Rescue Agreement 1968; Article VII created the Liability Convention 1972; Articles V and VIII constructed the Registration Convention 1974; Articles IV, XII, and others formed the Moon Agreement 1979. See Kolosov, Y, "Background and History of the Outer Space Treaties", (1998) 40 *IISL Colloquium on the Law of Outer Space* 437.

[170] Kupperman, Helen S., George E. Reese and David J. Thacher, "Maintaining Outer Space for Peaceful Purposes through International Cooperation", (1988) 30 *IISL Colloquium on the Law of Outer Space* 52, at 53.

[171] The Outer Space Treaty 1967 has 101 states parties and 26 signatory states. See http://www.oosa.unvienna.org/oosatdb/showTreatySignatures.do, accessed: 13 May 2014.

[172] See *id*., and http://www.fas.org/nuke/control/ost/text/space5.htm, accessed: 13 May 2014.

[173] There are three traditional methods of expressing consent to a treaty: by signature, ratification, and accession. For details, read MacLean, Robert M., *supra* note 110, at 163-164; see also Fitzmaurice, Malgosia, "The Practical Working of the Law of Treaties", *International Law,* Ed., Evans, Malcolm D., (New York: Oxford University Press Inc., 2003), at 173.

Treaties which affirmed: *'The consent of a state to be bound by a treaty may be expressed by signature, exchange of instruments constituting a treaty, ratification, acceptance, approval or accession; or by any other means if so agreed'*.[174] However, when the signature of a treaty is subject to ratification, as occurs with some treaties including the Outer Space Treaty in its Article XIV(2),[175] such signature does not yet establish consent to be bound by the treaty. This is exactly the case for Malaysia in relation to the Outer Space Treaty. Thus, the signing of the Treaty by Malaysia may simply represent an authentication of its text, and it does not create a legally binding force until it enters the ratification stage.

A good illustration of this type of situation is the *North Sea Continental Shelf Cases* (1969).[176] However, this does not mean that Malaysia is free from any related obligation. Pursuant to Article 18 of the Vienna Convention on the Law of Treaty, it emphasizes that a signatory state which has not yet ratified the treaty is required or has an obligation to abstain from any acts that would contradict the object and purpose of the treaty.[177] Thus, at this juncture, it signifies even though Malaysia is only a signatory state to the Outer Space Treaty, however, Article 18 of the Vienna Convention on the Law of Treaty imposes the state with legal obligation to refrain from any actions that could refute the aim and purpose of the treaty it signed.

Apart from that, it is also important to note when a treaty is declaratory of customary law in nature, then both the signatory state, even without ratification, and the non-party state may be bound by its provisions and rules. This is affirmed in Article 38 of the Vienna Convention on the Law of Treaty which prescribes an exception to the general rule of a treaty as stated in Article 34 of the Vienna Convention, that it does not create rights and obligations without the

---

[174] Vienna Convention on the Law of Treaties 1969, adopted on 22 May 1969, opened for signature on 23 May 1969, entered into force on 27 January 1980. 1155 UNTS 331, (hereinafter, 'the Vienna Convention on the Law of Treaties').

[175] Article XIV (2), the Outer Space Treaty 1967, mentions: *This Treaty shall be subject to ratification by signatory States*. On the other hand, when a treaty is not subject to ratification, a state's signature will signify consent to be bound. For more details, read MacLean, Robert M., *supra* note 110, at 163-164.

[176] The Federal Republic of Germany was a signatory to the 1958 Geneva Convention on the Continental Shelf, but did not ratify it. The Court held that Article 6 of the Convention was not binding on the Republic because its signature was only a 'preliminary step: it did not ratify the Convention, is not a party to it and therefore cannot be contractually bound by its provisions'. Refer *North Sea Continental Shelf Cases* (1969) ICJ Rep. at 3; MacLean, Robert M., *supra* note 110, at 163.

[177] Article 18(a), Vienna Convention on the Law of Treaties 1969, prescribes: *'A state is obliged to refrain from acts which would defeat the object and purpose of a treaty when: (a) it has signed the treaty or has exchanged instruments constituting the treaty subject to ratification, acceptance or approval, until it shall have made its intention clear not to become a party to the treaty'*. See *supra* notes 174; Lyall, Francis, *supra* note 46, at 70.

consent of state or the non-party state unless the treaty becomes part of customary rule of international law and consequently becomes binding upon them.[178] In such circumstances, in the case of the Outer Space Treaty it may be argued that certain rules of the Treaty have passed into customary rules of international law, and it hence becomes binding upon all states. Such rules include, for instance, the free exploration and use of outer space by all (Article I), the exploration and use being for the benefit of all (Article I), outer space not being subject to national appropriation (Article II), the application of international law in outer space (Article III), states being responsible for their national activities and having a duty to authorise and continue supervision of the activities (Article VI), and states' responsibility and liability for damage caused to other states by such activities (Article VII).[179] Therefore, from the perspective of the customary international law, the legal effect of Malaysia's signature of the Outer Space Treaty is that the country is most probably bound by the provisions of the Treaty even though Malaysia has yet to ratify it.

(b) The Rescue Agreement 1968

Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, commonly known as the 'Rescue Agreement 1968'[180], was adopted by the United Nations General Assembly in its Resolution 2345 (XXII) on 19 December 1967. This Agreement is the second outer space convention that came into existence after the Outer Space Treaty 1967. It was opened for signature on 22 April 1968 in London, Moscow, and Washington D.C., and entered into force on 3 December 1968.[181] Historically, its development and negotiation took place between the years of 1962 and 1967.

---

[178] The Vienna Convention on the Law of Treaty establishes a general rule of the treaty in its Article 34: *'A treaty does not create either obligations or rights for a third state without its consent'*; However, it also prescribes an exception to the general rule in its Article 38: *'Nothing in Articles 34 to 37 precludes a rule set forth in a treaty from becoming binding upon a third State as a customary rule of international law, recognised as such'*. See *supra* notes 174; Lyall, Francis, *supra* note 46, at 173-174.
[179] More information on customary rules of international law is available in Chapter 2 of the thesis (2.3.2(b) The Customary International Law). Gál, Gyula, *supra* note 46, at 44; Matte, Nicolas Mateesco, *supra* note 117, at 13; Vereshchetin, V.S. and Danilenko, Gennady M., *supra* note 119, at 25; Lyall, Francis, *supra* note 46, at 54 and 71.
[180] Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space (1968) (Resolution 2345 (XXII)), adopted on 19 December 1967, opened for signature on 22 April 1968, entered into force on 3 December 1968. 19 UST 7570, 672 UNTS 119, TIAS 6599. In this section, all Articles, unless specified otherwise, refer to those in the Rescue Agreement 1968. The Treaty's full text is available at United Nations, United Nations Treaties and Principles on Outer Space, *supra* note 161, at 9.
[181] The depositories of the Agreement are: Russian Federation, United Kingdom of Great Britain and Northern Ireland, and United States of America. See United Nations, United Nations Treaties and Principles on Outer Space and Related General Assembly Resolutions, *supra* note 162, at 2.

However, the idea of its formulation and its expediency was first raised by the *ad hoc* Committee of COPUOS as early as 1959.[182] On 20 March 1962, the idea of its formulation progressed further when the USSR proposed the elaboration of an international agreement on searching for and rescuing space objects in the case of emergency landings, as well as rescuing astronauts.[183] A draft agreement on the subject matter was submitted on 9 March 1964 by the USSR delegation in the COPUOS, followed by the submission of the draft agreement by the United States, Australia, and Canada in the same year.[184] Finally, on 15 December 1967, the draft was finalised and agreed upon by the COPUOS Legal Sub-Committee.

The Rescue Agreement 1968 indeed developed from Article V and Article VIII of the Outer Space Treaty 1967.[185] The Agreement consists of 10 Articles which are mainly concerned with the rescue and return of personnel of a spacecraft (Article 1-4), the rescue and return of a space object and its component parts (Article 5), and the meaning of launching authority (Article 6). This Agreement establishes rules and obligations to assist and rescue astronauts in the event of accident, distress or any emergency landing where the state parties need to perform necessary actions after the space objects have been launched and their components returned to earth, having made an emergency landing. Since the states parties agree to regard

---

[182] *Report of the Ad Hoc Committee on the Peaceful Uses of Outer Space,* UN Doc. A/4141, 14 July 1959, at Part II, para. 74 (page 17) and Part III, para. 21 (page 24), as cited in Jasentuliyana, Nandasiri, *supra* note 54, at 33; See also Bogaert, E.R.C. van, *supra* note 104, at 99; Gál, Gyula, supra note 46, at 97-98; Roy S. K. Lee, "Assistance to and Return of Astronauts and Space Objects", *Manual on Space Law*, *Vol.1,* Eds., Jasentuliyana, Nandasiri and Roy S.K. Lee, (Alphen aan den Rijn: Sijhoff & Noordhoff, 1979), at 55.

[183] Newspaper "Pravda", 22 March 1962, as cited in Kolosov, Y, "Background and History of the Outer Space Treaties", (1998) 40 *IISL Colloquium on the Law of Outer Space*, at 438.

[184] Kolosov, Y, *id*., at 438.

[185] Article V, Outer Space Treaty 1967, states: *'States Parties to the Treaty shall regard astronauts as envoys of mankind in outer space and shall render to them all possible assistance in the event of accident, distress, or emergency landing on the territory of another State Party or on the high seas. When astronauts make such a landing, they shall be safely and promptly returned to the State of registry of their space vehicle.*

In carrying on activities in outer space and on celestial bodies, the astronauts of one State Party shall render all possible assistance to the astronauts of other States Parties.

States Parties to the Treaty shall immediately inform the other States Parties to the Treaty or the Secretary-General of the United Nations of any phenomena they discover in outer space, including the Moon and other celestial bodies, which could constitute a danger to the life or health of astronauts'.

Article VIII, Outer Space Treaty 1967, mentions: *'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. 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. Such objects or component parts found beyond the limits of the State Party to the Treaty on whose registry they are carried shall be returned to that State Party, which shall, upon request, furnish identifying data prior to their return'.*

astronauts as envoys of mankind,[186] under the Rescue Agreement astronauts are entitled to special care, including receiving all possible assistance in the event of accident, distress, and emergency landing. They are also eligible for a safe and prompt return to the state of registry of the space object.[187]

With regard to Malaysia's position on the Rescue Agreement**,** similar to the Outer Space Treaty Malaysia is only a signatory state to the Rescue Agreement without ratification.[188] Malaysia signed the Agreement in London on 29 July 1968.[189] The legal effect of signing the Rescue Agreement without ratification is similar to Malaysia's position in relation to the Outer Space Treaty, meaning that Malaysia has only given preliminary consent to be bound by the Agreement without legally binding force.[190] Relying on Article 34 of the Vienna Convention on the Law of Treaty, as a non-party state to the Rescue Agreement Malaysia in general is not bound by any rules and obligations stated therein. Even if an emergency landing by personnel from a spacecraft were to occur, or any space object or its components were to land on Malaysia's territory or elsewhere, or even were it to receive information on the tragedy, Malaysia would indeed have no obligation to transmit the information, or provide any rescue or assistance, or even return the personnel or the space object to the launching state as required by the Agreement.[191]

As a signatory state to the Rescue Agreement, it does not only signify Malaysia's preliminary consent to the Agreement. However, Malaysia has also obligation to observe certain requirement (as provided under Article 18 of the Vienna Convention on the Law of Treaty) that is to avoid any actions that might contravene with the objective and purpose of Rescue Agreement. Moreover, Malaysia could be bound as well by the rules stipulated in the Rescue Agreement when these rules become part of the international custom as prescribed in Article 38 of the Vienna Convention on the Law of Treaty.

---

[186] UNGA Res. 1962, *supra* note 81, para.9; see also Article V (Outer Space Treaty 1967).
[187] *Id*. See also Article 1-4 (Rescue Agreement 1968); Gál, Gyula, *supra* note 46, at 98; Matte, Nicolas Mateesco, *supra* note 117, at 95.
[188] The Rescue Agreement 1968 has 92 states parties and 24 signatory states. See http://www.oosa.unvienna.org/oosatdb/showTreatySignatures.do, accessed: 13 May 2014.
[189] See http://www.fco.gov.uk/resources/en/pdf/pdf9/fco_ref_sl_rescueastronauts, accessed: 13 May 2014.
[190] For information on the effect of signing the Outer Space Treaty without ratification, refer to Chapter 2 of the thesis (2.3.3(a) The Outer Space Treaty 1967).
[191] The rules of providing rescue and assistance in the event of distress and emergency landing are mentioned in Article 1 – Article 5, Rescue Agreement 1968.

From a moral perspective, it is strongly suggested that Malaysia should provide full cooperation in performing these obligations as they are a matter of ethics and humanity.[192] As mentioned earlier, Malaysia is one of countries that have launched various satellites into orbit, as well its national into outer space.[193]As a considerably active participant in space activities, Malaysia may well experience such space disasters involving its satellites and astronauts due to outer space's hostile environment. It is irrefutable that outer space activities are exposed to various risks and dangers especially when personnel and space objects are sent into outer space. This was proved when a number of states experienced various kinds of space disasters and emergency landings involving loss of life[194] and space object destruction.[195] Since the Rescue Agreement deals with the rules of rescuing astronauts in distress and the return of space objects to their launching states, it seems that the Rescue Agreement is crucial to countries such as Malaysia.

As a matter of fact, due to Malaysia present position in respect of this Agreement, astronauts, space personnel, and space objects belonging to a non-party state such as Malaysia are not entitled to any special care and assistance as provided under the Rescue Agreement in the event of accident or distress unless such assistance is given on a humane basis. Thus, such circumstances might impose an insecure situation in terms of the possible treatment afforded the astronauts and space objects of the non-party state. Based on these arguments, it is suggested that Malaysia and other non-party states that intend to become further involved in space activities consider the ratification of the Rescue Agreement as soon as possible. By becoming parties to it, they will ensure that their astronauts, space personnel, and space objects are entitled to special attention and treatment in the event of accident, distress, and

---

[192] See Preamble of the Rescue Agreement 1968; see also Bogaert, *supra* note 104, at 103-106.

[193] The discussion is available in Chapter 1 of the thesis (1.4 Application and Activities).

[194] The first fatal accident involving astronauts was the tragedy at Cape Kennedy on 27 January 1967 where Roger Chaffee, Virgil Grissom and Edward White, the American astronauts, died in a fire during a ground test of an Apollo spaceship. On 24 April 1967, the Soviet cosmonaut Vladimir Komarov was killed during the landing of Soyuz-1 due to the defective functioning of the parachute system. The cosmonauts Georgi Dobrovolski, Victor Patseyev and Vladislav Volkov were killed on 29 June 1971 when their returning spacecraft, Soyuz-II, lost air pressure. See Gal, Gyula, "Observations on the Rescue Agreement", in *Maintaining Outer Space for Peaceful Uses, Proceedings of a Symposium Held in The Hague, March 1984,* Ed. Jasentuliyana, Nandasiri, (Japan: The United Nations University, 1984), at 93; Davies, J.K., *supra* note 164, at 192-197; Bogaert, *supra* note 104, at 99.

[195] An example of space object disaster is the Geosynchronous Satellite Launch Vehicle (GSLV D3), India's rocket; it was carrying a communication satellite but failed to reach orbit and fell into the Bay of Bengal. See, http://www.space-travel.com/reports/India_To_Return_To_Russian_Boosters_After_Falilikapuiled_Rocket_Launch_999.html, accessed: 21 April 2010.

emergency landing. Furthermore, these countries will have an excellent chance of recovering their objects and components when they land in another country's territory.

(c) The Liability Convention 1972

The Convention on International Liability for Damage Caused by Space Objects, commonly known as the 'Liability Convention 1972'[196], was adopted by the United Nations General Assembly in its Resolution 2777 (XXVI)[197] on 29 November 1971. It was opened for signature on 29 March 1972 in London, Moscow, and Washington D.C., and entered into force on 1 September 1972.[198] Historically, the consideration and negotiation of the Liability Convention took place between 1963 and 1972, while its elaboration was conducted in 1964, particularly after the United States, Hungary and Belgium submitted their drafts. In 1967, the submission of the draft was then followed by India and Italy.[199] The text of the Liability Convention was finally approved in 1971 in the 26th session of the General Assembly.

As its title suggests, the Liability Convention, which consists of 24 articles, deals with the states' liability for damage caused by space objects. Its purpose is to elaborate international rules and procedures with respect to liability for damage caused by space objects as well to ensure the prompt payment and equitable compensation to victims of damage caused by space objects. The Liability Convention indeed developed from general principles envisaged in Resolution 1962 (XVIII),[200] as well as Article VI and Article VII of the Outer Space Treaty.[201] Article VI of the Outer Space Treaty recognizes the right of governmental agencies

[196] Convention on International Liability for Damage Caused by Space Objects (1972) (Resolution 2777 (XXVI)), adopted on 29 November 1971, opened for signature on 29 March 1972, entered into force on 1 September 1972. 24 UST 2389, 961 UNTS 187, TIAS 7762. In this section, all Articles, unless specified otherwise, refer to those in the Liability Convention 1972. The Convention's full text is available at United Nations, *supra* note 161, at 13.
[197] UNGA Res. 2777 (XXVI), on the 'Convention on International Liability for Damage Caused by Space Object', adopted on 29 November 1971.
[198] The depositories of the Liability Convention are: the Russian Federation, United Kingdom of Great Britain and Northern Ireland, and United States of America. See United Nations, United Nations Treaties and Principles on Outer Space and Related General Assembly Resolutions, *supra* note 162, at 3.
[199] Kolosov, Y, *supra* note 183, at 439.
[200] UNGA Res. 1962 (XVIII), *supra* note 81. Para.5 reads: '*States bear international responsibility for national activities in outer space, whether carried on by governmental agencies or by non-governmental entities, and for assuring that national activities are carried on in conformity with the principles set forth in the present Declaration ...'*
[201] Article VI (Outer Space Treaty 1967) provides: *'States Parties to the Treaty shall bear international responsibility for national activities in outer space, including the Moon and other celestial bodies, whether such activities are carried on by the governmental agencies or by non-governmental entities, and for assuring that*

as well non-governmental agencies to conduct outer space activities, provided that the states parties shall bear international responsibility for their national activities in outer space. Apart from that, it is a requirement that outer space activities of the non-governmental agencies first obtain authorization from the state parties and thus continue supervising such outer space activities.[202] Article VII of the Outer Space Treaty, in fact, further confirms that states parties will be internationally liable for damage caused by their space objects, or by their component parts, regardless of whether the damage happens on the earth, in air space, or in outer space.[203] The legal rules were then elaborated further in Article II of the Liability Convention which specifies that a launching state shall be liable to pay compensation for damage caused by its space object.[204] The liability of such a launching state can be either absolute or on proof of fault. The liability is absolute when the damage caused by the space object happens on the surface of the earth or to the aircraft in flight.[205] However, in the event of damage caused elsewhere, the state shall be liable only if the damage is due to its own fault or the fault of persons for whom it is responsible.[206]

With respect to Malaysia's position regarding the Liability Convention 1972, Malaysia is currently a non-party state to the Convention.[207] Malaysia has neither signed nor ratified the Convention. This means that, as a non-party to the Convention, Malaysia at this point is not bound to fulfil any rights and obligations stated therein. However, it should be noted that

---

national activities are carried out in conformity with the provisions set forth in the present Treaty. The activities of non-governmental entities in outer space, including the Moon and other celestial bodies, shall require authorization and continuing supervision by the appropriate State Party to the Treaty. When activities are carried on in outer space, including the Moon and other celestial bodies, by an international organization, responsibility for compliance with this Treaty shall by an international organization, responsibility for compliance with this Treaty shall be borne both by the international organization and by the States Parties to the Treaty participating in such organization.'

Article VII (Outer Space Treaty 1967) mentions: '*Each State Party to the Treaty that launches or procures the launching of an object into outer space, including the Moon and other celestial bodies, and each State Party from whose territory or facility an object is launched, is internationally liable for damage to another State Party to the Treaty or to its natural or juridical persons by such object or its component parts on the Earth, in air space or in outer space, including the Moon and other celestial bodies.*'

[202] See Article VI, Outer Space Treaty 1967, *id*.

[203] See Article VII, Outer Space Treaty 1967, *supra* note 201.

[204] Article II, Liability Convention 1972 specifies: *'A launching State shall be absolutely liable to pay compensation for damage caused by its space object on the surface of the Earth or to aircraft in flight'.*

[205] See *id*.

[206] Article III, Liability Convention 1972 prescribes: *'In the event of damage being 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, the latter shall be liable only if the damage is due to its fault or persons for whom it is responsible'.*

[207] The Liability Convention 1972 has 90 states parties and 23 signatory states. See http://www.oosa.unvienna.org/oosatdb/showTreatySignatures.do, accessed: 13 May 2014.

Malaysia may still be bound to fulfil those rights and obligations on certain other grounds in public international law: when the rules of the Treaty have passed into customary rules of international law.[208] The international custom may serve as a source of legal rights and obligations of states whenever they are not parties to the treaties.[209] Apart from that, the principle of responsibility of a state for her national activities in outer space is envisaged in the United Nations General Assembly Resolution 1962[210] by which the legal effect of the resolution is binding upon the states when it is classified as 'evidence of general practices accepted as law' under the international custom.[211] This circumstance, in fact, may also create the international obligation that a state should fulfil. Since Malaysia is regarded as one of the more active participants in outer space activities, it is strongly suggested that Malaysia give serious consideration to signing and ratifying the Liability Convention 1972. By doing so, Malaysia would become and be viewed as a responsible participant in outer space activities, especially in terms of international liability for damage caused by space objects.

(d) The Registration Convention 1975

The Convention on Registration of Objects Launched into Outer Space, commonly known as 'Registration Convention 1975'[212], was adopted by the United Nations General Assembly in its Resolution 3235 (XXIX)[213] on 12 November 1974. It was opened for signature on 14

---

[208] Article 38, Statute of the International Court of Justice (hereinafter, 'Statute of the ICJ') stipulates: *'The Court, whose function is to decide in accordance with international law such disputes as are submitted to it, shall apply:*

> *(a) International conventions, whether general or particular, establishing rules expressly recognised by the contesting states;*
> *(b) International custom, as evidence of a general practice accepted as law;*
> *(c) The general principles of law recognised by civilised nations;*

Subject to the provisions of Article 59, judicial decisions and the teachings of the most highly qualified publicists of the various nations, as subsidiary means for the determination of rules of law.'

[209] Shaw, Malcolm N., *supra* note 116, at 24. More information is available in Chapter 2 of the thesis (2.3.2 (b) Customary International Law).

[210] See *supra* note 81.

[211] Article 38, Statute of the International Court of Justice, *supra* note 111. A discussion on the legal effect of United Nations resolutions and declarations is available in Ogunbanwo, Ogunsola B., *International Law and Outer Space Activities,* (The Hague: Martinus Nijhoff Publishers, 1975), at 15-16.

[212] Convention on Registration of Objects Launched into Outer Space (1975) (Resolution 3235 (XXIX)), adopted on 12 November 1974, opened for signature on 14 January 1975, entered into force on 15 September 1976. 28 UST 695, 1023 UNTS 15, TIAS 8480. In this section, all Articles, unless specified otherwise, refer to those in the Registration Convention 1975. The Convention full text is available at United Nations, *supra* note 161, at 22.

[213] UNGA Res. 3235 (XXIX), on 'Convention on the Registration of Objects Launched into Outer Space', adopted on 12 November 1974.

January 1975 in New York, and entered into force on 15 September 1976.[214] It was the fourth outer space convention to come into existence after the Outer Space Treaty, the Rescue Agreement, and the Liability Convention. The Registration Convention 1975 deals mainly with the system of registration of objects launched into outer space. Originally, the system of the international registration of space objects was introduced by the General Assembly Resolution 1721 B (XVI) in December 1961.[215] The United Nations General Assembly had called upon those states that were launching objects into orbit or beyond to promptly furnish, on a voluntary basis, the related information to the UNCOPUOS. This was done through the United Nations Secretary-General for the purpose of registration of the objects launched. In such matters, the Secretary-General was requested to maintain a public registry, which was introduced in 1962, for the launching information furnished.[216] Historically, in 1968 a draft convention on registration of space objects was submitted by France to the Legal Sub-Committee of the UNCOPUOS. In 1972, it was then substituted by a joint Franco-Canadian draft.[217] Finally, in 1974 the Registration Convention was successfully adopted and consequently the submission of launching information for the purpose of registration of space objects becomes mandatory for all states parties to the Convention. It was then opened for signature in mid-January 1975.

The Registration Convention 1975 consists of 11 Articles. Among its main objectives is the establishment of a central register of objects launched into outer space. It is a mandatory basis system whereby the public registry shall be maintained and kept by the Secretary-General of the United Nations.[218] By introducing such a mandatory system of registration of objects launched into outer space, the Registration Convention assists the states parties in the identification of space objects. In accordance with this Convention, the launching states should furnish to the United Nations, as soon as practicable, the related information, including the name of the launching state, the designator of the space object or its registration number, the date and territory or location of launch, the basic orbital parameters such as

[214] The depository of the Registration Convention is the Secretary-General of the United Nations. See United Nations, *supra* note 162, at 3.
[215] UNGA Res. 1721 (XVI), on the 'International Co-operation in the Peaceful uses of Outer Space' adopted on 20 December 1961. See also Kolosov, Y, *supra* note 183, at 439.
[216]See http://www.oosa.unvienna.org/oosa/SORegister/regist.html, accessed: 13 May 2014.
[217] Kolosov, Y, *supra* note 183, at 439.
[218] See Article III, Registration Convention 1975.

apogee and perigee,[219] and the general function of the space object.[220] The Convention indeed gives the public full and open access to the information in this register.[221] Apart from that, the launching states also have an obligation to establish a national registry[222] at the national level, the contents and conditions of which will be determined by the state of registry itself.[223]

In terms of Malaysia's position with respect to the Registration Convention 1975, Malaysia is currently a non-party state to the Convention.[224] Malaysia has neither signed nor ratified the Convention. Even though Malaysia is not a party to the Convention, she is among the non-parties states that send information to the United Nations on their space objects launched into outer space.[225] The first information that Malaysia furnished was dated 18 January 2002, and it concerned its two satellites: MEASAT-2 and Tiungsat-1.[226] On April of the same year, other information was furnished by Malaysia on MEASAT-1.[227] Then, in 2005, Malaysia supplied a third piece of information, notifying that its satellite TiungSat-1 was no longer functional.[228] In 2007 Malaysia sent information on its satellite MEASAT-3.[229] Lastly, in 2010, Malaysia furnished information on MEASAT-3a, her latest communications satellite.[230] From the preceding facts, it is noted that, even though Malaysia is not a party to the Convention, she has made a full commitment to furnishing to the United Nations

[219] Apogee is the highest altitude above the earth's surface, in kilometres, and perigee is the lowest altitude above the earth's surface, in kilometres.
[220] See Article IV, Registration Convention 1975.
[221] See Article III, Registration Convention 1975.
[222] See Article II, Registration Convention 1975.
[223] *Id*.
[224] The Registration Convention 1975 has 57 states parties and 4 signatory states. See http://www.oosa.unvienna.org/oosatdb/showTreatySignatures.do, accessed: 13 May 2014.
[225] It is based on UNGA Res. 1721 B (XVI), on the 'International Co-operation in the Peaceful uses of Outer Space' adopted on 20 December 1961. Read also UNGA Res. 62/101, on the 'Recommendations On Enhancing The Practice Of States And International Intergovernmental Organizations In Registering Space Objects' adopted on 17 December 2007. The information provided by the non-party states to the Registration Convention regarding their objects launched into space, and such information received in accordance with the Convention requirements, is issued in the United Nations documents in the A/AC.105/INF series. See also http://www.oosa.unvienna.org/oosa/en/SORegister/docsstatidx.html, accessed: 13 May 2014.
[226] The detailed information is available in United Nations document symbol: A/AC.105/INF.406. See http://www.oosa.unvienna.org/oosa/Reports/inf406.html, accessed: 13 May 2014.
[227] See a note verbale, dated 17 April 2002. Available in the United Nations document symbol: A/AC.105/INF.407. Refer http://www.oosa.unvienna.org/oosa/Reports/inf407.html, accessed: 13 May 2014.
[228] See a note verbale, dated 18 August 2005. Available in the United Nations document symbol: ST/SG/SER.E/478. See http://www.oosa.unvienna.org/oosa/Reports/ser478.html, accessed: 13 May 2014.
[229] See a note verbale, dated 19 March 2007. Available in the United Nations document symbol: A/AC.105/INF.415. See http://www.oosa.unvienna.org/oosa/Reports/Regdocs/inf415.html, accessed: 13 May 2014.
[230] See a note verbale, dated 8 February 2010. Available in the United Nations document symbol: A/AC.105/INF.421. See http://www.oosa.unvienna.org/oosa/en/Reports/Regdocs/inf421.html, accessed: 14 May 2014.

information on the space objects launched into space. Therefore, it is suggested that Malaysia seriously consider becoming a party to the Registration Convention.

(e) The Moon Agreement 1979

The Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, commonly known as 'Moon Agreement 1979'[231], was adopted by the United Nations General Assembly in its Resolution 34/68[232] on 5 December 1979. It was opened for signature on 18 December 1979 in New York, and entered into force only five years later, on11 July 1984.[233] Historically, the legal principles relating to the Moon were pointed out in 1961 in the UNGA Resolution 1721 (XVI).[234] In 1963, the legal rules concerning the Moon also emerged in the Test Ban Treaty,[235] the UNGA Resolution 1884 (XVIII),[236] and Resolution 1962 (XVIII)[237]. Then, in 1967, they were given stronger force in the Outer Space Treaty 1967.[238] Afterwards, they were also mentioned in, among others, the Rescue Agreement 1968[239], and the Liability Convention 1972.[240] Specifically, an intense concern over the Moon and its related matters was expressed by the members of UNCOPUOS, especially with respect to its natural

---

[231] Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (1979) (Resolution 34/68), adopted on 5 December 1979, opened for signature on 18 December 1979, entered into force on 11 July 1984. 18 ILM 1434, 1363 UNTS 3. In this section, all Articles, unless specified otherwise, refer to those in the Moon Agreement 1979. The Convention's full text is available at United Nations, *supra* note 161, at 27.

[232] UNGA Res. 34/68, on 'Agreement Governing the Activities of States on the Moon and Other Celestial Bodies', adopted on 5 December 1979.

[233] The depository of the Moon Agreement is Secretary-General of the United Nations. See United Nations, *supra* note 162, at 3.

[234] The resolution states that the outer space and celestial bodies are free for exploration and use by all states in conformity with international law and are not subject to national appropriation. It appears that the term 'celestial bodies' used in the Resolution included the Moon. See UNGA Res. 1721 (XVI), *supra* note 167; see also Jasentuliyana, Nandasiri and Roy S.K. Lee, eds., *Manual on Space Law*, *Vol. 1*, (Alphen aan den Rijn: Sijhoff & Noordhoff, 1979), at 253.

[235] The Test Ban Treaty forbids the carrying out of nuclear test explosions beyond the limits of the atmosphere including outer space. See Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and under Water 1963, opened for signature on 5 August 1963, entered into force on 10 October 1963. 480 UNTS 43.

[236] The Resolution called upon the state parties not to station in outer space any objects of mass destruction and not to install nuclear or mass destruction weapons on celestial bodies. See UNGA Res. 1884 (XVIII), on the 'Question of General and Complete Disarmament', adopted on 17 October 1963. See also Jasentuliyana, Nandasiri and Roy S.K. Lee, *supra* note 234.

[237] The legal principles provided in the Resolution are implicitly or explicitly applicable to the Moon and other celestial bodies. See UNGA Res. 1962 (XVIII), *supra* note 81. Refer also Jasentuliyana, Nandasiri and Roy S.K. Lee, *supra* note 234.

[238] The Treaty, *inter alia*, mentions that outer space, including the Moon and other celestial bodies, is not subject to any form of national appropriation. Refer Article II, Outer Space Treaty 1967.

[239] The Agreement states: '*any other place not under the jurisdiction of any state'*, which may include the Moon and other celestial bodies. See Articles 3, 4, and 5, Rescue Agreement 1968, *supra* note 180.

[240] The Convention covers damage caused elsewhere than on the surface of the earth, which probably refers to the Moon. See Article III and Article IV, Liability Convention 1972, *supra* note 196.

resources. This started after the successful landing by the United States on the Moon in 1969. To deal with such matters, within one year, in July 1970, Argentina submitted to the UNCOPUOS a proposal entitled 'Draft Agreement on the Principles Governing Activities in the Use of the Natural Resources of the Moon and Other Celestial Bodies'.[241] Then, in May 1971, the Soviet Union proposed to the UNGA an item entitled 'Preparation of an International Treaty Concerning the Moon'.[242]

A month later, on 4 June 1971, the Soviet Union submitted a draft moon treaty.[243] Consequently, on 29 November 1971 the UNGA adopted Resolution 2779 (XXVI)[244] and called the COPUOS to consider, as a matter of priority, the question of a moon treaty. Finally, in 1979, a draft entitled 'Agreement Governing the Activities of States on the Moon and Other Celestial Bodies' was completed and submitted to the UNGA. It was then approved on 5 December 1979 in the Resolution 34/68[245].

The Moon Agreement 1979 consists of 21 Articles. One of its purposes is to prevent the Moon from becoming an area of international conflict.[246] In general, the Agreement comprises general principles and specific provisions forming the permissible activities on the Moon and other celestial bodies. It makes a declaration that the Moon should be used for the benefit of all states and all peoples of the international community.[247] Indeed, the provisions of the Moon Agreement largely reaffirm and expand the application of the principles in the Outer Space Treaty 1967. For instance, the Moon and other celestial bodies should be used exclusively for peaceful purposes,[248] the Moon and other celestial bodies shall be the province of all mankind[249]; in addition, the United Nations Secretary-General should be notified about states' outer space activities,[250] and there are provisions on the environment.[251]

---

[241] UN Doc. A/AC. 105/C.2/L.71 and Corr.1 (1970).
[242] It was proposed as an inclusion in the agenda of the twenty-sixth session of the UNGA, and was done through a letter dated 27 May 1971. See Tronchetti, Fabio, *The Exploitation of Natural Resources of the Moon and Other Celestial Bodies: A Proposal for a Legal Regime,* Ph.D. dissertation, (Leiden, 2008), at 22.
[243] UN Doc. A/8391 and Corr. 1, 4 June 1971. See also Jasentuliyana, Nandasiri and Roy S.K. Lee, *supra* note 234, at 255.
[244] UNGA Res. 2779 (XXVI), on 'Preparation of an International Treaty Concerning the Moon', adopted on 29 November 1971.
[245] See UNGA Res. 34/68, *supra* note 232.
[246] See the preamble, Moon Agreement 1979.
[247] See Article 4, Moon Agreement 1979.
[248] See Article IV (Outer Space Treaty 1967); and Article 3 (Moon Agreement 1979).
[249] See Article I (Outer Space Treaty 1967); and Article 4 (Moon Agreement 1979).
[250] See Article XI (Outer Space Treaty 1967); and Article 5 and Article 9 (Moon Agreement 1979).
[251] See Article IX (Outer Space Treaty 1967); and Article 10 (Moon Agreement 1979).

In relation to Malaysia's position regarding the Moon Agreement 1979, Malaysia is not currently a party to the Agreement. However, it is suggested that Malaysia consider becoming a party to the Agreement even though the number of states that have ratified the Moon Agreement is low compared to the other outer space treaties.[252] Although the Moon Agreement is vague and unclear in certain provisions, it still provides a legal framework to deal with the exploitation of lunar resources.

2.3.4. Malaysia and the Five Outer Space Principles

Apart from the five outer space conventions mentioned earlier, the UNGA also adopted five other international outer space principles governing space-related activities. All of these five sets of legal principles were voted for by Malaysia.[253] Thus, Malaysia has an international obligation to adhere to the legal rules and principles stated therein. This part aims to highlight general ideas of the five outer space principles that Malaysia should observe, including their historical background in brief.

(a) Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space, 1963

Historically, the development of outer space legal rules evolved in stages with the submission of many documents to the UNCOPUOS. Among the most important documents submitted is a draft Declaration of the Basic Principles Governing the Activities of States Pertaining to the Exploration and Use of Outer Space.[254] This is a proposal for a set of legal rules intended to govern the activities of states conducted or to be conducted in outer space. At first, the draft

---

[252] Only 13 states are parties to the Moon Agreement 1979. They are Australia, Belgium, Lebanon, Mexico, Pakistan, Peru, Kazakhstan, Austria, Chile, Morocco, Netherlands, the Philippines, and Uruguay. Four other states - France, Guatemala, India and Romania - are signatory states only. These numbers are small compared to the other outer space treaties: for the Outer Space Treaty 1967, there are 101 states parties and 26 signatory states. For the Rescue Agreement 1968, there are 92 states parties and 24 signatory states. The Liability Convention 1972 has 90 states parties, and 23 signatory states. And the Registration Convention 1975 has 57 states parties and 4 signatory states. See http://www.oosa.unvienna.org/oosatdb/showTreatySignatures.do, accessed: 13 May 2014.

[253] See http://www.angkasa.gov.my/?q=polisi/undang-undang-angkasa, accessed: 13 May 2014.

[254] It was proposed by the USSR and submitted in the year of 1962. See A/AC.105/C.2/L.1. See also Kopal, Vladimir, "Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, New York, 19 December 1966", *Audio-visual Library of International Law*, http://untreaty.un.org/cod/avl/ha/tos/tos.html, accessed: 13 May 2014.

did not receive full support from the members of the UNCOPUOS. Nevertheless, it was successfully negotiated in 1963.[255] Consequently, in the same year, inspired by the great prospect of human exploration and use of outer space and celestial bodies, UNCOPUOS took a significant step forward when the UNGA approved the 'Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space, 1963' (hereinafter 'the Declaration of Legal Principles 1963') in its Resolution 1962 (XVIII)[256]. It was voted for by consensus on 13 December 1963 by the state members of the United Nations, including Malaysia.[257]

In the progress of outer space legal rules, the Declaration of Legal Principles 1963 is considered vital since it outlined a set of general principles to guide the states in the exploration and use of outer space. These principles have, in fact, characterized the legal status of outer space and celestial bodies, as well the scope of liability of states for their activities in outer space. In regard to its nature, the Declaration of Legal Principles 1963 was different from the other United Nations outer space principles since it formed the basis of, directed the formation of and paved the way for the adoption of the first outer space treaty: the Outer Space Treaty 1967.[258] The legal rules prescribed in the Declaration of Legal Principles 1963, with some amendments and additions, formed and shaped the creation of the Outer Space Treaty 1967 which then provided the foundation of the international legal order for the exploration and use of outer space and celestial bodies.

Since Malaysia has accepted the Declaration of Legal Principles 1963, she is bound under the international obligation to adhere to all rules and principles stipulated therein. In total, nine principles are prescribed in the Declaration of Legal Principles 1963, as follows: (1) The exploration and use of outer space shall be carried out for the benefit and interest of all mankind; (2) Outer space and celestial bodies are free for exploration and use by all states on the basis of equality and in accordance with international law; (3) Outer space and celestial bodies are not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means; (4) The states' activities in the exploration and use of outer space shall be carried on in accordance with international law; (5) States bear

[255] *Id*.
[256] UNGA Res. 1962 (XVIII), *supra* note 81.
[257] See *supra* note 253.
[258] The Outer Space Treaty 1967, *supra* note 161.

international responsibility for national activities in outer space, and the activities of non-governmental entities shall require authorization and continuing supervision by the state concerned; (6) In the exploration and use of outer space, states shall be guided by the principle of cooperation and mutual assistance and shall conduct their activities with due regard for the corresponding interests of other states; (7) The state on whose registry an object launched into outer space is carried shall retain jurisdiction and control over such object, and personnel thereon while in outer space; (8) Each state which launches or procures the launching of an object into outer space, and each state from whose territory or facility an object is launched, is internationally liable for damage to a foreign state or to its natural or juridical persons by such object or its component parts on the Earth, in air space, or in outer space; (9) States shall regard astronauts as envoys of mankind in outer space, and shall render to them possible assistance in the event of accident, distress, or emergency landing on the foreign state territory or on the high seas.

(b) Principles Governing the Use by States of Artificial Earth Satellites for International Direct Television Broadcasting, 1982

Another set of outer space-related principles voted for by Malaysia is ‘Principles Governing the Use by States of Artificial Earth Satellites for International Direct Television Broadcasting, 1982’ (hereinafter ‘Principles on Direct Broadcasting by Satellite (DBS) 1982’).[259] In view of the fact that broadcasting[260] is one of the most useful and well-known space applications besides telecommunications, remote sensing, and others, the UNGA foresaw the need for legal rules to govern the use by states of artificial earth satellites for international direct television broadcasting. In December 1968, the UNGA approved the establishment of a Working Group on Direct Broadcasting Satellites (hereinafter ‘Working Group on DBS’) by UNCOPUOS to study and report on the technical feasibility of communication by direct broadcast from satellites and on the current and foreseeable

[259] In this section, all Principles, unless specified otherwise, refer to those in the ‘Principles on DBS 1982’. See also *infra* note 264.

[260] Broadcasting is a distribution of audio and video content to a dispersed audience *via* radio, television or other digital transmission media. Among the famous form of electronic broadcasting is satellite television. Information on Malaysia’s involvement in the broadcasting activities is available in Chapter 1 of the thesis (1.4.1. Telecommunication and Broadcasting). See http://en.wikipedia.org/wiki/Broadcasting, accessed: 13 May 2014.

developments in the field.[261] In August 1972, the Soviet Union submitted a draft 'Convention on Principles Governing the Use by States of Artificial Earth Satellites for Direct Television Broadcasting'. Three months later, on 9 November 1972, the UNGA adopted Resolution 2916 (XXVII)[262] which then stressed the necessity of elaborating the principles for international direct television broadcasting with a view to concluding an international agreement. This was done after taking into account that the operation of direct broadcasting satellite technology would have significant implications internationally, particularly in the political, economic, social, and cultural life of countries. Moreover, several experiments involving direct broadcasting satellites had been carried out, and systems were indeed operational in many countries and would also be commercialized. Therefore, action was taken by giving the task to the UNCOPUOS and its Legal Sub-Committee of Working Group on DBS to elaborate the principles. Then, in November 1976, the Resolution 31/8[263] accelerated such efforts by emphasizing the priority of the work.

At last, on 10 December 1982, in the belief that the formation of the principles for international direct television broadcasting would strengthen international cooperation as well as promote the purpose and principles of the United Nations Charter, the UNGA through Resolution 37/92[264] adopted the 'Principles on DBS 1982'. UNGA achieved this by a majority vote, instead of by consensus.[265] Malaysia was among the countries that voted for the Principles on DBS 1982.[266] The existence of the Principles on DBS 1982 has, in fact, filled the gaps and holes in the *corpus juris spatialis*.[267]

[261] UNGA Res. 2453 (XXIII) on ''International Co-operation in the Peaceful uses of Outer Space', adopted on 20 December 1968. See also Traa-Engelman, H.L. van, *Commercial Utilization of Outer Space: Law and Practice,* (Dordrecht: Martinus Nijhoff, 1993), at 220.
[262] UNGA Res. 2916 (XXVII), on 'Preparation of an International Convention on Principles Governing the Use by States of Artificial Earth Satellite for Direct Television Broadcasting', adopted on 9 November 1972.
[263] UNGA Res. 31/8, on 'International Co-operation in the Peaceful Uses of Outer Space', adopted on 8 November 1976.
[264] UNGA Res. 37/92, on 'Principles Governing the Use by States of Artificial Earth Satellites for International Direct Television Broadcasting', adopted on 10 December 1982.
[265] Traa-Engelman, H.L. van, *supra* note 261, at 222; see also Jasentuliyana, Nandasiri, *supra* note 54, at 42.
[266] See http://www.angkasa.gov.my/?q=polisi/undang-undang-angkasa, accessed: 13 May 2014.
[267] *Corpus juris spatialis* refers to the laws governing outer space and concerns notably three of the five UN treaties on outer space including the Outer Space Treaty 1967, the Liability Convention 1972, and the Registration Convention 1975. See Dunk, F.G. von der, "Fundamental Provisions for National Space Laws", *Proceedings of United Nations/Nigeria Workshop on Space Law, in Abuja, Nigeria, 21-24 November 2005* (Vienna: United Nations, 2006), at 261.

Since Malaysia has accepted the Principles on DBS 1982, she is bound to adhere to all rules prescribed by the Principles. In general, the Principles on DBS 1982 consists of 10 subheadings: (1) Purposes and objectives; (2) Applicability of international law; (3) Rights and benefits of states; (4) International cooperation; (5) Peaceful settlement of dispute; (6) State responsibility; (7) Duty and right to consult; (8) Copyright and neighbouring rights; (9) Notification to the United Nations; and (10) Consultations and agreement between States. Under those subheadings, the DBS Principles 1982 prescribes 15 legal principles related to international direct television broadcasting. Since Malaysia voted the DBS Principles 1982, she has an obligation to observe and abide by those principles. Among the principles prescribed are the following: (1) International direct television broadcasting by satellite should be carried out in a manner compatible with the sovereign rights of states (Principle 1); (2) The activities should promote the free dissemination and mutual exchange of information and knowledge in cultural and scientific fields, and assist in educational, social and economic development, particularly in the developing countries (Principle 2); (3) The activities should be carried out in a manner compatible with the development of mutual understanding and the strengthening of friendly relations and cooperation among all states (Principle 3); (4) The satellite broadcasting activities should be conducted in accordance with international law (Principle 4); (5) Access to satellite broadcasting technology should be available to all states without discrimination (Principle 5); (6) The activities should be based upon international cooperation, with special consideration for the needs of developing countries to use the technology for national development (Principle 6); and (8) States should bear international responsibility for the related activities carried out by them (Principle 8).

(c) Principles Relating to Remote Sensing of the Earth from Outer Space, 1986

Malaysia also voted for ‘Principles Relating to Remote Sensing of the Earth from Outer Space, 1986’ (hereinafter, ‘the Principles on Remote Sensing 1986’).[268] Besides broadcasting, remote sensing is another useful application of space activities. At present, such technology is common practice and manages to extensively improve the quality of life on earth. It helps to upgrade natural resources management, land use, and the protection of the human

[268] In this section, all Principles, unless specified otherwise, refer to those in the ‘Principles on Remote Sensing 1986’. See also UNGA Res. 41/65, *infra* note 278.

environment.[269] In view of the great benefits gained from such technology and the possibility of potential misuse of the information gathered, the UNGA took an essential step towards establishing a set of legal principles governing the conduct of states in their remote sensing activities.

Historically, the process of negotiation of the legal rules took nearly 17 years to reach its conclusion. The first specific reference made to remote sensing by the UNGA was on 16 December 1969 in Resolution 2600 (XXIV).[270] This resolution urged, *inter alia*, the states members who possessed remote sensing capability to share it with others and to help explore the technology, including data analysis, its dissemination, and application. In July 1970, Argentina submitted a draft proposal agreement on 'activities carried out through remote-sensing satellite surveys of earth resources'.[271] One year later, in July 1971, an interdisciplinary 'Working Group of Remote Sensing of the Earth by Satellite' was established with the objective of promoting the use of space applications, including monitoring the earth's environment.[272] In 1973, a comprehensive Background Paper[273] on remote sensing was prepared. It contributed significantly to the development of further remote sensing legal rules. In November 1974, the UNGA made a recommendation to the Legal Sub-Committee of UNCOPUOS, through its Resolution 3234 (XXIX) of 12 November 1974,[274] to consider the legal implications of remote sensing of the earth from space. Consequently, on 10 February 1975 a new working group (Working Group III) on remote sensing was established and tasked with elaborating the principles governing remote sensing-related activities.[275] And on 18 November 1975, pursuant to Resolution 3388 (XXX),[276] the

---

[269] The remote sensing satellites manage to gather information on agriculture, including crop estimation, forestry, geography and mapping, geology and mineral resources, meteorology and weather forecasting, air and water pollution, and natural disasters, as well as carrying out military reconnaissance and verification of arms control agreements. Information on Malaysia's involvement in remote sensing activities is available in Chapter 1 of the thesis (1.4.2. Remote Sensing). See Gorove, Stephen, *Developments in Space Law: Issues and Policies,* Utrecht Studies in Air and Space Law, vol. 10, (Dordrecht: Martinus Nijhoff Publishers, 1991), at 293.

[270] UNGA Res. 2600 (XXIV), on 'International Co-operation in the Peaceful uses of Outer Space', adopted on 16 December 1969. See also Jasentuliyana, Nandasiri and Roy S.K. Lee, *supra* note 234, at 313.

[271] However, the discussion was postponed for various reasons. See UN Doc. A/AC.105/85, Annex II, at 2, 3 July 1970, as cited in *id*.

[272] UNGA Res. 2733 C (XXV), on 'International Co-operation in the Peaceful uses of Outer Space', adopted on 16 December 1970. See Jasentuliyana, Nandasiri and Roy S.K. Lee, *supra* note 234, at 313.

[273] "Background Paper by the Secretary-General Assessing United Nations Documents and Other Pertinent Data Related to the subject of Remote Sensing of the Satellite". UN Doc. A/AC.105/118, 12 June 1973, as cited in Jasentuliyana, Nandasiri and Roy S.K. Lee, *supra* note 234, at 314.

[274] UNGA Res. 3234 (XXIX), on 'International Co-operation in the Peaceful Uses of Outer Space', adopted on 12 November 1974.

[275] Jasentuliyana, Nandasiri and Roy S.K. Lee, *supra* note 234, at 314-315.

related subjects were treated as matters of high priority when the UNGA directed the Working Group to 'continue detailed legal consideration of remote sensing from space of the earth' and to 'proceed to drafting of principles in regard to those particular areas of the subject'. Again, in Resolution 31/8 of 8 November 1976,[277] the matter was given high priority with particular emphasis on the formation of draft principles. In late 1977, Resolution 32/196 (A) of 20 December 1977 gave special weight to further elaboration of the draft principles. After various efforts and negotiations, finally, on 3 December 1986, a set of legal principles, namely 'Principles Relating to Remote Sensing of the Earth from Outer Space, 1986' was approved unanimously by the UNGA and was adopted in its Resolution 41/65.[278] Malaysia was one of the countries that voted for the Remote Sensing Principles 1986.

The Principles on Remote Sensing 1986 comprises 15 legal principles. These principles are applicable only to the sensing of the earth's surface from outer space, and do not include sensing from air space.[279] The principles start with definitions of some legal terms including remote sensing, primary data, processed data, analysed information, and remote sensing activities (Principle I). Malaysia, as one of the countries that voted for the Remote Sensing Principles 1986, has to observe the legal rules stipulated therein. Several provisions aim at benefiting the developing countries like Malaysia; for instance, the remote sensing activities must be carried out for the benefit and in the interest of all countries, irrespective of their economic status and social or scientific and technological development, and the needs of the developing countries must be given particular consideration (Principle II). Other rules include the following: The promotion of international cooperation and the states' participation must be based on equitable and mutually acceptable terms (Principle V); Technical assistance must be available to the interested states (Principle VII); Activities in such areas must be coordinated (Principle VIII). Other provisions are rules relating to international law compliance (Principle III), promotion of protection of the earth's natural environment (Principle X), and protection of mankind from natural disasters (Principle XI).

---

[276] UNGA Res. 3388 (XXX), on 'International Co-operation in the Peaceful Uses of Outer Space', adopted on 18 November 1975.
[277] See UNGA Resolution 31/8, *supra* note 263.
[278] UNGA Res. 41/65, on 'Principles Relating to Remote Sensing of the Earth from Space', adopted on 11 December 1986.
[279] See Principle I (a), Principles on Remote Sensing 1986.

(d) Principles Relevant to the Use of Nuclear Power Sources in Outer Space, 1992

'Principles Relevant to the Use of Nuclear Power Sources in Outer Space, 1992' (hereinafter, 'the Principles on Nuclear Power Sources 1992')[280] is another set of United Nations principles on outer space voted for by Malaysia. Aside from the use of solar energy to supply power to spacecraft, nuclear power has also proven essential and well suited to certain space missions.[281] However, nuclear-powered spacecraft present a danger in that, should they crash onto the earth's surface, they would expose the public and other living things including animals and plants to harmful radiation or radioactive material. Reconsidering such a risk, the UNGA urged that the use of nuclear power sources (hereinafter, the 'NPS') be based on a thorough safety assessment.[282] Thus, a set of principles was drafted to guide the states to ensure the safe use of NPS in outer space.

Matters related to NPS gained special attention in the United Nations as early as 1978 after the incident of the Soviet Cosmos 954 satellite.[283] In November 1978, as indicated in Resolution 33/16,[284] the UNCOPUOS was authorised by the UNGA to set up a working group of experts, namely the 'Working Group on the Use of Nuclear Power Sources in Outer Space', to study NPS matters. This Resolution also urged the launching states to inform the states concerned in the event of NPS spacecraft malfunctioning, particularly when there is a risk of radioactive material re-entering the earth's atmosphere.[285] In the first Working Paper on NPS, submitted in 1978, it was highlighted that the existing outer space international legal instruments should be examined with a view to recommending the necessary legal

[280] In this section, all Principles, unless specified otherwise, refer to those in the 'Principles on Nuclear Power Sources 1992'. See also UNGA Res. 47/68, *infra* note 288.
[281] For instance, a large-scale mission such as an expedition to the Moon or a manned mission to Mars requires nuclear power sources. Among the advantages of nuclear power if used in long-distance voyages are the saving of considerable funds and the shortening of interplanetary journeys. See Preamble of the 'Principles on Nuclear Power Sources 1992'. See also Zaitsev, Yury, "Nuclear Power in Space", *Space Daily*, 15 August 2007, http://www.spacedaily.com/reports/Nuclear_Power_In_Space_999.html, accessed: 13 May 2014.
[282] Preamble of the 'Principles on Nuclear Power Sources 1992'.
[283] On 24 January 1978, Cosmos 954, a Soviet nuclear-powered satellite, entered the earth's atmosphere and disintegrated. The crash emitted radioactive material over Canadian territory, including portions of the Northwest Territories, Alberta, and Saskatchewan. See http://www.hc-sc.gc.ca/hc-ps/ed-ud/event-incident/radiolog/index-eng.php, accessed: 16 November 2012; http://en.wikipedia.org/wiki/Kosmos_954, accessed: 13 May 2014.
[284] UNGA Res. 33/16, on 'International Co-operation in the Peaceful Uses of Outer Space', adopted on 10 November 1978.
[285] See *supra* note 283.

measures.[286] Then, in 1980, the Legal Sub-Committee of the UNCOPUOS started to review the outer space international law and determined the appropriateness of the law relating to NPS activities.[287] Many proposals and suggestions were presented through Working Papers submitted by states including Canada, Argentina, Chile, Brazil, and Nigeria. After holding many negotiations and debates, finally, on 14 December 1992, the UNGA adopted Resolution 47/68 which endorses a set of legal principles namely 'Principles Relevant to the Use of Nuclear Power Sources in Outer Space, 1992'.[288]

The Principles on Nuclear Power Sources 1992 comprises 11 principles. These principles are open for revision in view of the growth of nuclear power applications.[289] The legal rules stipulated in these Principles, to which Malaysia as one of the countries voting in favour must adhere, include the following: (1) The applicability of international law to outer space activities that involve the use of NPS (Principle 1); (2) The use of NPS is to be restricted to space missions which cannot be operated by non-nuclear energy sources (Principle 3); (3) Nuclear reactors may be operated on interplanetary missions in sufficiently high orbits, or in low-earth orbits if they are stored in sufficiently high orbits after the operational part of the mission (Principle 3, paragraph 2(a)); (4) Radioisotope generators should be designed and constructed to survive the heat and the re-entry aerodynamic forces without spreading radioactive material into the environment (Principle 3, paragraph 3(b)); (5) The launching state should conduct a thorough safety assessment with respect to the systems involved in the mission and the assessment result should be publicly available (Principle 4); (6) The launching state should notify the re-entry of the space object to the Secretary General and states concerned in the event of the space object malfunctioning with a risk of re-entry of radioactive materials onto the earth (Principle 5); (7) The launching state should provide assistance to eliminate any harmful effects caused by the re-entry (Principle 7); (8) The launching state is liable for any damage caused (Principle 9).[290]

---

[286] A/AC.105/C.2/L.115 and A/AC.105/218, Annex IV as cited in Haanappel, P.P.C., "Nuclear Power Sources in Outer Space", (1985) 27 *IISL Colloquium on the Law of Outer Space* 215.
[287] Refer Resolution A/34/66, on 'International co-operation in the Peaceful Uses of Outer Space'. See also, *id*.
[288] UNGA Res. 47/68, on 'Principles Relevant to the Use of Nuclear Power Sources in Outer Space', adopted on 14 December 1992.
[289] *Id*.
[290] See also Article VII of the Outer Space Treaty 1967, and Article I(a), II and XII of the Liability Convention 1972.

(e) Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of All States, Taking into Particular Account the Needs of Developing Countries, 1996

The fifth set of outer space principles voted for by Malaysia is the 'Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of All States, Taking into Particular Account the Needs of Developing Countries, 1996' (hereinafter 'the Declaration on Outer Space Benefits 1996').[291] It deals with international cooperation among states in the exploration and utilisation of outer space, and has proven to be fundamental due to the nature of activities in outer space. The Declaration on Outer Space Benefits 1996 is verifiably significant for space nations, particularly for the developing countries, in ensuring that space exploration and the application of space technology benefits all countries.[292]

International cooperation in outer space activities is indeed required by,[293] or reflected from the application of, Article 1 of the Outer Space Treaty 1967,[294] which stipulates that the exploration and use of outer space shall be carried out for the benefit and in the interest of all countries regardless of their degree of economic or scientific development. Nevertheless, it is believed that this Article is insufficient to ensure that the benefits of outer space exploration and its technology are shared equally by all countries.[295] This circumstance has caused dissatisfaction among the developing countries especially regarding the scope and pace of international cooperation in space activities. Therefore, efforts have had to be made to expand and further develop the scope of international cooperation in such activities.

In 1989, the Legal Sub-Committee of the UNCOPUOS placed on its agenda an item on 'Outer Space Benefits'.[296] It aimed to promote the principle of Article 1 of the Outer Space

---

[291] In this section, all sections, unless specified otherwise, refer to those in the 'Declaration on Outer Space Benefits 1996'. See also *infra* note 298.
[292] Jasentuliyana, Nandasiri, *supra* note 54, at 46.
[293] Jasentuliyana, Nandasiri, "Ensuring Equal Access to the Benefits of Space Technologies for All Countries", (1994) 10 (no.1) *Space Policy,* at 7.
[294] Article 1, Outer Space Treaty 1967 reads: *'The exploration and use of outer space, including the moon and other celestial bodies, shall be carried out for the benefit and in the interest of all countries irrespective of their degree of economic or scientific development, and shall be the province of all mankind'.*
[295] Jasentuliyana, Nandasiri, *supra* note 54, at 8.
[296] This happened in the 28th session of the Legal Subcommittee of UNCOPUOS; the item's full title was 'Consideration of the legal aspects related to the application of the principle that the exploration and utilization

Treaty 1967 that the exploration and use of outer space should be carried out for the benefit of all countries. This was done with the intention of codifying the rights and responsibilities of countries with respect to international cooperative space activities. In fact, a number of working papers were submitted to the Legal Sub-Committee sessions on the related issues including the question of access to the benefits of space technology and elaboration of principles to ensure international cooperation.[297] In 1995 a set of principles, which formed a foundation of the discussion, was presented in a joint Working Paper that was co-sponsored by several developing states.[298] After various debates and intensive discussions, and after several revisions and amendments were accomplished, finally, in June 1996, the Declaration on Outer Space Benefits 1996 was adopted by the UNCOPUOS through consensus. Then, on 13 December 1996, it was formally adopted by the UNGA in its Resolution 51/122.[299]

The Declaration on Outer Space Benefits 1996, which was desirous of facilitating the application of the rule of Article 1 of the Outer Space Treaty 1967, introduced eight declarations. This was done in order to further strengthen international cooperation to achieve efficient collaboration in outer space activities and for the mutual benefit and interest of all states involved. Such declarations, among others, include the following:[300] (1) International cooperation shall be conducted in accordance with the international law, and shall be carried out for the benefit and in the interest of all states, irrespective of their degree of economic, social or scientific and technological development, taking into particular account the needs of the developing countries; (2) States are free to determine aspects of their participation in international cooperation on an equitable and mutually acceptable basis; (3) All states, especially those with space capabilities, must contribute to promoting and fostering international cooperation on an equitable and mutually acceptable basis, particularly for the interest and benefit of the developing countries; (4) International cooperation must be conducted in the most effective and appropriate way by the countries involved; (5)

---

of outer space shall be carried out for the benefit and in the interests of all states, taking into particular account the needs of developing countries'. Jasentuliyana, Nandasiri, *supra* note 54, at 7 and at 46.

[297] For more specific information, refer to Jasentuliyana, Nandasiri, "Article 1 of the Outer Space Treaty Revisited", (1989) 17 (no.2) *Journal of Space Law* 129; Jasentuliyana, Nandasiri, "Ensuring Equal Access to the Benefits of Space Technologies for All Countries", *supra* note 293, at 7.

[298] See Report of the 34th session of the Legal Sub-Committee, U.N. Doc. A/AC.105/607 of Apr. 19, 1995, Working Paper jointly co-sponsored by Brazil, Chile, Colombia, Egypt, Iraq, Mexico, Nigeria, Pakistan, Philippines, Uruguay and Venezuela as cited in Jasentuliyana, *supra* note 54, at 47.

[299] See UNGA Res. 51/122 on "Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of All States, Taking into Particular Account the Needs of Developing Countries", adopted on 13 December 1996.

[300] For details, see *id*.

International cooperation should aim to: (a) promote space science and technological development, and its application; (b) foster the development of relevant and appropriate space capabilities; and (c) facilitate the exchange of expertise and technology among states. In respect of the above, since Malaysia has agreed to and accepted such a Declaration, she is bound to observe all those principles under her international obligation and commitment.

2.4. MALAYSIA AS A MEMBER OF INTERNATIONAL AND REGIONAL ORGANIZATIONS

Apart from signing and ratifying a number of outer space-related conventions, principles, and international agreements, Malaysia has also become a member of many international and regional organizations that relate to outer space activities. Thus, this section will concisely present a number of international and regional organizations of which Malaysia has become a member. This section is important in order to know the country's level of engagement in relation to regional and international space organizations.

2.4.1. International Level

Malaysia has become a member of various international organizations. This section will highlight a number of outer space-related organizations that Malaysia has joined as a member at the international level. These organizations include the following:

(a) United Nations Committee on the Peaceful Use of Outer Space (UNCOPUOS)

The United Nations Committee on the Peaceful Use of Outer Space (UNCOPUOS)[301] is the only committee of the UNGA which deals exclusively with international cooperation in the peaceful uses of outer space. At the very beginning, in 1958, the UNCOPUOS was established by the UNGA as an *ad hoc* Committee on the Peaceful Uses of Outer Space with the participation of 18 member states. This was established under the UNGA Resolution 1348 (XIII).[302] One year later, in 1959, this *ad hoc* Committee was then turned into a permanent

---

[301] UNCOPUOS website is available at http://www.oosa.unvienna.org/oosa/en/COPUOS/copuos.html, accessed: 13 May 2014.
[302] UNGA Res. 1348 (XIII), *supra* note 165.

Committee after its mandate was reaffirmed in the UNGA Resolution 1472 (XIV).[303] At that time its membership had increased to 24 members.[304]

The main missions of the UNCOPUOS include reviewing the scope of international cooperation in peaceful uses of outer space, and devising programmes on related fields to be undertaken under the auspices of the United Nations. Its other missions are to promote research and dissemination of information on outer space-related matters, and to study the legal problems arising from outer space exploration.[305] The UNCOPUOS has two standing subcommittees: (1) Scientific and Technical Subcommittee; and (2) Legal Subcommittee. They meet annually to discuss matters raised by the member states, as well to consider questions put before them by the UNGA.

With regard to the law-making process, the UNCOPUOS employs a unique process of consensus. This has indeed encouraged compromise and successfully accommodates the different interests of member states. The process of drafting international space law in fact involves time-consuming, general discussion, detailed negotiation, and editorial review. This is done through numerous formal and informal discussions, as well as consultation on bilateral and multilateral bases. Before the draft text reaches its final draft, it will go through several versions. If the text is agreed upon by consensus among the member states, the UNGA will then adopt a resolution containing the agreed text. In the case of a treaty, states can then decide whether to sign, ratify or accede to it, and the treaty will come into force in accordance with its provisions. If not, it will remain a declaration of legal principles adopted by the UNGA. Considering the benefits gained from the consensus procedure,[306] the United Nations attempts to arrive at decisions by consensus, failing which they may also resort to the majority vote system.[307]

---

[303] UNGA Res. 1472 (XIV), *supra* note 166.

[304] See http://www.oosa.unvienna.org/oosa/en/COPUOS/members.html, accessed: 15 November 2012. See also Jasentuliyana, Nandasiri, *supra* note 54, at 23.

[305] See http://en.wikipedia.org/wiki/United_Nations_Committee_on_the_Peaceful_Uses_of_Outer_Space, accessed: 13 May 2014. See also UNGA Res. 1348 (XIII), *supra* note 165.

[306] Among the benefits is the fact that the process can be conducted with patience and not cut off suddenly by a vote which may defeat what might come to fruition; it also can ensure the maximum compliance by the members. For more details, see Galloway, Eilene, "Creating Space Law", in *Space Law: Development and Scope,* Ed., Jasentuliyana, Nandasiri, (London: Praeger, 1992), at 248.

[307] Jasentuliyana, Nandasiri, *supra* note 54, at 27-29.

As of 2013, the UNCOPUOS has 74 member states altogether, including Malaysia.[308] Actually, Malaysia joined the UNCOPUOS as a member in 1994 on a rotational basis. Malaysia, the Republic of Korea, Cuba and Peru indeed rotate seats every two years.[309] However, in 2001, the practice of sharing seats on a rotational basis was abolished by the UNGA. Thus, Malaysia and the three other aforementioned states became full members of the UNCOPUOS starting from 2001.[310] Malaysia, as a member of UNCOPUOS, can participate in the adoption of the UNGA legal rules either by consensus or by voting. Apart from this, it is also worth noting that a Malaysian woman, Prof. Datuk Dr. Mazlan Othman[311] has been entrusted with leading the United Nations Office for Outer Space Affairs (UNOOSA), a United Nations office responsible for promoting international cooperation in the peaceful uses of outer space. The UNOOSA serves as a secretariat for the UNCOPUOS,[312] and it is responsible to the UNGA for implementing outer space-related policies. It also conducts 'Programmes on Space Applications' and maintains the 'Register of Objects Launched into Outer Space'. Hence, as far as Malaysia's present commitment to the UNOOSA is concerned, it is evident that Malaysia has succeeded in gaining confidence and recognition from the world community in leading an important world organization in relation to outer space activities.

(b) International Telecommunication Union (ITU)

Acknowledging that states have the right to regulate their telecommunications, and considering the importance of telecommunications technology for preserving peace and achieving economic and social development, a group of countries embarked on various steps to establish the International Telecommunication Union (ITU).[313] The ITU was actually

---

[308] In 2012, Armenia, Costa Rica and Jordan have applied for membership of the Committee. See http://en.wikipedia.org/wiki/United_Nations_Committee_on_the_Peaceful_Uses_of_Outer_Space, accessed: 13 May 2014. See *supra* note 304.
[309] See UNGA Res. 49/33, on 'Enlargement of the Committee on the Peaceful Uses of Outer Space', adopted on 9 December 1994. See http://www1.umn.edu/humanrts/resolutions/49/33GA1994.html, accessed: 13 May 2014. See also *supra* note 304.
[310] See UNGA Res. 56/51, on 'International Cooperation in the Peaceful Uses of Outer Space', adopted on 10 December 2001. See also *supra* note 304.
[311] Prof. Datuk Dr. Mazlan Othman was given the post of Director of the UNOOSA twice: First, between the years of 1999 and 2002 and then from the year 2007 until the present. See http://www.oosa.unvienna.org/oosa/OOSA/heads.html, accessed: 13 May 2014.
[312] See http://www.oosa.unvienna.org/, accessed: 13 May 2014.
[313] ITU's official website is available at http://www.itu.int/, accessed: 13 May 2014. See *infra* note 314.

founded in 1865,[314] and it is the leading and oldest international organization in the United Nations family.[315] It deals with outer space-related activities, specifically information and communication technology issues.[316] The ITU is based in Geneva and headed by a Secretary-General.[317] One of the purposes of the establishment of the ITU is to maintain and extend international cooperation among members for the improvement and use of all kinds of telecommunications. Its other objective is to promote and offer various related technical assistance to developing countries.[318]

With regard to the ITU membership, it has 193 member states. Malaysia became a member of the ITU under the category of state membership on 3 February, 1958.[319] Under the sector membership, there are 625 members from various states including seven companies and two institutions of higher education from Malaysia.[320] Those companies are as follows: Altel Communications Sdn. Bhd., Celcom Axiata Berhad, Green Packet Berhad, MEASAT Satellite Systems Sdn Bhd, Maxis Mobile Sdn Bhd., Telekom Malaysia Bhd., and Axiata Group Berhad. The institutions of higher educations are: Universiti Sains Malaysia (USM) and Universiti Utara Malaysia (UUM).

On 2 January 2007, the ITU opened its Centre of Excellence at the Universiti Utara Malaysia (UUM), one of the Malaysian public universities.[321] The Centre is known as 'ITU-UUM Centre of Excellence', one of the ITU Centres of Excellence that operate in Asia.[322] The Centre aims to benefit the developing nations by providing executive training, research and

---

[314] Historically, the birth of ITU dates back to the establishment of the International Telegraph Union in 1865. In 1865, after a group of countries signed the International Telegraph Convention, the ITU was established under the name of International Telegraph Union. This name was used until 1932 when two agreements - International Telegraph Convention 1865 and International Radio Telegraph Convention 1906 - were merged into one agreement called International Telecommunication Convention. The ITU was then widely known as International Telecommunication Union. For more information on the historical development of ITU, refer to Lyall, Francis, "The International Telecommunication Union and Development", (1994) 22 *Journal of Space Law* 23. See also "International Telecommunication Union (ITU)," *Gale Encyclopaedia of E-Commerce 2002*, http://www.encyclopedia.com, accessed: 10 December 2010.

[315] It became a specialized agency of the United Nations in 1947. See Lyall, Francis, "The International Telecommunication Union and Development", *id*., at 25.

[316] See http://www.itu.int/en/history/Pages/default.aspx, accessed: 13 May 2014.

[317] A Secretary-General is elected to a four-year term by the member states at the Plenipotentiary Conference.

[318] Article 1, ITU Constitution.

[319] See http://en.wikipedia.org/wiki/International_Telecommunication_Union#Membership, accessed: 13 May 2014.

[320] See http://www.itu.int/members/index.html; http://www.itu.int/online/mm/scripts/mm.list?_search=SEC&_languageid=1#total, accessed: 13 May 2014.

[321] The official website of UUM is available at http://www.uum.edu.my, accessed: 13 May 2014.

[322] Other Centres, for instance, are located in Thailand, Korea, Iran and Pakistan. See *supra* note 313.

development, advisory services, and an information, communication, and technology (ICT) referral centre. Its major focus is on ICT developments covering wireless technology, broadband applications, network management, operations, applications, services and others.[323]

The ITU's core legal framework is governed by the Constitution and Convention of the ITU.[324] They were adopted by the Additional Plenipotentiary Conference[325] at Geneva in 1992, and were opened for signature on 22 December 1992.[326] They entered into force on 1 July 1994, thereby abrogating and replacing the earlier Convention, namely the International Telecommunication Convention of Nairobi 1982.[327] Since their adoption in 1992, the ITU Constitution and Convention have been amended by a number of Plenipotentiary Conferences. The latest version of the Constitution and the Convention of the ITU incorporates the 2010 amendments as adopted by the Plenipotentiary Conference held at Guadalajara, Mexico, in October 2010. This amendment entered into force on 1 January 2012.[328] Apart from this amendment, the Constitution and Convention of ITU and their respective annexes also incorporate a number of earlier amendments adopted by other Plenipotentiary Conferences such as the Plenipotentiary Conference of Kyoto 1994, Plenipotentiary Conference of Minneapolis 1998, Plenipotentiary Conference of Marrakesh 2002, and Plenipotentiary Conference of Antalya 2006.[329] The 2014 Plenipotentiary Conference will be held in Busan, Republic of Korea.[330]

---

[323] See http://www.uum.edu.my/w10/index.php?option=com_content&view=article&id=277:itu-uum-and-the-digital-gap-in-rural-areas&catid=62, accessed: 19 November 2012.

[324] The full text of the Constitution and Convention of the ITU is available at the *Collection of the Basic Texts of the International Telecommunication Union adopted by the Plenipotentiary Conference,* Edition 2011, (Geneva: ITU, 2011). Also available at http://www.itu.int/net/about/basic-texts/index.aspx, accessed: 13 May 2014.

[325] The Plenipotentiary Conference is the top policy-making body and the supreme organ of the ITU. It is the only body with the power to amend the Constitution and Convention of the ITU. It is also the key event at which the ITU member states decide on the future role of the organization, and determine the organization's ability to influence and affect the development of information and communication technology. See Article 1, ITU Convention. See also, http://www.itu.int/plenipotentiary/2010/index.html, accessed: 13 May 2014.

[326] See Article 58 (1), ITU Constitution.

[327] See Article 58 (2), ITU Constitution.

[328] See ITU, Final Acts of the Plenipotentiary Conference Guadalajara, 2010, available at http://www.itu.int/pub/S-CONF-ACTF-2010/en, and message from the ITU Secretary-General in Collection of the Basic Texts of the International Telecommunication Union, *supra* note 324. See also http://www.itu.int/plenipotentiary/2010/index.html, accessed: 13 May 2014.

[329] Explanatory Notes in Collection of the Basic Texts of the International Telecommunication Union, *supra* note 324. The details of all ITU Plenipotentiary Conferences are available at http://www.itu.int/en/history/plenipotentiaryconferences/Pages/ListofPlenipotentiaryConferences.aspx, accessed: 13 May 2014.

[330] It will be held on 20 October – 7 November 2014. See http://www.itu.int/en/plenipotentiary/Pages/default.aspx, accessed: 27 June 2013.

The Constitution of the ITU consists of nine chapters. The Constitution prescribes the ITU's basic provisions, such as purposes of its establishment, composition, and structure of the Union, rights and obligations of member parties, legal instruments, and many others.[331] It also establishes the ITU's three main sectors and their different spheres, as well as prescribing their functions and structures. These three sectors are as follows:[332] (1) Radio communication ('ITU-R'), which is responsible for managing the international radio-frequency spectrum and satellite orbit resources;[333] (2) Standardization ('ITU-T'), entrusted with fulfilling the ITU purposes with respect to telecommunication standardization;[334] and, (3) Development ('ITU-D'), established to assist the spread of equitable, sustainable and affordable access to ICT technologies.[335] There is also a specific chapter on general provisions relating to telecommunications, such as the right of the public to use international telecommunications services, the right to stop or suspend the services, clauses on secrecy of international correspondence, priority of telecommunications concerning threats to life, and government telecommunications.[336] Other chapters deal with special radio provisions,[337] relations with the United Nations and other international organizations, and relations with non-member states.[338] The ITU Convention comprises six chapters and is designed to complement the ITU Constitution. It prescribes, among other things, matters relating to the functioning of the Union[339] including clauses on its election, conferences and assemblies, its council, and its coordination committee. Other chapters deal with specific provisions regarding conferences and assemblies,[340] operation of telecommunication services,[341] arbitration and amendment,[342] and others.[343]

---

[331] Chapter 1, ITU Constitution.
[332] See http://www.itu.int/net/about/index.aspx, accessed: 13 May 2014.
[333] Chapter II, ITU Constitution, and also Section 5, ITU Convention.
[334] Chapter III and Article 1, ITU Constitution, and Section 6, ITU Convention.
[335] Chapter IV, ITU Constitution, and Section 7, ITU Convention.
[336] Chapter VI, ITU Constitution.
[337] Chapter VII, ITU Constitution.
[338] Chapter VIII, ITU Constitution.
[339] Chapter I, ITU Convention.
[340] Chapter II, ITU Constitution.
[341] Chapter V, ITU Convention.
[342] Chapter VI, ITU Convention.
[343] Chapter IV, ITU Convention.

(c) International Telecommunications Satellite Organization (ITSO)

International Telecommunication Satellite Organization (ITSO)[344], previously abbreviated to 'INTELSAT', is an intergovernmental organization established to ensure that communications by means of satellites are available to the world's nations on a global and non-discriminatory basis. The Organization was formed on 20 August 1964 initially under the name of INTELSAT. Its establishment resulted from the willingness of nations to join the United States to establish a commercial communications satellite system.[345] The Organization is headquartered in Washington D.C. and currently has 149 member states including Malaysia.[346]

The establishment of the INTELSAT, as a matter of fact, took place three years after the UNGA adopted an important resolution, Resolution 1721 (XVI)[347] on 20 December 1961, which prescribed that 'communication by means of satellites should be available to the nations of the world as soon as practicable on a global and non-discriminatory basis'. Such a creation has, indeed, incorporated the rule set out in the Resolution and also the rule in Article I of the Outer Space Treaty 1967[348] that further states that 'outer space shall be used for the benefit and in the interest of all countries'. From 1964 to 2001, INTELSAT was an intergovernmental consortium that owned and managed a constellation of communications satellites and provided international broadcasting services.[349] By 2001, INTELSAT was reported as having over 100 member states.[350]

The Organization underwent an important restructuring in 2001. Specifically, the restructuring involved the privatization of INTELSAT, which took place on 18 July 2001. This was done in order to secure the long-term viability of its communication system in a market characterized by increasing competition, fast-paced innovations, and rising capital

[344] ITSO's official website is available at http://www.itso.int/, accessed: 13 May 2014.
[345] See http://www.itso.int/index.php?option=com_content&view=article&id=486&Itemid=206&lang=en, accessed: 13 May 2014.
[346] See http://www.itso.int/index.php?option=com_content&view=article&id=486&Itemid=1&lang=en/, accessed: 13 May 2014.
[347] UNGA Res. 1721 (XVI), *supra* note 167.
[348] The Outer Space Treaty 1967, *supra* note 161.
[349] Its first communication satellite known as Intelsat I (nicknamed 'Early Bird') was launched and placed in geostationary orbit on 6 April 1965. This was the world's first communication satellite. See http://www.intelsat.com/about-us/history/intelsat-1960s.asp, accessed: 20 November 2012.
[350] See *id*.

costs, and in order to attract private investment.[351] Two levels of restructuring were involved: intergovernmental level and operating level. At the intergovernmental level, it was structured into two organs: (1) Assembly of Parties, comprising the 149 member countries including Malaysia; and (2) an Executive Organ, headed by a Director General. Meanwhile, at the operating level, a commercial and pro-competitive company named Intelsat Ltd was then created.[352] This company is a private satellite communication service provider under the supervision of the Organization. It aims are to operate and control the satellite system as well as providing space segment capacity in a manner consistent with the core principles of global coverage and connectivity, lifeline connectivity and non-discriminatory access.[353] To fix these purposes, INTELSAT then transferred its global satellite system, including the geostationary-orbital locations, and the brand-name of 'Intelsat' to Intelsat Ltd. As a result of this transfer, its global communication network, which comprised 19 satellites in 2001, has expanded to 53 satellites through new launches and acquisitions.[354] As of March 2011, Intelsat Ltd operates a fleet of 52 communication satellites, which is the world's largest fleet of commercial satellites.[355]

With respect to the treaty agreement, the Organization is governed by the 'Agreement Relating to the International Telecommunications Satellite Organization' (hereinafter, the 'Agreement Relating to the ITSO').[356] The Agreement was opened for signature on 20 August 1971 and entered into force two years later on 12 February 1973. Malaysia ratified the Agreement on the date of its conclusion, which was 20 August 1971.[357] The Agreement encompasses 21 Articles and deals mainly with the establishment of the Organization.[358] It prescribes the Organization's main purpose and core principles, as well as the types of public telecommunications services covered.[359] It also provides, among other things, the location of its headquarters and its privileges, exemptions, and immunities.[360] Apart from that, the

---

[351] See *supra* note 344.
[352] Intelsat Ltd is headquartered at Luxembourg. The website of the company is available at http://www.intelsat.com/, accessed: 13 May 2014.
[353] See *supra* note 344.
[354] *Id*.
[355] See http://en.wikipedia.org/wiki/Intelsat, accessed: 13 May 2014.
[356] See http://www.itso.int/images/stories/Treaty/itso%20agreement%20booklet%20format-efs.pdf, accessed: 13 May 2014.
[357] See http://www.minbuza.nl/en/Key_Topics/Treaties/Search_the_Treaty_Database?isn=002791, accessed: 2 November 2012.
[358] See Article II, the Agreement Relating to the ITSO.
[359] See Articles III, and IV, Agreement Relating to the ITSO.
[360] Article XIII, Agreement Relating to the ITSO.

Agreement sets out the rights and obligations of states parties, the Organization's structure, its financial principles, power of supervision, juridical personality capacity, and others.[361] Furthermore, the Agreement emphasizes the mode of settlement of disputes between the parties regarding their rights and obligations under this Agreement.[362]

(d) International Mobile Satellite Organization (IMSO)

International Mobile Satellite Organization (IMSO)[363] is another international organization dealing with outer space-related activities. It is an intergovernmental organization responsible for overseeing certain public satellite safety and security communication services provided via Inmarsat satellites.[364] It is headquartered in London. At present, IMSO has 98 member countries, and Malaysia joined as a member on 12 June 1986.[365]

Historically, the origin of IMSO can be traced back to the formation of the International Maritime Satellite Organization (INMARSAT). The establishment of INMARSAT in 1976, similarly to INTELSAT, is based on the UNGA Resolution 1721(XVI) which prescribes that 'communication by means of satellites should be available to the nations of the world as soon as practicable on a global and non-discriminatory basis'.[366] It also responds to the rule in Article I, Outer Space Treaty 1967, stressing that 'outer space shall be used for the benefit and in the interest of all countries'.[367]

---

[361] See Article XI, Article VIII, Article VII, Article V, and Article VI, Agreement Relating to ITSO.
[362] See Article XVI, and Annex A, Agreement Relating to the ITSO. Annex A is about 'Provisions on Procedures Relating to Settlement of Dispute' and consists of 14 articles.
[363] IMSO official website is available at http://www.imso.org/, accessed: 27 November 2012.
[364] Currently there are four constellations with a total of 11 satellites: (1) Inmarsat-2 series (There four satellites, but only Inmarsat-2 F2 still continue in service (launch date: 8 March 1991); (2) Inmarsat-3 series (five satellites: Inmarsat-3 F1 (3 April 1996), Inmarsat-3 F2 (6 September 1996), Inmarsat-3 F3 (18 December 1996), Inmarsat-3 F4 (3 June 1997), Inmarsat-3 F5 (4 February 1998). They are expected to remain in operation until 2018); (3) Inmarsat-4 series (four satellites: Inmarsat-4 F1 (11 March 2005), Inmarsat-4 F2 (8 November 2005), Inmarsat-4 F3 (18 August 2008), Inmarsat-4A F4/Alphasat (25 July 2013). They are expected to continue service until the early-2020s); (4) Inmarsat-5 series/Global Xpress (five satellites: Inmarsat-5 F1 (8 December 2013). The second and third are expected to be deployed by end of 2014. The fourth is expected from Boeing for delivery in late 2016. They are projected to have a commercial life of 15 years). For more information, refer to http://www.inmarsat.com/about-us/our-satellites/, accessed: 2 May 2014; read also "First Global Xpress Satellite Successfully completes In-Orbit Testing", *Inmarsat Press Releases,* http://www.inmarsat.com/press-release/first-global-xpress-satellite-successfully-completes-orbit-testing/, accessed: 13 May 2014.
[365] Refer to http://www.imso.org/member_states.asp, accessed: 13 May 2014.
[366] UNGA Res. 1721 D (XVI), "International Co-operation in the Peaceful uses of Outer Space", adopted on 20 December 1961. See also Paragraph 1, English Text of the IMSO Convention, *infra* note 381.
[367] See *supra* note 161. See also Paragraph 2, *id*.

The INMARSAT was established under the auspices of the International Maritime Organization (IMO)[368] by the Convention on the International Maritime Satellite Organization signed in London on 3 September 1976.[369] The original purpose of its establishment was to create a global mobile satellite communications system for maritime communications sectors. The system thereby assists in reducing distress and improving safety of life at sea, management of ships, maritime public correspondence services, and radio determination capabilities.[370] Despite all this, the INMARSAT has, indeed, further extended its services by providing aeronautical and land mobile satellite communications, including aeronautical satellite communications for air traffic management, aircraft operational control, and radio determination services.[371] Consequently, in December 1994, the name 'International Maritime Satellite Organization' or 'INMARSAT' was changed to 'International Mobile Satellite Organization', abbreviated to 'Inmarsat'. Even though such amendment did not formally enter into force, the new name of Inmarsat was used thereafter, including in the restructuring of the Organization's documentation.[372]

After around twenty years of successful operation, Inmarsat then decided to challenge the rapidly growing competition from the private providers of satellite communications services.[373] Therefore, in April 1999 Inmarsat underwent an important restructuring resulting in conversion of the Organization into a private company. Consequently, the Inmarsat business was split into two parts: (1) Inmarsat Ltd;[374] and (2) the IMSO. The effect of such restructuring led to the transfer of the Inmarsat assets, its commercial operations and its interests without restriction on the new commercial company of Inmarsat Ltd. Meanwhile,

[368] IMO, formerly known as the Inter-Governmental Maritime Consultative Organization (IMCO), was established in Geneva in 1948. The name was changed to IMO in 1982. It is a specialised agency of the United Nations. Its primary purpose is to develop and maintain a comprehensive regulatory framework for shipping including safety, environmental concerns, legal matters, technical cooperation, maritime security and shipping efficiency. See http://en.wikipedia.org/wiki/International_Maritime_Organization, accessed: 13 May 2014.
[369] See http://en.wikipedia.org/wiki/International_Mobile_Satellite_Organization, accessed: 13 May 2014.
[370] See Paragraph 4, Preamble of the English Text of the IMSO Convention, *infra* note 381. See also Diederiks-Verschoor, I.H.Ph. and V.Kopal, *An Introduction to Space Law*, 3rd Revised Edition, (The Netherlands: Kluwer Law International, 2008), at 62. See also http://www.imo.org/About/Conventions/ListOfConventions/Pages/Convention-on-the-International-Maritime-Satellite-Organization.aspx, accessed: 13 May 2014.
[371] See Paragraph 5, Preamble of the English Text of the IMSO Convention, *infra* note 381.
[372] See Paragraph 6, Preamble of the English Text of the IMSO Convention, *infra* note 381.
[373] See http://www.imso.org/history_UK.asp, accessed: 5 April 2011.
[374] Its website is available at http://www.inmarsat.com/, accessed: 13 May 2014.

the provisions of the Global Maritime Distress and Safety System (GMDSS) services[375] and adherences to the other public interests have been secured by the IMSO.[376]

Since the restructuring process, the IMSO has become a supervisory body with the task of overseeing Inmarsat Ltd to ensure that it continues to meet its public services obligations. Such services include obligations relating to maritime safety within the GMDSS for ships and aircraft at no charge, as well continuing to provide global, regional and domestic satellite services, especially maritime, aeronautical, land mobile and navigation services.[377] Other public services offered are distress alerting, search-and-rescue coordinating communications, maritime safety information broadcasts, and others. Furthermore, the IMSO acts as coordinator of the International Long Range Identification and Tracking of Ships (LRIT), a system for global identification and tracking of ships.[378] The IMSO is also responsible for guaranteeing that the services provided by the company are free from any discrimination and available in a peaceful way to all persons, as well as ensuring that the principles of fair competition are observed.[379] The IMSO operates through the Assembly of Parties, its Advisory Committee, and a small Directorate headed by a Director General.[380]

With respect to its treaty agreement, the IMSO is governed mainly by the Convention on the International Mobile Satellite Organization (IMSO Convention).[381] It was formerly called the

---

375 GMDSS is an internationally agreed set of safety procedures, types of equipment, and communication protocols used to increase safety, and make it easier to rescue distressed ships, boats and aircraft. See http://en.wikipedia.org/wiki/Global_Maritime_Distress_Safety_System, accessed: 13 May 2014.

376 See Paragraph 7, Preamble of the English Text of the IMSO Convention, *infra* note 381.

377 Information on privatisation of Inmarsat is available in Sagar, D., "The Privatisation of Inmarsat", *Proceedings 41st Colloquium* (Melbourne, 1998), at 205-223. Read also Sagar, D., "The Privatisation of INMARSAT: Special Problems", *International Organisations and Space Law, Proceedings of the Third ECSL, Colloquium, Perugia, Italy, 6-7 May 1999,* Ed., Harris, R.A., (ESA/ESTEC, 1999), at 127, also available at http://articles.adsabs.harvard.edu//full/1999ESASP.442..127S/0000127.000.html, accessed: 30 November 2012. See also Diederiks-Verschoor, I.H.Ph. and V.Kopal, *supra* note 370, at 62.

378 LRIT of ships is an international system established on 19 May 2006 by the International Maritime Organization. It applies to certain types of ships such as all passenger ships, including high-speed craft. The rule is that the ship must report its position to its flag administration at least four times a day. Most vessels set their existing satellite communication systems to make these reports automatically. See http://en.wikipedia.org/wiki/Long_Range_Identification_and_Tracking, accessed: 13 May 2014. See also Articles 4 and 7, English Text of the IMSO Convention, *supra* note 381.

379 See http://www.imo.org/About/Conventions/ListOfConventions/Pages/Convention-on-the-International-Maritime-Satellite-Organization.aspx, accessed: 13 May 2014. See also Articles 3 and 4, English Text of the IMSO Convention, *infra* note 381.

380 See Articles 8, 9, 10, 11, and 12, English Text of the IMSO Convention, *infra* note 381.

381 See English Text of the IMSO Convention Amended as Adopted by the Twentieth Session of the IMSO Assembly Provisionally Applied from 6 October 2008. The document is available at http://www.imso.org/pdfs/Public/Basic%20Documents/Convention/IMSO%20CONVENTION%20-%20ENGLISH.pdf, accessed: 13 May 2014.

Convention on the International Maritime Satellite Organization, established in London and opened for signature on 3 September 1976.[382] In 2008, amendments were made to the IMSO Convention with the aim of extending the supervisory functions of the IMSO to all new potential satellite providers of GMDSS services in the future. Malaysia is one of the 97 countries that became a party to the IMSO Convention. Malaysia acceded to the Convention on 12 June 1986, and on the same date it entered into force. The Convention consists of 22 articles dealing essentially with the formation of IMSO. It specifies, among other things, the IMSO's primary purpose, its other functions, power of supervision of GMDSS, the right to enter into LRIT Service Agreement, and other contractual relationships.[383] It also prescribes the IMSO organizational structures with their functions, powers and procedures. The mode of dispute settlement between parties suggested by the Convention is negotiation.[384]

From the preceding passage, it can be observed that Malaysia has participated at the international level and become a member of various global outer space-related bodies. This situation may reflect Malaysia's commitment and dedication to the growth and progress of outer space-related activities.

2.4.2. Regional Level

Apart from being a member of various international organizations, Malaysia has also joined a range of regional bodies concerned with outer space-related activities. These regional bodies include the following:

(a) Asia-Pacific Telecommunity (APT)

Asia-Pacific Telecommunity (APT)[385] is a regional organization that manages information and communication technology for member countries in the Asia Pacific region. It was founded and established in Bangkok in July 1979.[386] The APT operates in conjunction with

---

[382] See http://www.imso.org/member_states.asp, accessed: 13 May 2014.
[383] See Articles 3, 4, 5, and 7, English Text of the IMSO Convention, *supra* note 381.
[384] See also Articles 9, 10, 11, 12 and 17, English Text of the IMSO Convention, *supra* note 381.
[385] The official website of APT is available at http://www.aptsec.org/, accessed: 13 May 2014.
[386] The establishment was a joint initiative between the United Nations Economic and Social Commission for Asia and the Pacific (UN ESCAP) and the International Telecommunication Union (ITU). See also *infra* note 390. See http://www.aptsec.org/APT-Introduction, accessed: 13 May 2014.

telecommunication service providers, communication equipment manufacturers, and research and development organizations, specifically in areas of information, communication, and innovation technologies.[387]

The APT comprises three principal organs: (1) General Assembly; (2) Management Committee; and (3) Secretariat. It is led by a Secretary General.[388] The objectives of the APT are to promote the expansion of telecommunication services and information infrastructure, and maximize the benefits of information, communication and technology for the welfare of the regional community. It also aims to develop regional cooperation in common-interest areas such as radio communications, and standards development. The APT also aims to encourage technology transfer, human resource development and exchange of information for a balanced development of telecommunications, services, and information infrastructure in the region.[389]

Malaysia joined APT on 1 July 1979. APT membership is indeed open to any state in the Asia-Pacific region that is a member of United Nations Economic and Social Commission for Asia and the Pacific (UN ESCAP).[390] As well as the aforesaid membership of states, the APT also offers also an Associate Membership[391] and an Affiliate Membership[392]. Among the affiliated members of the APT from Malaysia are Telekom Malaysia Bhd[393], TIME dotcom Sdn. Bhd.[394], Measat Satellite Systems Sdn. Bhd,[395] and Allied Digital Infonet Bhd.[396] Those who become members of the APT will enjoy benefits such as the privilege of participating in APT seminars, meetings, workshops and training courses. In addition, members from

[387] *Id*.
[388] The present Secretary General of APT is Mr Toshiyuki Yamada. See http://www.aptsec.org/APT-Organ, accessed: 13 May 2014.
[389] See http://www.aptsec.org/APT-Objectives, accessed: 13 May 2014.
[390] UN ESCAP is the United Nations body serving the regional development of the Asia-Pacific region. It aims to encourage economic cooperation among its member states. The UN ESCAP has a membership of 62 Governments including 53 member states and 9 Associate members (Malaysia joined UN ESCAP on 17 September 1957). It was established in Shanghai, China, in 1947. Currently, it has its headquarters in Bangkok, Thailand, and is headed by an Executive Secretary, Dr Shamshad Akhtar of Pakistan. See its official website http://www.unescap.org/; see also http://www.unescap.org/about/member-states, both accessed: 13 May 2014.
[391] Associate Membership is open to any territory, part or group of territories within the Asia-Pacific region that is an associate member of UN ESCAP. http://www.aptsec.org/become-members, 13 May 2104.
[392] Affiliate Membership is open to any enterprise, agency, institute, organization, association, or other undertaking entity or participant, whether private or government-owned, active in telecommunication services or information infrastructure. See, *id*.
[393] The joining date was 19 May 1994. See http://www.aptsec.org/affiliatemember, accessed: 13 May 2104.
[394] The joining date was 8 August 1995. See *id*.
[395] The joining date was 31 May 2007. See *id*.
[396] The joining date was 27 March 2009. See *id*.

developing countries are eligible for fellowships to attend APT meetings and training courses. The members are also provided with free publications such as reports from meetings and seminars, yearbooks, and an annual newsletter.[397]

(b) Asia-Pacific Regional Space Agency Forum (APRSAF)

Asia-Pacific Regional Space Agency Forum (APRSAF)[398] is another space-related body in which Malaysia participates at regional level. APRSAF was established in 1993 mainly with the purpose of strengthening and enhancing the activities related to outer space in the Asia-Pacific, specifically through the cooperation of the participating countries.[399]

The aim of the establishment of the APRSAF is, among other things, to provide opportunities to gather together the representatives of various space agencies and international organizations in the Asia-Pacific region. Its other objectives include exchanging views, opinions and information on national programs and space resources of each participating country. The participants will also have the opportunity to discuss the possibilities of future cooperation amongst the space technology developers and users that might bring benefits to each of them.[400] Indeed, APRSAF consists of four working groups:[401] (1) Earth Observation Working Group; (2) Communication Satellite Applications Working Group; (3) Space Environment Utilization Working Group; and (4) Space Education and Awareness Working Group. The Earth Observation Working Group's task is to exchange knowledge on earth observation activities, and to promote the use of such technologies for climate change mitigation and other things. The task of the Communication Satellite Applications Working Group is to discuss digital-divide issues, popularise broadband services, and promote the new communication satellite applications, including tele-education and tele-medicine, in the Asia-Pacific region.[402] The Space Environment Utilization Working Group aims, among other things, to promote the utilization of the space environment.[403] Lastly, the Space Education and Awareness Working Group targets the use of space materials to enhance young people's

[397] See http://www.aptsec.org/Members-benefits, accessed: 14 May 2014.
[398] APRSAF official website is available at http://www.aprsaf.org/, accessed: 14 May 2104.
[399] See http://www.aprsaf.org/about/, accessed: 14 May 2014.
[400] *Id*.
[401] See https://www.aprsaf.org/working_groups/about/, accessed: 14 May 2014.
[402] See APRSAF leaflet (English), at 6, at http://www.aprsaf.org/about/leaflet.php, accessed: 14 May 2014.
[403] *Id*.

education, as well as providing education and training opportunities for them in space science and technology.[404]

APSRAF has a membership of 472 organizations from 42 various countries and regions, and 27 international organizations.[405] Malaysia is one of the participating countries, and at least 16 Malaysian governmental agencies and local organizations have joined the APSRAF. They include Astronautic Technology (M) Sdn. Bhd. (ATSB), the National Space Agency of Malaysia (ANGKASA), Malaysian Meteorological Service (MMS), Malaysian Remote Sensing Agency (Remote Sensing Malaysia), Malaysian Agricultural Research and Development Institute (MARDI) and others.[406] APRSAF holds an annual meeting jointly organized by the Ministry of Education, Culture, Sports, Science and Technology, Japan (MEXT), and the Japan Aerospace Exploration Agency (JAXA), along with organizations from the host countries. In fact, thus far Malaysia has twice been appointed a host country to organize the meeting. The first was during the APRSAF 8th session meeting held in Kuala Lumpur in 2001. This event was jointly organized with the Malaysian Ministry of Science, Technology and the Environment (MOSTE) and the Malaysian Centre for Remote Sensing (MACRES).[407] The second was the APRSAF 19th session meeting held on 11-14 December 2012, also in Kuala Lumpur. The event was jointly organized with the Malaysian Ministry of Science, Technology and Innovation (MOSTI) and the Malaysian National Space Agency (ANGKASA).[408]

(c) Commonwealth Telecommunications Organization (CTO)

Commonwealth Telecommunications Organization (CTO)[409] is one of the largest institutions within the Commonwealth of Nations[410] and has existed since 1901. It is headquartered in

---

[404] See *supra* note 402, at 7.
[405] The fact is as of March 2014. See http://www.aprsaf.org/participants/, accessed: 14 May 2014.
[406] Other parties include the Malaysian Science and Technology Information Centre (MASTIC), Ministry of Science, Technology and Innovation (MOSTI), University of Malaya (UM), University Sains Malaysia (USM), Universiti Malaysia Sarawak (UNIMAS), Universiti Teknologi Malaysia (UTM), Universiti Teknologi Mara (UiTM), Multimedia University (Cyberjaya Campus), National Security Division of the Prime Minister's Department, Earth Observation Center, and Elite Solutions. See http://www.aprsaf.org/participants/countries/malaysia.php, accessed: 14 May 2014.
[407] See http://www.aprsaf.org/annual_meetings/aprsaf8/meeting_details.php, accessed: 14 May 2014.
[408] See http://www.aprsaf.org/annual_meetings/aprsaf19/meeting_details.php, accessed: 14 May 2014.
[409] The official website of the CTO is available at http://www.cto.int/, accessed: 14 May 2014.
[410] The Commonwealth of Nations is commonly referred to as the Commonwealth. It was formerly known as the British Commonwealth. It is an intergovernmental organization comprising 53 independent sovereign states.

London. It aims, *inter alia*, to help bridge the digital divide and achieve social and economic development within the Commonwealth and non-Commonwealth countries, especially in food and agriculture sectors (e-nutrition), education (distance learning), health (telemedicine), e-government and e-commerce sectors. This is achieved by delivering to the developing countries knowledge-sharing programmes in the use of information and communication technologies in areas such as telecommunications, information technologies, broadcasting, and the Internet.[411] Another mission of CTO is to offer the highest-quality programmes for capacity development, knowledge-sharing, and information services to member countries.

The CTO is governed by a constitution, namely the Constitution of the Commonwealth Telecommunications Organization.[412] Other rules and procedures governing the CTO are specified in CTO Rules of Procedure[413] and the CTO Ethical Framework.[414] The Constitution and Rules were adopted in 2002, while the Ethical Framework was adopted in 2012. The CTO is ruled by a Council made up of representatives from the governments of full member countries, one from each.[415] The Council meets annually in one of the member countries to discuss and evaluate the past year's progress and set the subsequent year's targets. At this meeting, a Chairperson and two Vice-Chairpersons are elected.[416]

CTO membership is open to Commonwealth Nations and also to those directly involved in telecom and information, as well as communication technology businesses of the Commonwealth Nations. Three types of memberships are offered:[417] (1) Country Membership; (2) Sector Membership; and (3) Programme for Development and Training Membership. Country Membership is given to the government of any Commonwealth

---

All those states, except Mozambique and Rwanda, were formerly part of the British Empire. Its headquarters are in London. The Head of the Commonwealth is Queen Elizabeth II. The member states cooperate within the framework of common values including the promotion of democracy, human rights, good governance, rule of law, individual liberty, free trade, fight against poverty and disease, environmental sustainability, and others. Its official website is available at http://www.thecommonwealth.org/; see also http://en.wikipedia.org/wiki/Member_states_of_the_Commonwealth_of_Nations; http://thecommonwealth.org/member-countries, both accessed: 14 May 2014.

[411] See http://www.cto.int/Default.aspx?tabid=54, accessed: 4 December 2012.

[412] The full text is available at http://www.cto.int/about-the-cto/our-organisation/constitution-and-rules/, accessed: 14 May 2014.

[413] The text is available at *id*.

[414] The full text is available at *id*.

[415] See *infra* note 417, and 418.

[416] See http://www.cto.int/about-the-cto/our-organisation/executive-committee/, accessed: 14 May 2014.

[417] See http://www.cto.int/membership/our-members/, accessed: 14 May 2014.

member country wishing to become a full member country of the CTO.[418] Malaysia is one of the Commonwealth countries that have become members of the CTO under the Country Membership. Sector Membership is available to any business and private sector, non-Commonwealth governments, international development agencies, academic institutions and non-governmental organizations. Benefits offered to members of the CTO include one free delegate place at CTO events, discounted delegate places in addition to the free place, speaking opportunities at the CTO events, and many others.[419] Programme for Development and Training Membership is a unique low-cost membership programme that provides needs-based professional training and capacity-building courses on telecommunications policy, regulations, technologies, and telecom business management. The Programme for Development and Training members automatically gain Sector Membership. Telekom Malaysia Berhad (TM Malaysia)[420] is one of the Programmes for Development and Training partners of the CTO.

(d) The Association of South East Asian Nations (ASEAN) Subcommittee on Space Technology and Applications (SCOSA)

Malaysia is also a member of the ASEAN Subcommittee on Space Technology and Application (SCOSA).[421] SCOSA is an upgraded version of ASEAN Experts Group on Remote Sensing (AEGRS).[422] It is one of the ASEAN implementing bodies under the ASEAN Committee on Science and Technology (COST).[423] SCOSA's main task is to continue the AEGRS practices, as well identify areas of common interest among the ASEAN member countries in space-related technologies. Other objectives of SCOSA are as follows: to formulate and coordinate collaborative programmes on space technology and its applications, particularly in areas of remote sensing, communication and satellite technology

---

[418] See http://www.cto.int/membership/our-members/full-member-countries/, accessed: 14 May 2014.
[419] See http://www.cto.int/membership/member-benefits/, accessed: 14 May 2014.
[420] TM Malaysia is one of the leading communication companies in Malaysia and offers a comprehensive range of communication services and solutions in broadband, data and fixed-line. Its website is available at http://www.tm.com.my/, accessed: 14 May 2014.
[421] See http://astnet.asean.org/index.php?name=Main&file=content&cid=85, accessed: 14 May 2014.
[422] In 1995, AEGRS made a request to be elevated to a subcommittee under the Committee on Science and Technology (COST). In October 1999, the elevation of AEGRS was endorsed and the new name used is SCOSA. See *id.*
[423] ASEAN COST is responsible for steering the ASEAN science and technology policy, management and implementation of programmes guided by mandates laid down by the Summits of ASEAN Heads of States and Governments, and by the Meetings of the ASEAN Ministers for Science and Technology. See http://astnet.asean.org/index.php?name=Main&file=cost, accessed: 14 May 2014.

applications; to facilitate and accelerate the transfer of space technology and its applications to the ASEAN region; and to promote collaborative activities and projects on space technology and its applications with international organizations.[424]

SCOSA initiates two types of projects, namely Project Intra ASEAN, and Project ASEAN with Other Partners.[425] Under the Intra ASEAN Project, SCOSA introduces projects such as the ASEAN oil spill detection project, space technology and applications directory project, training workshop on precision farming, and others.[426] Meanwhile, the ASEAN with Other Partners Project involves collaboration and cooperation with donor countries, dialogue partners, financial institutions and international agencies. Such projects include ASEAN-China project, ASEAN-India project, ASEAN-ESA project, and many others.[427]

All ten members of the ASEAN countries make up the membership of SCOSA.[428] The SCOSA secretariat is located in Jakarta. The election of the SCOSA Chairmanship is undertaken on a rotation basis among the ASEAN member countries. In 1999, a Malaysian representative was chosen as Interim Chairman of SCOSA after the elevation process. He was appointed Chairman until 2002.[429] In SCOSA, all ASEAN member countries are represented. These appointments are made for coordinating purposes. In such circumstances, Malaysia has been represented by Datuk Nik Nasruddin Mahmood and also by Dato' Haji Darus Ahmad of the Malaysian Centre for Remote Sensing (MACRES).[430]

2.5. CONCLUDING REMARKS

From the foregoing discussion in Chapter 2, a number of conclusions can be inferred. Firstly, in respect of the current major world space activities, it is observed that space-related activities are engaging the attention of the world community at present, and they have the

---

[424] See http://astnet.asean.org/index.php?name=Main&file=content&cid=85, accessed: 14 May 2014.
[425] http://scosa.lapan.go.id/projects.htm, accessed: 8 February 2011.
[426] For details, see http://scosa.lapan.go.id/project1.htm, accessed: 2 February 2011.
[427] For more information, refer to http://scosa.lapan.go.id/project2.htm, accessed: 8 February 2011.
[428] The ASEAN member countries are Malaysia, Brunei Darussalam, Cambodia, Indonesia, Laos, Myanmar, Philippines, Singapore, Thailand, and Vietnam. See the ASEAN official website, http://www.asean.org/, accessed: 4 December 2012.
[429] Such person is Mr Nik Nasruddin Mahmood. As of 28 October 2010, Mr Darus bin Ahmad, the Director General of Malaysian Remote Sensing Agency (MACRES) is the Chairman of the ASEAN SCOSA. See http://scosa.lapan.go.id/chairmanship.htm, accessed: 8 February 2011; http://astnet.asean.org/index.php?name=Main&file=content&cid=94, accessed: 4 December 2012.
[430] See *id*.

most potential to continue to evolve rapidly in the future. Malaysia is one of the potential participants on and contributors to space-related activities, and has shown great interest in taking further part in such activities.

Secondly, regarding Malaysia's position with respect to outer space conventions, it is noted that Malaysia is a signatory state to only two United Nations outer space conventions (the Outer Space Treaty 1967, and the Rescue Agreement 1968) with no ratification at present. Malaysia is a non-party state to the other three conventions (the Liability Convention 1972, the Registration Convention 1975, and the Moon Agreement 1979). Pursuant to the general rule prescribed in Article 34 of the Vienna Convention on the Law of Treaty, as a signatory and non-party state to the space treaties, Malaysia is not bound by any rules prescribed in the outer space Treaties. However, there are certain circumstances should be noted at this point. Firstly, an obligation imposed by Article 18 of the Vienna Convention on the Law of Treaty to the signatory state which required for Malaysia (under her capacity as a signatory state) to refrain from any acts contravene the objective and purpose of the treaties that she signed. Secondly, there is a legal binding force in respect of the space treaties' rules to the signatory and non-party state when the treaties' rules are part of international custom under Article 38 of the Vienna Convention on the Law of Treaty.

From non-legal perspective, if Malaysia is to be seen as one of the 'responsible' space participants at the international level, it is strongly suggested that she considers ratifying the two conventions, as well as consider becoming a party to the other three conventions. The universal acceptance of and compliance with all these treaties by states such as Malaysia would certainly contribute to the orderly use of outer space as well strengthening its rules. Moreover, by becoming a party to the United Nations treaties, Malaysia would be able to protect and defend her legitimate rights and interest, as well as taking legal actions in accordance with the treaties. Furthermore, parties to the treaties can also propose new agreements, declarations and other instruments to regulate new areas or activities, and the use of new technologies.[431] As for the international outer space principles, it is noted that Malaysia has voted for all five of the United Nations outer space principles. This situation

[431] UNGA, Committee on the Peaceful Uses of Outer Space 'Report on the United Nations/Ukraine Workshop on Space Law on the theme "Status, application, and progressive development of international and national space law" (Kyiv, 6-9 November 2006), A/AC.105/880, at 5.

demonstrates Malaysia's willingness to recognize some international outer space legal rules and to further consider becoming a party to the other outer space treaties, conventions, and agreements.

Thirdly, with regard to Malaysia's membership of international and regional organizations, it is noted that Malaysia has become a member of various space-related bodies at both international and regional levels. This situation indicates Malaysia's high interest in becoming further involved in outer space-related activities either at the international or regional level by offering her contributions and commitments as a member of the international and regional space-related organizations.

In conclusion, Malaysia's involvement in the outer space rules and treaties, as well her contributions and commitments as a member of the international and regional space organizations have verified her willingness and enthusiasm to further engaged in outer space-related activities.

3 THE STUDY OF THE LEGAL FRAMEWORK OF SOME NATIONAL SPACE LEGISLATIONS

3.1. INTRODUCTION

The evolution of space law occurs at both international and national levels. Many countries acknowledge that the enacting of national space law, besides adhering to the United Nations treaties, is a matter of priority, especially for those involved in outer space activities. The development of national space legislation will enable states to provide their nationals with legal certainty and transparency in matters relating to domestic space law, as well as to afford a reliable legal framework, particularly for their private space activities.[1] On top of this, the growth of national space legislation is, in fact, a response to the international legal rules set forth in Article VI of the Outer Space Treaty 1967,[2] which prescribes that a state has an obligation to take responsibility for its national activities in outer space. Moreover, the state is obliged to ensure that its national activities in outer space are carried out in accordance with international law. Such assurance can indeed be achieved, as suggested by Article VI of the Outer Space Treaty 1967, through authorization and continuous supervision by the states through their domestic space legislation.

In proposing and drafting a Malaysian space law, it is worth exploring a number of domestic space laws of other countries. This chapter aims to study the legal frameworks of selected national space legislations of a number of countries. This method is used in the expectation that the legislative experience of those countries will present a useful model for outlining the proposed legal framework for Malaysian space legislation. The seven selected countries are as follows: (1) United Kingdom, (2) Australia, (3) United States of America, (4) India, (5) Singapore, (6) Thailand, and (7) Brunei. These countries have been selected according to various criteria; for instance, some share common constitutional systems, all are involved in space activities, some are Commonwealth countries, and some are neighbours. The United Kingdom, Australia, India, Singapore and Brunei are Commonwealth countries, like Malaysia. The United Kingdom is not only the mother of the Commonwealth but also among

---

[1] UNGA, Committee on the Peaceful Uses of Outer Space, 'Report on the United Nations/Ukraine Workshop on Space Law on the theme "Status, Application, and Progressive Development of International and National Space Law" (Kyiv, 6-9 November 2006), A/AC.105/880, at 6.

[2] See *infra* note 40.

the first to establish national outer space legislation. Meanwhile, Singapore and Brunei are not only Commonwealth countries but also neighbours of Malaysia.

Like Malaysia, India, Australia, Singapore and Brunei have also inherited the British legal system. It should also be noted that the law of those countries, except Thailand, is based on the common law legal system. As for Thailand, even though the country's law is based on civil law, its legal system has also been influenced by the common law system.[3] Furthermore, Thailand is a neighbouring country of Malaysia that is involved in numerous space activities. Such circumstances might, therefore, to some extent influence the development of Malaysian space legislation and activities. However, Indonesia, although a neighbour of Malaysia, has been excluded from the selection since the law of the country is based on a civil law system combined with customary law, as well as Roman Dutch law. Moreover, Indonesia is not a Commonwealth country. Such circumstances have thus excluded the country from the group selection.[4] Meanwhile, the United States has been chosen mainly because of its advanced and comprehensive domestic space legal framework, which may contribute significantly to the drafting of the Malaysian space legal framework. Furthermore, the United States legal system also follows the common law legal system.

In this chapter, the discussion begins with the United Kingdom, followed by Australia, the United States, India, Thailand, Singapore and, lastly, Brunei. It will begin with an overview of each country with respect to its political and legal systems and its involvement in space activities. Next, the discussion elaborates on the status of the five United Nations outer space conventions for each country. It then proceeds to discuss the state's national space legislation. At this juncture, the nature and scope of the domestic space legislation of each country is analysed, along with its mode of authorization, registration obligation, constant monitoring and supervision, liability and indemnification, safety, peace and security measures and, finally, other provisions in the legislation. However, for states that have yet to enact their domestic space legislation, such as India, Thailand, Singapore, and Brunei, the discussion will then focus on the states' status in relation to five outer space conventions, their outer space activities, and related experiences.

---

[3] More information is available in Chapter 3 of the thesis (3.6.1. Thailand).
[4] See http://en.wikipedia.org/wiki/Law_of_Indonesia, accessed: 14 May 2014.

3.2. UNITED KINGDOM

3.2.1. An Overview

The United Kingdom consists of Great Britain (England, Wales and Scotland) and Northern Ireland. Its capital city is London and its official language is English. Politically, the country is a unitary parliamentary democracy state[5] with a constitutional monarchy system[6]. The head of the United Kingdom is the Queen[7] and the head of Government is the Prime Minister. The United Kingdom Parliament comprises two houses: the House of Commons and the House of Lords. The United Kingdom legal system is governed by three distinct systems of laws: (1) English and Welsh law, which applies in England and Wales, (2) Northern Ireland law, which applies in Northern Ireland, and (3) Scots law, which applies in Scotland. The English, Welsh and Northern Ireland laws are based on common law principles. However, the Scots law is a pluralistic system based on civil law principles with common law elements.[8] The UK is a member state of European Union, a permanent member of the United Nations Security Council, a member of the Commonwealth of Nations and a member of the World Trade Organization, among many others.[9]

Economically, the United Kingdom is the eighth largest economy in the world by purchasing power parity.[10] It is a developed country with traditional industries including iron, steel production, coalmining, shipbuilding, aircraft, and textiles. Other industries include, to name a few, automobile manufacturing, electronic products, food processing, and chemicals. The

---

[5] The unitary system, in contrast to a federal system, is a system whereby a sovereign state is governed as one single unit in which the central government is supreme and any sub-national units exercise only such powers as the central government chooses to delegate. Around the end of 1997, devolution took place in the United Kingdom Governmental system. This involved transferring a range of powers from the United Kingdom central government to its sub-national units. In this case, the United Kingdom Parliament transferred powers involving matters of education and health, among others, to its national parliament or assemblies: the Scottish Parliament, the National Assembly for Wales, and the Northern Ireland Assembly. However, the scope of those powers differs between each political institution. With respect to the country's national policy on matters such as foreign affairs, defence, social security and trade, they remain the United Kingdom Government's responsibility. For more information refer http://en.wikipedia.org/wiki/Unitary_state; read also Leeke, Matthew, Chris Sear, and others, "An Introduction to Devolution in the UK", *Research Paper 03/84*, 17 November 2003, House of Commons Library, at http://www.parliament.uk/documents/commons/lib/research/rp2003/rp03-084.pdf, all accessed: 21 January 2013.

[6] A constitutional monarchy system is a form of government in which a monarch acts as a head of state within the parameter of a constitution.

[7] Under the United Kingdom monarchy system, Queen Elizabeth II is the head of the United Kingdom and the Commonwealth countries. See http://en.wikipedia.org/wiki/United_Kingdom, accessed: 1 January 2013.

[8] For more information see http://en.wikipedia.org/wiki/Law_of_United_Kingdom, accessed: 1 January 2013.

[9] For more information see *supra* note 7.

[10] See http://en.wikipedia.org/wiki/United_kingdom_economy, accessed: 1 January 2013.

country is also considered to have a strong and competitive space industry. This is evident as this industry contributes 9.1 billion pounds a year to the United Kingdom economy and directly employs 28,900, with an average growth rate of almost 7.5 per cent.[11] The country has particular expertise in areas such as satellite platforms and payloads, software, components, testing facilities, remote sensing application, antennas and signal simulators, satellite operators, and many others.[12]

Historically, the involvement of the United Kingdom in space activities, especially in developing launch vehicles, and both scientific and technological satellites, was initiated at the beginning of the space age. In the late 1950s, the United Kingdom led Europe in the field of large liquid-fuelled rockets with its Blue Streak ballistic missile, but this programme was halted in 1960.[13] In 1957, the first British scientific rocket was successfully launched from Woomera in Australia by a team of scientists and engineers, led by the late Sir Harrie Massey.[14] In 1959, the United Kingdom accepted the offer of the United States to work on building a series of scientific satellites called the Ariel programme. Ariel-1, the world's first international satellite, launched in 1962, was designed and built by NASA and carried seven experiments conducted by the United Kingdom. It was designed to study the ionosphere and solar radiation. Ariel-2 was launched in 1964, and Ariel-3 in 1967. Ariel-3 was the first spacecraft to be built entirely in the United Kingdom, by the British Aircraft Corporation in Bristol. On 28 October 1971, the Prospero satellite was launched into orbit by a Black Arrow vehicle. This was the first time a British satellite had been launched on a British rocket.[15] Between 1969 and 2010, it was reported that the United Kingdom has had at least 43 objects launched into space. Most of the objects were registered with the United Nations, but a few of

[11] UK Space Agency, "The Size and Health of the UK Space Industry: A Report for the UK Space Agency, Executive Summary November 2010". http://www.bis.gov.uk/assets/ukspaceagency/docs/industry/oxecon%20executive%20summary%20for%20final%20web%20version.pdf; Madeleine Russell, "UK Space Sector Trajectory Rises through the Economic Storm", *UK Space Agency,* 12 July 2012, http://www.bis.gov.uk/ukspaceagency/news-and-events/2012/Jul/uk-space-sector-trajectory-rises-through-the-economic-storm, both accessed: 2 January 2013.

[12] UK Space Agency, "The UK Space Sector", http://www.bis.gov.uk/assets/ukspaceagency/docs/uk-space-sector-technologies-and-capabilities.pdf, accessed: 3 January 2013.

[13] Even though the programme was stopped, the Blue Streak was chosen as the first stage of the international European space launch vehicle being developed by the European Launcher Development Organization (ELDO). Davies, J.K., *Space Exploration*, Chambers Encyclopaedic Guides Series, (Edinburgh: W & R Chambers, 1992), at 16.

[14] It was reported that Sir Harrie Massey, the Head of the Physics Department at University College London (UCL), was the one who initiated space science and its foundation for its development in Britain. See http://www.bis.gov.uk/ukspaceagency/discover-and-learn/discovering-space/space-history/uk-space-history, accessed: 2 January 2013.

[15] See *id*.

them were not.[16] Apart from sending and launching satellites, the United Kingdom is involved in a number of ambitious missions to other planets including Mars, Saturn, Venus, the Moon, and others.[17]

The agency responsible for coordinating the United Kingdom's civil space activity is called the UK Space Agency.[18] The Agency was launched officially on 23 March 2010, and became an executive agency of the Department for Business, Innovation and Skills (BIS) on 1 April 2011.[19] It replaced the British National Space Centre (BNSC), the previous British Government body that coordinated the United Kingdom's civil space activities. It was reported that the UK Space Agency took over responsibility for the United Kingdom Government policy and the key budgets for space.[20] It thus became responsible for all the United Kingdom's space activities. On the UK Space Agency's launch date, the Space Leadership Council was formed. The Council's duty is to advise the Agency on its work plans and future opportunities. It offers advice on what areas of space activities the United Kingdom should develop, as well promoting the United Kingdom's space industry and scientific excellence in space research, technology, and application.[21]

3.2.2. Five Outer Space Conventions: The United Kingdom's Status

In relation to the United Kingdom's status regarding the five major United Nations outer space conventions,[22] it is noted that the United Kingdom is a state party to all major outer space conventions except the Moon Agreement.[23] The first outer space treaty to be signed by

---

[16] See online index of objects launched into space at http://www.oosa.unvienna.org/oosa/osoindex.html, accessed: 2 January 2013.

[17] See http://www.bis.gov.uk/ukspaceagency/discover-and-learn/discovering-space/uk-space-activity, accessed: 2 January 2013.

[18] The UK Space Agency website is available at http://www.bis.gov.uk/ukspaceagency, accessed: 3 January 2013.

[19] The official website of BIS is available at http://www.gov.uk/bis/, accessed: 3 January 2013.

[20] The Agency's other tasks include: supporting academic research, nurturing the country's space industry, working to increase understanding of space science and its practical benefits. See Mosteshar, Sa'id, "Regulation of Space Activities in the United Kingdom", in *National Regulation of Space Activities,* ed., Jakhu, Ram S., (Dordrecht: Springer, 2010), at 357; Amos, Jonathan, "Muscular' UK Space Agency Launched", *BBC News,* 23 March 2010, http://news.bbc.co.uk/2/hi/science/nature/8579270.stm; see also http://en.wikipedia.org/wiki/British_National_Space_Centre#cite_note-bbc-2, both accessed: 1 January 2013.

[21] See http://www.bis.gov.uk/ukspaceagency/who-we-are/how-we-work/space-leadership-council, accessed: 1 January 2013.

[22] The conventions refer to the Outer Space Treaty 1967, the Rescue Agreement 1968, the Liability Convention 1972, the Registration Convention 1975, and the Moon Agreement 1979.

[23] The United Kingdom is a party to the Outer Space Treaty 1967, the Rescue Agreement 1968, the Liability Convention 1972, and the Registration Convention 1975. See United Nations, *United Nations Treaties and*

the country was the Outer Space Treaty 1967.[24] It was signed on 27 January 1967, the same date the Treaty was opened for signature to all states. Nine months later, on 10 October 1967, the United Kingdom then ratified[25] it, indicating that it was ready to be bound by the legal obligations stipulated therein.[26] On this date, the Outer Space Treaty 1967 entered into force.

The second agreement was the Rescue Agreement 1968[27]. The United Kingdom expressed its consent to become a party to the Agreement when it signed it on 22 April 1968, the date that the Agreement was opened for signature to all states. Then, on 3 December in the same year, the country ratified the Agreement.[28] This was the date when the Agreement entered into force. The third was the Liability Convention 1972.[29] This Convention was also signed on the date when it was opened for signature to all states, i.e. 29 March 1972. The ratification took place in the subsequent year on 10 October 1973.[30] The fourth convention was the Registration Convention 1975,[31] which the United Kingdom signed on 6 May 1975. This was executed four months after it was opened for signature to all states on 14 January 1975.[32] Only three years later, on 30 March 1978, the United Kingdom then ratified this Convention.[33] Such circumstances indicate that the country took approximately three years to consider ratifying the Registration Convention 1975. However, with respect to the Moon

---

Principles on Outer Space and Related General Assembly Resolutions: Status of International Agreements Relating to Activities in Outer Space as at 1 January 2010, Addendum, Ref.: Sales No. E.08.1.10, ST/SPACE/11/Rev.2/Add.3, (Vienna: United Nations, 2009).

[24] Treaty on Principles Governing the Activities of States in the Exploration and Use of the Outer Space, Including the Moon and Other Celestial Bodies (1967) (Resolution 2222 (XXI)), adopted on 19 December 1966, opened for signature on 27 January 1967, entered into force on 10 October 1967. (1967) 610 UNTS 205, 18 UST 2410, TIAS 6347; (1967) 6 ILM 386; (1967) 61 AJIL 644.

[25] Ratification refers to the act undertaken whereby a state establishes its consent to be bound by a treaty. Normally it involves two procedural acts: (1) Act of the appropriate state's organ, like the Crown in the United Kingdom, called ratification in the constitutional sense; (2) International procedure, by a formal exchange or deposit of the ratification instruments. For more information read Brownlie, Ian, *Principles of Public International Law,* 5th ed. (Oxford: Oxford University Press, 1999), at 611; see also http://europatientrights.eu/countries/signing_and_ratifying_a_treaty.html, accessed: 5 January 2013.

[26] See http://www.oosa.unvienna.org/oosatdb/showTreatySignatures.do, accessed: 5 January 2013.

[27] Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space (1968) (Resolution 2345 (XXII)), adopted on 19 December 1967, opened for signature on 22 April 1968, entered into force on 3 December 1968. 19 UST 7570, 672 UNTS 119, TIAS 6599.

[28] See *supra* note 26.

[29] Convention on International Liability for Damage Caused by Space Objects (1972) (Resolution 2777 (XXVI)), adopted on 29 November 1971, opened for signature on 29 March 1972, entered into force on 1 September 1972. 24 UST 2389, 961 UNTS 187, TIAS 7762.

[30] See *supra* note 26.

[31] Convention on Registration of Objects Launched into Outer Space (1974) (Resolution 3235 (XXIX)), adopted on 12 November 1974, opened for signature on 14 January 1975, entered into force on 15 September 1976. 28 UST 695, 1023 UNTS 15, TIAS 8480.

[32] See *id*., and *supra* note 23.

[33] See *supra* note 26.

Agreement 1979,[34] the United Kingdom has neither signed nor ratified the Agreement. Thus, it is not a party to the Agreement.

In summary, the United Kingdom is a state party to four United Nations outer space conventions: the Outer Space Treaty 1967, the Rescue Agreement 1968, the Liability Convention 1972 and, lastly, the Registration Convention 1975. However, the country is a non-party state to the Moon Agreement 1979, as it has neither signed nor acceded to the Agreement. The United Kingdom became a party to all four conventions by means of ratification only. No mode of accession was used to signify its consent to be bound by the treaties. Being a state party to the four treaties, the United Kingdom is bound under the international obligation to abide by the legal rules set forth in treaties in regulating its outer space activities. The legal effects will then commence from the date of the state's ratification of the treaties.

3.2.3. National Space Legislation: The Outer Space Act 1986

The birth of the Outer Space Act 1986[35] was related to the growth of the United Kingdom's outer space-related activities. Prior to the late 1980s, the United Kingdom's outer space activities were conducted by the United Kingdom Government or Government-controlled organizations only.[36] However, when the commercialization of outer space activities commenced, it resulted in various UK companies procuring the launch of satellites as well as operating them. This scenario then led to the enactment of the first United Kingdom domestic outer space legislation in 1986, namely the Outer Space Act 1986. This then became the legal basis for regulating their outer space-related activities.

---

[34] Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (1979) (Resolution 34/68), adopted on 5 December 1979, opened for signature on 18 December 1979, entered into force on 11 July 1984. 18 ILM 1434, 1363 UNTS 3.

[35] The United Kingdom Outer Space Act 1986, 1986 Chapter 38; the full text is available at, http://www.bis.gov.uk/assets/ukspaceagency/docs/osa/outer-space-act-1986.pdf; see also http://www.bis.gov.uk/ukspaceagency/what-we-do/space-and-the-growth-agenda/uk-capabilities-for-overseas-markets/the-outer-space-act-1986, accessed: 6 January 2013.

[36] Tremayne-Smith, Richard J, "The Outer Space Act 1986: UK Experience", *Berlin Workshop, January 2004, Project 2001+*, http://www.docstoc.com/docs/34413827/OUTER-SPACE-ACT-1986, accessed: 5 January 2013.

(a) Nature and Scope

On 18 July 1986, the United Kingdom adopted the Outer Space Act for its outer space-related activities.[37] The enactment of the Act was in fact a response to the United Kingdom's constitutional requirements by which the state is bound by the international treaties it has ratified.[38] However, the treaties have no legal effect at the United Kingdom national level unless the rules are domesticated into United Kingdom law either by Act of Parliament or by United Kingdom subordinate legislation.[39] The Act's scope was set out in the light of Article VI of the Outer Space Treaty 1967.[40] The Outer Space Act 1986 encompasses fifteen articles that deal principally with the application of the Act, licensing activities, licensing procedure, registration of space object, and offences against the Act. The main purpose of passing the Act is to grant licensing and other powers to the United Kingdom Secretary of State. Such authorization was in turn delegated to the British National Space Centre (BNSC),[41] which was then replaced by the United Kingdom Space Agency on 1 April 2010**.** At present, the United Kingdom Space Agency administers the licensing regime of the Outer Space Act 1986 on behalf of the Secretary of State.[42] Apart from that, the Outer Space Act 1986 is designed to ensure that the United Kingdom Government complies with its obligations under

---

[37] See Preamble of the Outer Space Act 1986. See also *supra* note 35.

[38] In the United Kingdom, the Crown has the power to negotiate, sign and ratify international treaties. But, in actual practice, the treaty-making power falls to the Executive Branch of the United Kingdom Government. It has a practice of submitting the treaty to Parliament for a certain period before it is ratified. See Hermida, Julian, *Legal Basis for a National Space Legislation,* Space Regulations Library Series, vol. 3, (Dordrecht: Kluwer Academic Publisher, 2004), at 123; Lord Templeman, "Treaty Making and the British Parliament", *Parliamentary Participation in the Making and Operation of Treaties: A Comparative Study,* Eds., S.A. Riesenfeld, F.M.Abbott, (Dordrecht: Martinus Nijhoff Publishers, 1994), at 159.

[39] International agreements reached by the Crown in the exercise of its treaty-making power are not part of the law of England unless they are embodied in laws enacted by Parliament. The United Kingdom court held that the Bermuda Agreement did not form part of the law of England; thus, it could not restrict any powers of the United Kingdom Secretary of State to impose conditions when granting Pan American's operating permit. For details, read *Pan American World Airways v. Department of Trade*, [1976] 1 Lloyd's L.R. 257 (C.A.) (U.K.). See also Hermida, Julian, *id*,

[40] Refer to Article VI, Outer Space Treaty 1967, which states:
'*States Parties to the Treaty shall bear international responsibility for national activities in outer space, including the Moon and other celestial bodies, whether such activities are carried on by governmental agencies or by non-governmental entities, and for assuring that national activities are carried out in conformity with the provisions set forth in the present Treaty. The activities of non-governmental entities in outer space, including the Moon and other celestial bodies, shall require authorization and continuing supervision by the appropriate State Party to the Treaty. When activities are carried on in outer space, including the Moon and other celestial bodies, by an international organization, responsibility for compliance with this Treaty shall be borne both by the international organization and by the States Parties to the Treaty participating in such organization*. See also Tremayne-Smith, Richard J, *supra* note 36.

[41] Lyall, F., "UK Space Law", (1992) 35 *IISL* 386, as cited in Hermida, Julian, *supra* note 38, at 124.

[42] The UK Space Agency is the United Kingdom Government agency responsible for its civil space programme. It replaced the BNSC and took over responsibility for government policy and key budgets for space; it represents the United Kingdom in all negotiations on space matters. For official website of UK Space Agency refer *supra* note 18. See also http://en.wikipedia.org/wiki/UK_Space_Agency, accessed: 14 May 2014.

the international treaties and principles predominantly on the use of outer space regarding the launch and operation of space objects as well as other outer space activities carried out by persons connected with the country.[43]

In term of its application, the Act mainly covers launch activities, procurement,[44] and operation of space objects whether carried out in the United Kingdom or elsewhere. It also includes any other activities carried out in outer space.[45] The Act, as a matter of fact, applies specifically to United Kingdom nationals, Scottish firms, and bodies incorporated under the law of any part of the United Kingdom.[46] At this juncture, a United Kingdom national refers to an individual who is: (a) a British citizen, a British Dependent Territories citizen, a British National (Overseas), or a British Overseas citizen; (b) a person covered by the British Nationality Act 1981; and (c) a British protected person within the meaning of the Act.[47] The Act, in other words, is relevant to all activities in space carried out by United Kingdom nationals including companies, and also to any nationals of Overseas Territories and Crown Dependencies to which the Act has been extended through Orders in Council.[48]

The Outer Space Act 1986 also conferred on the Secretary of State the authority to make regulations prescribing anything required or authorized to be prescribed under this Act, and

---

[43] *Id*.

[44] The word 'procurement' is noted as relevant in relation to the international space law liability. Such inclusion resulted in the insertion that any entity who might be 'involved anywhere down the chain of causation or responsibility could find himself included in the scope of the Act'. See Dunk, Frans von der, "Heeding the Public-Private Paradigm: Overview of National Space Legislation around the World", *2004 Space Law Conference Paper Assemble,* (Beijing: China Institute of Space Law, 2004), at 25.

[45] Article 1, Outer Space Act 1986.

[46] Article 2(1), Outer Space Act 1986.

[47] It is noted that only United Kingdom nationals would be subject to the provisions of the Outer Space Act 1986. Foreign nationals conducting space activities in the United Kingdom would not be subject to the regulation under this Act. Thus, such a situation may give the impression that the United Kingdom is not being adequately protected should any foreign national conduct launch activities from the United Kingdom and cause damage to third parties outside the United Kingdom. In such circumstances, the United Kingdom Government might be held liable not only under the Liability Convention 1972 as a launching state, but also internationally responsible under Article VI of the Outer Space Treaty 1967. Refer to Article 2(2), Outer Space Act 1986. See also Lee, Ricky J. and Felicity K. Eylward "Article II of the Outer Space Treaty and Human Presence on Celestial Bodies: Prohibition of State Sovereignty, Exclusive Property Rights, or Both?" (2006) 48 *IISL Colloquium on the Law of Outer Space* 222.

[48] British Overseas Territories (formerly known as British Dependent Territories) are 14 territories of the United Kingdom that fall under its jurisdiction but do not form part of the United Kingdom. They are remnants of the British Empire that have not acquired independence or have voted to remain British Territories. They include Falkland Islands, Gibraltar, Cayman Islands, Montserrat, Anguilla and Bermuda. Crown Dependencies are British possessions or under the sovereignty of the British Crown that have a different constitutional relationship or have independently administered jurisdiction with the United Kingdom. They do not form part of the United Kingdom either. They are the Channel Island Bailiwicks of Jersey and Guernsey, and the Isle of Man. Refer to Article 2(3), Outer Space Act 1986. Read also http://en.wikipedia.org/wiki/Crown_Dependencies; and http://en.wikipedia.org/wiki/British_Overseas_Territories, all accessed: 7 January 2013.

also for putting this Act into effect. Such regulations shall be made by statutory instrument which shall be subject to annulment in pursuance of a resolution of either House of Parliament.[49] In May 1989, a special committee known as the Parliamentary Space Committee of the United Kingdom was established in order to support and strengthen the growth of the United Kingdom's outer space activities.[50] The Committee acts as a forum of discussion for parliamentarians and industrialists to promote a better understanding of the United Kingdom's space activity and its economic, technological and scientific benefits. The Committee is also involved in the formulation of the United Kingdom's space policy.[51]

(b) Authorization: Licensing and Procedure

A requirement to obtain a licence to conduct space activities is a mode of authorization emphasized in the United Kingdom Outer Space Act 1986.[52] Under the United Kingdom licensing system of the Outer Space Act 1986, the general rule is that every person under this Act must acquire a licence for carrying on activities to which the Act applies.[53] In a strict sense, this means that no one is permitted to perform such activities except under the authority of a licence granted to him/her. Nevertheless, there is an exception to the general rule whereby certain persons and activities have been exempted from such obligation. This situation applies when it involves a person acting as an employee or agent of another.[54] Moreover, it also applies to activities where certain arrangements have been made between the United Kingdom and other countries to secure compliance with the United Kingdom's international obligations. This must be then certified by the United Kingdom Order in Council.[55] Apart from this, the exemption also applies when the Secretary of State exercises his/her power by order, which shall be made by statutory instrument, to exempt any other

[49] See Article 11(1) and (2), Outer Space Act 1986.
[50] It is formed by Members of Parliament of all political parties and representatives of the United Kingdom Industrial Space Committee and the British Association of Remote Sensing Companies. See Williamson, Mark, "The UK Parliamentary Space Committee: The Emergence of A Space Lobby?" (May, 1992) 8 *Space Policy* 159. Cited also in Hermida, Julian, *supra* note 38, at 126. The official website of Parliamentary Space Committee is available at http://www.parliamentaryspacecommittee.com/index.htm, accessed: 7 January 2013.
[51] Williamson, Mark, *id.*, at 159. Cited also in Hermida, Julian, *supra* note 38, at 125.
[52] Article VI, Outer Space Treaty 1967. See *supra* note 40.
[53] Article 3(1), Outer Space Act 1986 states: '*A person to whom this Act applies shall not, … carry on an activity to which this Act applies except under the authority of a licence granted by the Secretary of State*'. See also Article 1, Outer Space Act 1986.
[54] Article 3(2), Outer Space Act 1986 states: '*A licence is not required – (a) by a person acting as employee or agent of another; or (b) for activities in respect of which it is certified by Order in Council that arrangements have been made between the United Kingdom and another country to secure compliance with the international obligations of the United Kingdom*'.
[55] *Id.*

persons and activities from the requirement to obtain a licence provided that he/she is satisfied that the requirement is unnecessary to secure compliance with the United Kingdom's international obligation.[56]

The power to grant a licence lies in the hands of the Secretary of State, who may grant the licence only when he/she thinks fit.[57] In such circumstances, before granting the licence, the Secretary of State must be satisfied that the activities are categorized under the three conditions prescribed by the Act. Those conditions are as follows: First, the activities must not jeopardize public health and the safety of persons and property; second, the activities must also be consistent with the international obligations of the United Kingdom; finally, the activities must not impair the United Kingdom's national security.[58]

In terms of procedure for granting the licence, the Act does not specifically provide a mode. However, the Act in fact gives the Secretary of State power to make regulations regarding the procedure to follow. Apart from that, the Secretary of State has the power to prescribe the form and contents of the licensing application, as well as other documents. The Secretary of State may also impose a requirement for the payment of prescribed fees. Furthermore, the Secretary of State may formulate a time limit for anything done in connection with the application, and provide an extension of any period so prescribed.[59] In the event of the licence application being granted, such licence shall describe the authorised activities that are granted for a stipulated period, which is then subject to any prescribed conditions as the Secretary of State thinks fit.[60]

(c) Registration Obligation

Apart from the licensing system, the Outer Space Act 1986 imposes an obligation of registration of the space object.[61] Any licensee who obtains a licence under the Outer Space Act 1986 is obliged to register the space object in compliance with the United Kingdom's international obligation.[62] The registration is executed by providing particulars of the space

---

[56] See Article 3(3), and also Article 3(4), Outer Space Act 1986.
[57] Article 4(1), Outer Space Act 1986 states: *'The Secretary of State may grant a licence if he thinks fit'*.
[58] See Article 4(2), Outer Space Act 1986.
[59] See Article 4(3), Outer Space Act 1986.
[60] See Article 5(1), Outer Space Act 1986, and also *supra* note 58.
[61] See Article 7, Outer Space Act 1986.
[62] See also Article IV, Registration Convention 1975.

object to the Secretary of State, including information on its date of construction, launch location, orbital parameters (such as apogee and perigee), its general function, and other information considered necessary, particularly in relation to its nature and conduct and the results of the licensee's activities.[63] Such particulars must be provided as soon as possible[64] and must be entered in the United Kingdom registry of space objects. It is the Secretary of State's duty to maintain the registry of space objects.[65] Regarding the inspection of the information in the registry, the Outer Space Act 1986 indeed allows the public to inspect a copy of the registry provided that a prescribed fee is paid to the Secretary of State.[66]

In addition to the above, the United Kingdom Government initiated a supplementary registry of space objects. This supplementary system is a result of the United Kingdom Government policy that allows transparency on all licences issued under the Outer Space Act 1986. It also aims to provide visibility to the United Kingdom Government and international authorities of the objects launched into orbit.[67] This applies in situations where a United Kingdom satellite supplier has procured the launch of a space object, but the object appears on the registry of another state party to the Registration Convention 1975. In such circumstances, the United Kingdom supplementary registry of space objects will then record the object. Apart from that, the supplementary registry will record the circumstances in which the title and control of the space object, such as a satellite, was transferred to a United Kingdom satellite operator after its launch provided that the Secretary of State has licensed that company to operate such a satellite.[68]

(d) Constant Monitoring and Supervision

The Outer Space Act 1986 also institutes a comprehensive monitoring and supervision system. Under the system, the Secretary of State can constantly monitor, supervise and control the space-related activities registered under this Act. The licensee, having been granted a licence under this Act, must allow the Secretary of State to inspect the licensee's

---

[63] See Article 7(2) and Article 5(2)(b), Outer Space Act 1986.
[64] See Article 5(2)(b), Outer Space Act 1986.
[65] See Article 7(1), Outer Space Act 1986.
[66] See Article 7(3), Outer Space Act 1986.
[67] See http://www.bis.gov.uk/ukspaceagency/what-we-do/space-and-the-growth-agenda/uk-capabilities-for-overseas-markets/the-outer-space-act-1986/registry-of-space-objects, accessed: 14 May 2014; see also Hermida, Julian, *supra* note 38, at 134.
[68] See *Id*.

facilities, and indeed authorize the Secretary of State to test the related equipment.[69] Such a task is admissible when the licensee provides the information required by the Secretary of State regarding his activities.[70] Moreover, the Secretary of State is entitled to inspect and take copies of documents related to the information given.[71] Another controlling measure imposed under the Outer Space Act 1986 is the requirement for the licensee to obtain approval in advance from the Secretary of State for any intended deviation by a space object from its orbital parameter. The Secretary of State must also be informed immediately of any unintended deviation of the object.[72] With regard to the disposal of a payload in outer space, the licensee is required to notify the Secretary of State as soon as is practicable of such final disposal.[73]

The possibility of monitoring and controlling outer space activities also occurs when the Act grants the Secretary of State power to give direction to any person carrying on activities in contravention of the licensing requirements and condition. This also occurs when the Secretary of State finds it necessary to secure compliance with the United Kingdom's international obligations.[74] In addition, the Secretary of State may give directions in order to secure the cessation of the activity and the disposal of the space object.[75] Moreover, a warrant can be issued by a Justice of the Peace, who may authorize a person, acting on behalf of the Secretary of State, to do anything necessary to secure compliance with the United Kingdom's international obligations and the licensing conditions. This can be executed if the Justice of the Peace is satisfied that there are reasonable grounds for believing that outer space-related activities are being carried out in violation of the licensing conditions and are not complying with the directions issued.[76] Apart from that, the licence is subject to variation, suspension and termination in the event of the licensing conditions not being complied with, or in the interests of public health, national security or compliance with the United Kingdom's

[69] See Article 5(2)(a), Outer Space Act 1986.
[70] See *supra* note 62.
[71] See Article 5(2)(c), Outer Space Act 1986.
[72] See Article 5(2)(d), Outer Space Act 1986.
[73] See Article 5(2)(e) and (g), Outer Space Act 1986.
[74] See Article 8(1)(a) and (b), Outer Space Act 1986.
[75] Compliance with such direction may be enforced on the application of the Secretary of State by injunction, interdict, or by order. For details, read Article 8(2) and Article 8(3), Outer Space Act 1986.
[76] The warrant will specify the action authorized, such as entry onto specified premises at any reasonable hour. It also may include power to use force, if necessary. See Article 9(1), 9(2), 9(3), 9(4), Outer Space Act 1986.

international obligations.[77] In fact, the licence may only be transferred with the written consent of the Secretary of State.[78]

(e) Liability and Indemnification

Under the international rule of liability,[79] a state is internationally liable for any damage caused by a space object, regardless of whether the object is owned, operated, launched or paid for by any private entity, as long as such state qualifies as a launching state of the space object concerned.[80] Thus, bound by such rule of liability, the United Kingdom Government can be held internationally liable for damage caused by a space object in circumstances where the state is a launching state.[81] Founded on this fact, the Outer Space Act 1986 therefore initiates a rule of obligation for the licensee to indemnify the United Kingdom Government against any claim brought under this Act. In other words, the Outer Space Act 1986 establishes a statutory indemnification rule prescribing that the licensee shall indemnify the United Kingdom Government against any claim brought against the Government in respect of damage or loss arising out of the space-related activities carried on by the licensee.[82] This indemnification rule applies even if the licensee is not the actual perpetrator of the damage.[83] It is noted that the rule was designed to pass the risk of international liability to the licensee,

---

[77] See Article 6(2) and 6(3), Outer Space Act 1986.

[78] See Article 6(1), Outer Space Act 1986.

[79] See Article VII of the Outer Space Treaty 1967 and the Liability Convention 1972. The Article VII of the Treaty states, "*Each State Party to the Treaty that launches or procures the launching of an object into outer space, including the Moon and other celestial bodies, and each State Party from whose territory or facility an object is launched, is internationally liable for damage to another State Party to the Treaty or to its natural or juridical persons by such object or its component parts on the Earth, in air space or in outer space, including the Moon and other celestial bodies".*

[80] Dunk, F.G. von der, "Fundamental Provisions for National Space Laws", *Proceedings of United Nations/Nigeria Workshop on Space Law, in Abuja, Nigeria, 21-24 November 2005* (Vienna: United Nations, 2006), at 264. See also *id*.

[81] See Article I(c), Liability Convention 1972.

[82] Article 10(1), Outer Space Act 1986 stipulates, "*A person to whom this Act applies shall indemnify Her Majesty's government in the United Kingdom against any claims brought against the government in respect of damage or loss arising out of activities carried on by him to which this Act applies*".

[83] For instance, the licensee might be a satellite telecommunications operator licensed under the United Kingdom law. Its satellite, carried by a launch vehicle of another state, causes damage to a third state (Here, the actual wrongdoer is the launch services provider). In such circumstances, the third state may claim compensation from the United Kingdom Government in accordance with the Liability Convention 1972. This happens under the joint and several liabilities for damages when the object is jointly launched by two or more states. However, under the United Kingdom Outer Space Act 1986, the United Kingdom Government may, in return, seek the reimbursement of this compensation from the satellite telecommunications operator licensed under its law. See Hermida, Julian, *supra* note 38, at 127.

which is done without limit.[84] In such a situation, the Outer Space Act 1986, in return, prescribes the requirement of the licensee to insure him/herself against liability incurred in respect of damage or loss suffered by a third party as a consequence of the activities authorized by the licence.[85] This is done in order to secure the availability of funds in confronting the obligations arising from such statutory indemnity rule.[86]

On the other hand, the Act prescribes two exceptions to the general rule of indemnification. These exceptions reflect the two circumstances in which the indemnification does not apply: (1) to a person acting as employee or agent of another; and (2) to damage, or loss resulting from anything done on the instruction of the Secretary of State.[87]

(f) Safety, Peace and Security Measurement

In view of spirit of safety and peace introduced by the international law[88] with respect to conducting outer space-related activities, the Outer Space Act 1986 establishes an explicit condition on the technical safety assessment.[89] The Act strictly requires the licensee to conduct his operations in a manner that will prevent the contamination of outer space or adverse changes to the Earth's environment.[90] The Act further stresses the requirement for the licensee to conduct such activities in a way that avoids interference with other activities in the peaceful exploration and use of outer space.[91] In addition, the related activities must not jeopardize public health and the safety of persons and property; this forms part of the conditions for granting a licence to the licensee.[92] The licensing terms also contain conditions governing the actual disposal of a payload in outer space on the termination of the operations

---

[84] Ballard, Tony, "National Space Laws: United Kingdom Outer Space Act", *Proceedings of the United Nations/International Institute of Air and Space Law Workshop on Capacity Building in Space Law, The Hague, Netherlands, 18-21 November 2002, ST/SPACE/14,* (New York: United Nations, 2003), at 206.
[85] Article 5(2)(f), Outer Space Act 1986.
[86] Hermida, Julian, *supra* note 38, at 128.
[87] See Article 10(2), Outer Space Act 1986.
[88] Read Article IX, Outer Space Treaty 1967.
[89] Close, Roger, "Outer Space Act 1986: Scope and Implementation", *Proceedings of the Project 2001 – Workshop on National Space Legislation, 'Need and Prospects for National Space Legislation', at Munich, Germany, 5-6 Dec. 2000.* Ed. Institute of Air and Space Law, Cologne University and Deutsches Zentrum fur Luft- und Raumfahrt (DLR), (Cologne: Institute of Air and Space Law & Chair of International Business Law of the University of Cologne, 2001), at 141-147.
[90] See Article 5(2)(e)(i), Outer Space Act 1986.
[91] See Article 5(2)(e)(ii), Outer Space Act 1986.
[92] See Article 4(2)(a), Outer Space Act 1986.

specified under the licence. They also include a requirement for the licensee to notify the Secretary of State as soon as is practicable of the payload final disposal.[93]

With respect to the security aspect, the Outer Space Act 1986 prescribes that the licence shall contain conditions requiring the licensee to conduct his/her operations in such a way as to preserve the national security of the United Kingdom.[94] Therefore, the licence will not be granted by the Secretary of State unless he/she is satisfied that the activities authorized by the licence will not impair the national security of the United Kingdom.[95] The Act also grants the Secretary of State power to revoke, vary or suspend a licence if it appears to the Secretary of State that revocation, variation or suspension of the licence is required in the interests of the public health or national security of the country.[96]

(g) Other Provisions

Among other provisions set forth in the Outer Space Act 1986 are those dealing with offences.[97] The Act sets out a list of criminal offences that will be deemed to have been committed by any persons carrying out activities in contravention of the licensing requirements.[98] The Act also prescribes that it is an offence to make a false statement knowingly or recklessly for the purpose of obtaining a licence.[99] Besides that, other actions classified as offences under this Act include the following: failure to comply with the direction issued; intentionally obstructing a person in the exercise of powers conferred by an issued warrant; and failure to comply with the conditions and regulations as prescribed under the Outer Space Act 1986.[100] The Act confers the liability of the offender by stipulating that he/she is liable on conviction or indictment to a fine, and on summary conviction to a fine not exceeding the statutory maximum.[101] In the event of an offence being committed by a

---

[93] See Article 5(2)(g), Outer Space Act 1986. See also, Dunk, F.G. von der, *Private Enterprise and Public Interest in the European 'Spacecape': Towards Harmonized National Space Legislation for Private Space Activities in Europe,* (Leiden: International Institute of Air and Space Law, Faculty of Law, Leiden University, 1998), at 139.
[94] See Article 5(2)(e)(iv), Outer Space Act 1986.
[95] See Article 4(2)(c), Outer Space Act 1986.
[96] See Article 6(2)(b), Outer Space Act 1986.
[97] See Article 12, Outer Space Act 1986.
[98] See Article 12(1)(a), Outer Space Act 1986. See also Brisibe, T.C. and M.E. Davies, "The Regulation of Commercial Space Launches: The Differences between the National Systems", (2002) 44 *IISL Colloquium on the Law of Outer Space* 46.
[99] See Article 12(1)(b), Outer Space Act 1986.
[100] See Articles 12(1)(c), (d), (e), and (f), Outer Space Act 1986.
[101] See Article 12(1)(2), Outer Space Act 1986.

corporate body, with the consent or involvement of a director, secretary, or other similar officer, or a person purporting to act in any such capacity, he/she and the corporate body will be guilty of the offence.[102]

Regarding the proceedings for an offence committed outside the United Kingdom, it may be taken and treated as having been committed in any place in the United Kingdom.[103] The Act also prescribes that the accused is allowed to defend him/herself by proving that he/she used all due diligence and took all reasonable precautions to avoid the commission of the offence.[104]

The Outer Space Act 1986 also provides several definition clauses to elaborate the meanings of certain words, including the terms 'dependent territory', 'outer space', and 'space object'.[105] Other articles dealt with in this Act include the short title of the Act, its commencement, and its extent.[106]

3.2.4. Concluding Remarks

The United Kingdom is a party to all United Nations outer space treaties except the Moon Agreement 1979. This situation indicates that the United Kingdom is ready to be bound by the international legal rules and obligations stipulated in the United Nations outer space treaties. The enactment of the United Kingdom's Outer Space Act 1986 is, in fact, a response to the United Kingdom's constitutional requirement by which the state is bound by the international treaties it has ratified. However, such treaties do not bind their nationals and incorporated companies unless the rules are domesticated by a United Kingdom Act of Parliament or its subordinate legislation. In such circumstances, it is noted that among the purposes of establishing the Outer Space 1986 is to realise the matter.

---

[102] See Article 12(3), Outer Space Act 1986.
[103] See Article 12(4), Outer Space Act 1986.
[104] See Article 12(5), Outer Space Act 1986.
[105] Article 13(1), Outer Space Act 1986 states: "*dependent territory', means – (a) a colony, or (b) a country outside Her Majesty's dominions in which Her Majesty has jurisdiction in right of Her Government in the United Kingdom; "outer space" includes the moon and other celestial bodies; and "space object" includes the component parts of a space object, its launch vehicle and the component parts of that".*
[106] See Article 15, Outer Space Act 1986.

The Outer Space Act 1986 establishes a comprehensive licensing regime as a mode of authorization, accompanied by a set of regulations and conditions that control the United Kingdom's outer space activities. In terms of issuing a licence, the Act grants power to the United Kingdom Secretary of State to issue licences, impose conditions, regulate procedures, and supervise outer space-related activities. Such power was then delegated to the British National Space Centre (BNSC**)**, which was replaced by the United Kingdom Space Agency. Apart from that, the United Kingdom Government established a United Kingdom Parliamentary Space Committee to support and sustain the growth of the United Kingdom's outer space activities.

With regard to the registration obligation, the United Kingdom has two systems of registration. These systems, a main and supplementary registration system, are designed to complement each other. The Act also introduced a statutory indemnification rule to safeguard the United Kingdom Government against any claims brought against it. It is also noted that the United Kingdom Government instils the spirit of safety, peace and security with respect to conducting its outer space-related activities in some clauses of its Outer Space Act 1986.

3.3. AUSTRALIA

3.3.1. An Overview

Australia, officially known as the Commonwealth of Australia, comprises the mainland of the Australian continent,[107] the island of Tasmania, and numerous smaller islands in the Indian and Pacific Oceans. Its capital city is Canberra, and its national language is English. Politically, Australia is a federal parliamentary democracy state[108] with a constitutional monarchy system.[109] Its federal government has three separate branches: (1) Legislative; (2) Executive; and (3) Judiciary.[110] At the Australian Commonwealth Government level, the

[107] The continent of Australia is the world's smallest continent. See http://en.wikipedia.org/wiki/Australia#Geography_and_climate, accessed: 15 January 2013.

[108] A federal state, in contrast to a unitary state, is a type of sovereign state characterized by a union of partially self-governing states united by a federal or central government. See http://en.wikipedia.org/wiki/Federal_state, accessed: 15 January 2013.

[109] A constitutional monarchy system is a form of government in which a monarch acts as a head of state within the parameter of a constitution.

[110] The legislative branch is a body with the legislative power to make law. The executive branch is a body to administer the law. And the judiciary branch is a body to interpret and apply the law. For more details read

Parliament encompasses the House of Representatives and the Senate. At the State Government level, it comprises the Lower House and Upper House. Under the Australian constitutional monarchy system, Queen Elizabeth II[111] is the head of state. In practice, the Queen has no role within the Australian political system beyond a ceremonial one. The Queen is represented at the national level by a Governor General, who is appointed on the recommendation of the Australian Prime Minister. The Governor General acts only on the advice of Ministers in virtually all matters. At the state level, six State Governors perform the same roles in their respective states.[112] With respect to the country's legal system, Australia follows the common law legal system with its main sources of constitutional law, statute, common law, equity, and international law.

Economically, Australia is the thirteenth largest national economy in the world by nominal gross domestic product (GDP).[113]. Australia is a prosperous developed country with an economy dominated by its services sector, including tourism, media, education, and financial services. Agriculture and natural resources are reported to contribute substantially to the state's export performance.[114] The same is true for its space sector, which is a major contributor to the Australian economy. It was reported that 'space-enabled services and applications' were categorized as the major category of Australian space-related activities. This category is regarded as the largest area of Australian space-related activities; it includes telecommunications and broadcasting services, Earth observation services including satellite imagery and positioning, navigation, and timing services.[115] As a matter of fact, Australia's involvement in space activities started as early as 1949 in Woomera. The place was chosen by the European Launcher Development Organization (ELDO) as the launch site for test vehicles. Australia was granted the status of the only non-European member of ELDO in return for providing the launch facility. A series of launches was conducted in Woomera from

"Australia's Political System", http://www.abc.net.au/ra/federasi/tema1/aus_pol_chart_e.pdf, accessed: 15 January 2013.

[111] The Queen of the United Kingdom.

[112] See *supra* note 110.

[113] This data is as of 2011. Refer http://en.wikipedia.org/wiki/Economy_of_Australia, accessed: 15 January 2013.

[114] See *id*.

[115] Asia Pacific Aerospace Consultants Pty Ltd, *A Review of Current Australian Space Activities: Executive Summary, April 2010*, A Report to the Space Policy Unit, Department of Innovation, Industry, Science & Research, available at http://www.space.gov.au/Documents/APAC%20Final%20Report%20-%20Current%20Space%20Activities%20April%202010%20-%20Executive%20Summary.pdf, accessed: 15 January 2013.

1964 to 1970.[116] In 1961, it was evident that Australia had entered into bilateral arrangements with the United States regarding its satellite programme. These arrangements resulted in the establishment of a number of space tracking stations in Australia.[117] It is noted that such circumstances contributed significantly to the evolution of the Australia's early involvement in space activities. It was reported that, from 1967 until 2009, 13 objects were launched into space by Australia. All those objects were registered with the United Nations as prescribed by the UN space treaties.[118]

Around the late1990s, the Australian Government began to seriously consider the potential of their commercial space launch industry with the implementation of the Australian Space Activities Act 1998.[119] In mid-2001, it established the 'Space Licensing and Safety Office' (SLASO) to regulate the space activities undertaken under the Space Activities Act 1998.[120] However, in 2003 Australian space activities experienced a major shock. This occurred when the Australian Space Engagement and Policy Framework,[121] with its numerous revisions, indicated that there was no pressing necessity and support for its space programme. Indeed, 2005 saw the termination of Australian Government funding for its Cooperative Research Centre for Satellite Systems (CRCSS).[122] However, in May 2009, the Australian Government announced its support for the establishment of an Australian Space Science Programme to coordinate its national and international civil space activities, as well as its space research, innovation and skills development. Under this programme, a Space Policy Unit and a Space Industry Innovation Council (Space Council) were established. [123] All those significant steps,

---

[116] http://en.wikipedia.org/wiki/Australian_Space_Research_Institute#History_of_space_activities_in_Australia accessed: 15 January 2013.

[117] The arrangement was made through 'Exchange of Notes constituting an Agreement between the Government of Australia and the Government of the United States of America for Cooperation in a Transit Navigational Satellite Program', 5 June 1961, [1961] ATS 10, as cited in Freeland, Steven, "The Australian Regulatory Regime for Space Launch Activities: Out to Launch?", (2005), 47 *IISL Colloquium on the Law of Outer Space* 57.

[118] See http://www.oosa.unvienna.org/oosa/search.do, accessed: 15 January 2013.

[119] Siemon, Noel, and Steven Freeland, "Regulation of Space Activities in Australia", *National Regulation of Space Activities,* ed., Jakhu, Ram S., (Dordrecht: Springer, 2010), at 38. See also *infra* note 141.

[120] See http://www.space.gov.au/SpaceLicensingSafetyOffice/Pages/default.aspx, accessed: 15 January 2013.

[121] Australian Government Space Engagement: Policy Framework and Overview at 10, as cited in Siemon, Noel, and Steven Freeland, *supra* note 119, at 41.

[122] The CRCSS built and operated the Australian research satellite FedSat, launched in December 2002. See "Milestone for Australian Satellite as Space Effort Hits Wall", *Space Daily*, 15 December 2004 (accessed at www.spacedaily.com, on 20 January 2005), as cited in Siemon, Noel, and Steven Freeland, *supra* note 119, at 41.

[123] The Space Policy Unit was established in July 2009 in the Australian Department of Innovation, Industry, Science and Research. However, on December 2011, it became part of the Department of Industry, Innovation, Science, Research and Tertiary Education. For the Space Industry Innovation Council (Space Council), an announcement was made on 19 November 2009 on the establishment of Australian Industry Innovation

in fact, were executed after the Australian Senate Standing Committee on Economics issued its final report in November 2008. Thus, such circumstances provide a possible platform upon which Australia might develop a revised national space strategy for the future.[124]

The Space Policy Unit was established on 1 July 2009. However, on 15 December 2011, the Unit became part of the the newly established Department of Industry, Innovation, Science, Research and Tertiary Education. Among its responsibilities is to bring forward a National Space Policy for consideration by the Australian Government. The Policy focuses on three main areas: (1) satellite communications; (2) Earth observations and remote sensing; and (3) position navigation and timing applications. It will address, among other things, how the country utilizes space to tackle climate change, weather forecasting, natural resource management, forestry and agriculture, disaster management, and national security.[125] Meanwhile, the establishment of the Space Industry Innovation Council recognizes the importance of the space sector to Australia. Among the Council's responsibilities are the provision of strategic advice on innovation priorities in the space sector to the Minister and the forging of links with other organizations.[126] At this point, it is perhaps worth mentioning the Australian Space Research Institute (ASRI).[127] This is a non-profit research organization that contributes to the growth of Australian space activities. The Institute was created to provide opportunities for space-related industries and technological development for the Australian technical community.[128]

3.3.2. Five Outer Space Conventions: Australia's Status

Australia is a party to all five United Nations outer space conventions.[129] Australia signed the first outer space convention, the Outer Space Treaty 1967,[130] on 27 January 1967, the date it

---

Councils which included the Space Council. See http://www.space.gov.au/SPACEPOLICYUNIT/NATIONALSPACEPOLICY/Pages/default.aspx; and http://www.space.gov.au/SPACEINDUSTRYINNOVATIONCOUNCIL/Pages/default.aspx, both accessed: 16 January 2013.

[124] See Siemon, Noel, and Steven Freeland, *supra* note 119, at 44.

[125] See http://www.space.gov.au/SPACEPOLICYUNIT/NATIONALSPACEPOLICY/Pages/default.aspx, accessed: 15 January 2013.

[126] See http://www.space.gov.au/SpaceIndustryInnovationCouncil/Pages/default.aspx, accessed: 15 January 2013.

[127] Its website is available at http://www.asri.org.au/About, accessed: 15 January 2013.

[128] See *supra* note 116.

[129] These conventions are: the Outer Space Treaty 1967, the Rescue Agreement 1968, the Liability Convention 1972, the Registration Convention 1975, and the Moon Agreement 1979. See United Nations, *supra* note 23.

[130] Outer Space Treaty 1967, *supra* note 24.

was opened for signature for all states. On 10 October the same year, the date when the Outer Space Treaty 1967 entered into force, Australia ratified the Treaty.[131] From this date, Australia has been bound by its international obligation to observe and comply with the legal rules set forth in the Outer Space Treaty 1967.

The second agreement was the Rescue Agreement 1968.[132] Australia indicated its early interest in becoming a party to the Rescue Agreement 1968 by signing the Agreement on 22 April 1968. This was the date when the Rescue Agreement 1968 was opened to signature for all states. However, Australia ratified this Agreement only on 18 March 1986, approximately 18 years after the date of its entry into force, on 3 December 1968.[133] This shows that Australia took about 18 years to consider becoming a party to the Agreement after its signature date. The third was the Liability Convention 1972,[134] to which became a party by accession[135]. The state acceded to the Liability Convention 1972 on 20 January 1975, about three years after its date of entry into force on, 1 September 1972.[136]

The fourth United Nations outer space convention was the Registration Convention 1975,[137] to which Australia became a party by accession. The accession date was 11 March 1986. Such accession took place only 10 years after the Convention entered into force, 15 September 1976.[138] The last Agreement was the Moon Agreement 1979,[139] to which the country acceded on 7 July 1986.[140] This accession was executed about four months after Australia's accession to the Registration Convention 1975. It is noted that the country took around just two years to accede to the Agreement after the Agreement had entered into force, on 11 July 1984.

To sum up, Australia is a state party to all five United Nations outer space conventions: the Outer Space Treaty 1967, the Rescue Agreement 1968, the Liability Convention 1972, the

[131] See *supra* note 26.
[132] Rescue Agreement 1968, *supra* note 27.
[133] See *id*., and *supra* note 26.
[134] Liability Convention 1972, *supra* note 29.
[135] Accession occurs when a state that has not signed a treaty already signed by other states formally accepts its provisions. Accession may occur before of after the treaty has entered into force. The procedure involved depends on the provisions of the treaty. See Brownlie, Ian, *supra* note 25, at 611.
[136] See *supra* note 26.
[137] Registration Convention 1975, *supra* note 31.
[138] See *id*., and *supra* note 26.
[139] Moon Agreement 1979, *supra* note 34.
[140] See *supra* note 26.

Registration Convention 1975 and, lastly, the Moon Agreement 1979. Australia expressed its consent to be bound by the treaties in two ways: ratification and accession. The state became a party to two treaties - the Outer Space Treaty 1967 and the Rescue Agreement 1968 - via ratification. It became a party to the other three treaties - the Liability Convention 1972, the Registration Agreement 1975, and the Moon Agreement 1978 - through accession. Since Australia is a party to all five UN outer space treaties, the state is bound by the legal rules stipulated in all United Nations outer space treaties. Such binding effect commenced from the moment Australia ratified or acceded to the treaties.

3.3.3. National Space Legislation: Space Activities Act 1998

The birth of the Space Activities Act 1998[141] was closely related to the Australian Government policy in the late 1990s. Around this period, the Australian Government started to seriously consider the potential of its space launch industry. This was in response to the interests of various private sectors in the development of the space launch industry in Australia. For example, Kistler Aerospace submitted a proposal in 1997 to develop and operate a commercial launch facility at Woomera.[142] Other private commercial launch operators also showed the same interest.[143] At this point, it is noted that the interest of space-faring nations in conducting launch activities in Australia is, in fact, based on certain criteria. The country is regarded as a suitable place to conduct launch activities not only because of its highly suitable geographical features such as its proximity to the equator, but also because of its extensive sparsely-populated land areas. Such a location reduces the risk of human injury. Moreover, the country offers numerous other advantages including a stable political history, technical expertise, and well developed and sophisticated infrastructure such as telecommunications and transport facilities.[144] Acknowledging its great potential in the space

---

[141] The Space Activities Act 1998 refers to 'Act No. 123 of 1998 as amended, taking into account amendments up to Act No. 8 of 2010'. It was prepared by the Office of Legislative Drafting, Attorney-General Department, Canberra. The full text is available at http://www.comlaw.gov.au/Details/C2010C00193, accessed: 17 January 2013.

[142] In April 1997, the American corporation Kistler Aerospace Corporation signed an Operations Agreement with the Australian Government, to allow the company to develop and operate a commercial launch facility at Woomeera. Even though this project has not proceeded due to funding difficulties, the Australian Government still describes it as 'under development'. For more information see Freeland, Steven, *supra* note 117, at 57-58; Siemon, Noel, and Steven Freeland, *supra* note 119, at 46.

[143] To name a few, they are: the United Launch Systems International, and the Asia Pacific Space Centre Pty Ltd (ASPC). For more information read Freeland, Steven, *supra* note 117, at 57-58; Siemon, Noel, and Steven Freeland, *supra* note 119, at 46.

[144] Davies, Michael, "Space Legislation: The Australian Experience", *Proceedings of the Project 2001 – Workshop on National Space Legislation, 'Need and Prospects for National Space Legislation', at Munich,*

launch industry, by the end of 1998 the Australian Government had introduced its first domestic space legislation, namely the Space Activities Act 1998.[145] Such legislation, together with the Australian Space Activities Regulation 2001[146], aims to provide a regulatory framework for Australian space activities. The laws outline, in particular, the operation of launch facilities, the launching of space objects, and the return of space objects in fulfilment of Australia's international obligations under the United Nations space treaties.[147]

(a) Nature and Scope

The Space Activities Act came into force on 21 December 1998,[148] the day on which the Act received the Royal Assent.[149] The passing of the Act was actually, *inter alia*, for the implementation of a number of Australia's obligations under the United Nations space treaties.[150] As mentioned earlier, Australia is a party to all five United Nations space treaties. Of these five treaties, two - the Outer Space Treaty 1967 and the Liability Convention 1972 - reflect most of the provisions of the Australian Space Activities Act 1998. This is because these two treaties are the most relevant to commercial and private space activities.[151] It is noted that, under Australian law, similarly to the United Kingdom, the international treaties ratified will only bind the state. However, such treaties have no legal effect at the national level. This is because mere ratification does not make treaties operate domestically. Hence, in such circumstances, the treaties will not impose any legal obligation on nationals unless the rules are incorporated into Australian domestic law.[152]

Germany, 5-6 Dec. 2000. Ed. Institute of Air and Space Law, Cologne University and Deutsches Zentrum für Luft- und Raumfahrt (DLR), (Cologne: Institute of Air and Space Law & Chair of International Business Law of the University of Cologne, 2001), at 165. See also Freeland, Steven, *supra* note 117, at 58.

[145] See *supra* note 141.

[146] The full text of the Australian Space Activities Regulation 2001 is available at http://www.comlaw.gov.au/Details/F2004C00906, accessed: 17 January 2013.

[147] Siemon, Noel, and Steven Freeland, *supra* note 119, at 47.

[148] See *supra* note 141.

[149] Section 2, Space Activities Act 1998.

[150] Section 3(c), Space Activities Act 1998.

[151] Lee, Ricky J., "The Australian Space Activities Act: Creating a Regulatory Regime for Space Activities", (2000) XXV (No.2) *AIR & Space Law* 57.

[152] In Australia, the federal executive, through the Crown's representative, has an exclusive treaty-making power. The federal power, nominally vested in the Queen, is exercisable by the Governor-General. In practice, treaty-making is carried out by the Federal Executive Council. They will negotiate, conclude, and even ratify the treaties. And, like the United Kingdom, the treaty will be tabled before Parliament for a certain period, for the members to give comments. Hermida, Julian, *supra* note 38, at 11. See also http://www.dfat.gov.au/treaties/making/ , accessed: 17 January 2013.

Based on the above scenario, the Space Activities Act 1998 then materialized. The Act constitutes a fairly comprehensive piece of domestic space legislation.[153] It was designed to meet certain purposes. Aside from the implementation of obligations prescribed by the United Nations treaties, its other objectives include the establishment of a system for regulating space activities carried on either from Australia or by Australian nationals outside Australia.[154] Its other purposes are to provide payment of compensation for damage caused by the space activities and to implement Australia's obligations under the space cooperation agreements.[155] Considering the historical background of the state's early involvement in space activities and the fact that Australia herself does not have a space launch carrier industry, it is observed that the process of drafting the Act was done with the mind-set of attracting and encouraging foreign companies to establish space launch facilities in Australia and its territorial waters.[156] In view of that, the Act was indeed designed for the purpose of facilitating a commercial space launch industry in Australia, as well as launching Australian payloads from overseas site[157] within the context of ensuring the preservation of public safety.[158] In terms of space-related activities, the Act deals only with launch activities and the return of space objects. No other specific space-related activities, including satellite communication, are mentioned in the Act.

In general, the Space Activities Act 1998 comprises 8 parts and 110 sections.[159] Those parts are as follows: Introduction (Part 1); Definitions (Part 2); Regulation of space activities (Part 3); Liability (Part 4); Registration (Part 5); Space cooperation agreements (Part 5A); Civil penalties (Part 6); Investigation of accidents (Part 7); and Miscellaneous (Part 8). In relation to the application of the Act, the provisions apply to space activities conducted either in

[153] Hermida, Julian, *supra* note 38, at 112.
[154] See *infra* note 160.
[155] The last objective was subsequently added to the Act under the Space Activities Amendment (Bilateral Agreement) Act 2001 (Cth). It takes into account the implementation of intergovernmental agreement between Australia and Russia. See Section 3, Space Activities Act 1998; Freeland, Steven, "Australian National Space Legislation and Policy", *2004 Space Law Conference Paper Assemble,* (Beijing: China Institute of Space Law, 2004), at 104; see also Siemon, Noel, and Steven Freeland, *supra* note 119, at 48.
[156] Hermida, Julian, *supra* note 38, at 112.
[157] Dunk, Frans von der, "Launching From 'Down Under': The New Australian Space Activities Act of 1998", (2001) *43 IISL Colloquium on the Law of Outer Space* 136.
[158] It is reported that Australian law draws greatly on the United States experience with the United States Commercial Space Launch Act. Larsen, Paul B. "Commercial Space Launches", *Proceedings of The Space Law Conference 2006: Asian Cooperation in Space Activities, A Common Approach to Legal Matters' in Bangkok, Thailand, 2-3 August 2006,* (Montreal: Institute and Centre for Research of Air and Space Law, McGill University, 2007); Siemon, Noel, and Steven Freeland, *supra* note 119, at 48.
[159] See *supra* note 141.

Australia, or undertaken by the Australian nationals abroad.[160] At this juncture, it should be noted that 'Australian national' may mean either an Australian citizen, or a body incorporated by or under Australian law or the Commonwealth, a State or a Territory.[161] Specifically, the Space Activities Act 1998 applies only to space activities conducted, or attempts to conduct them, beyond the distance of 100 km above sea level.[162] It was acknowledged that this was the first example of domestic space legislation that provides a specific 'demarcation point' for regulation of space activities.[163]

For the implementation of the Space Activities Act 1998, the Australian Government established a Space Licensing and Safety Office (SLASO) in June 2001 to administer the Act and other regulations and agreements related to the Australian space launch activities.[164] The SLASO is headed by a director who is advised by expert assessors. Under the delegation of the Minister, the Office is responsible for the licensing approval of space launch facilities, space launches and other related activities. The Office also has responsibility for enforcing the provisions of the Space Activities Act, the Space Activities Regulations, and other related Agreements. Apart from that, the Office has to ensure that space activities do not jeopardize public safety, property, the environment, national and foreign policy, and international obligations. It should also ensure that there is adequate third-party insurance coverage and that any accidents that might occur are investigated.[165]

(b) Authorization: Licensing and Procedure

The Australian Space Activities Act 1998 provides modes of authorization and supervision through the issuance of licences, permits and certificates. Five licensing regimes were introduced under the Act:[166] (1) Space licences; (2) Launch permits; (3) Overseas launch certificates; (4) Authorization of return; and (5) Exemption certificates. These licensing regimes are required for the approval of certain space activities. The first mode of authorization is through space licences.[167] A space licence is required specifically for

[160] Section 3(a), Space Activities Act 1998.
[161] Section 8 (Definition of Australian National), Space Activities Act 1998.
[162] Read Section 8 (Definition of launch and launch vehicle), Space Activities Act 1998; see also Siemon, Noel, and Steven Freeland, *supra* note 119, at 51; Larsen, Paul B., *supra* note 158.
[163] Siemon, Noel, and Steven Freeland, *supra* note 119, at 52.
[164] See *supra* note 120.
[165] Siemon, Noel, and Steven Freeland, *supra* note 119, at 53.
[166] See Sections 11 – 46B, Part 3 (Regulation of space activities), Space Activities Act 1998.
[167] See Division 2, Space Activities Act 1998.

operating a launch facility in Australia, or doing anything directly connected with the operation of such launch facility.[168] The granting of a space licence is subject to nine conditions. These include the following:[169] the Minister must be satisfied that the person is competent to operate the launch facility and vehicle; the 'person' must be a corporation and have sufficient funding to construct and operate such facility; the Minister must be satisfied with the evidence of environmental approval under Australian law and evidence of a low probability that the construction and the operation of the launch facility will cause substantial harm to public health, safety and property. The licence is issued for a specified term of not more than 20 years.[170]

The second mode of authorization is launch permits.[171] A launch permit is required for conducting a launch or launches of space objects from launch facilities located in Australia.[172] In other words, the launch facility operator, after obtaining a space licence for the launch facility and launch vehicle, also needs to apply for a launch permit in order to conduct a launch or launches. Such a launch permit may also authorize the return of a space object to a specified area in Australia.[173] The launch permit is granted only when the Minister is satisfied with certain conditions. For example, the person seeking a permit, who holds a space licence, must be a corporation, be competent and satisfy the insurance or financial requirements.[174] Other conditions are, for example, that the Minister is satisfied that the probability of the launch causing substantial damage is low, and that the space object does not contain a nuclear weapon or other weapon of mass destruction.[175] The launches permit is granted for a specified period, started from the day on which it comes into force until the day it expires. It may also end on the occurrence of a particular event prescribed in the permit.[176] However, the Minister has power to extend, by written notice, the validity period of the permit.[177]

[168] For detail read Section 15, Space Activities Act 1998.
[169] Section 18, Space Activities Act 1998.
[170] Section 19, Space Activities Act 1998.
[171] See Division 3, Space Activities Act 1998.
[172] For detail refer to Section 11 and Section 26(1), Space Activities Act 1998.
[173] Section 26(2), see also Section 13, Space Activities Act 1998.
[174] Division 7, Space Activities Act 1998.
[175] Section 26(3), Space Activities Act 1998.
[176] Section 28(2), Space Activities Act 1998.
[177] Section 28(3), Space Activities Act 1998.

The third mode of authorization is through overseas launch certificates.[178] An overseas launch certificate is needed for a launch or launches of space objects operated by an Australian national from a launch facility located outside Australia.[179] Certain conditions need to be satisfied before an overseas launch certificate can be issued; for example the applicant must either provide evidence of insurance or financial competency, or demonstrate that such requirements are unnecessary in view of the nature and purpose of the space object.[180] Other requirements include proof that threats to public safety and health are low, and that the country's national security, foreign policy or international obligations do not require the certificate to be withheld.[181] The validity period granted for this certificate, like the launch permit, starts from the date when it comes into force until the end of a particular event, as approved.[182] In such circumstances, however, the Minister has the power to extend, by written notice, the period of the certificate.[183]

The fourth mode is authorization of return.[184] Such authorization of return is required for space objects launched from outside Australia but being brought back to Australia.[185] Some proofs are required before an authorization of return can be granted. The Minister needs to be satisfied, among other things, of the competence of the applicant to carry out the return, the presence of insurance or financial competency regarding the return, and a low probability of the return causing substantial damage to public health and safety. Other requirements include the following: the space object must not contain a nuclear weapon or weapon of mass destruction, and Australia's national security, foreign policy and international obligations should not preclude the authorization from being granted.[186] It should also be noted that, under the Act, an offence will be deemed to have been committed if it is proved that the return of the space object has been conducted in a manner that causes substantial harm. The same applies if the space object contains a nuclear weapon or any other weapon of mass destruction, or if the applicant cannot demonstrate insurance provision or financial competence for the return.[187]

---

[178] See Division 4, Space Activities Act 1998.
[179] Section 12 and Section 35(1), Space Activities Act 1998.
[180] Division 7, Space Activities Act 1998.
[181] Section 35(2), Space Activities Act 1998.
[182] Section 36(2), Space Activities Act 1998.
[183] Section 36(3), Space Activities Act 1998.
[184] See Division 5, Space Activities Act 1998.
[185] Section 14 and Section 42, Space Activities Act 1998.
[186] Section 43(3), Space Activities Act 1998.
[187] Section 44 and Division 7, Space Activities Act 1998.

The fifth mode is exemption certificate.[188] This particular exemption is granted by the Minister at his discretion. It may exempt an entity from the licensing requirements under the Acts, and is also intended for emergency situations.[189] The validity period for the exemption certificate starts from the date when it comes into force and ends on the occurrence of the specified event.[190]

(c) Registration Obligation

Australia also prescribes registration obligation in the Space Activities Act 1998.[191] The Act requires the Minister to maintain a Register of Space Objects.[192] For the purpose of registration of the space object, certain information must be disclosed under the Act. This includes[193] information on the registration number given by the Minister to the space object when it was granted a launch permit. On this point, it is noted that, when the Minister issues a launch permit authorizing the launch of the space object from a launch facility, the Minister must then allocate a specific registration number to the space object. This is done, indeed, for the purpose of identifying the space object.[194] Other information required for registration includes information regarding the launch facility of the object, the date of the launch of the object into space, the space object's general function, and the space object's orbital parameters including its nodal period, inclination, apogee, and perigee. There is also a requirement to disclose the name of other launching state(s), if there are more than one launching state for the space object. The Space Activities Act 1998 also prescribes that this Register must be kept by the Minister on computer.[195] It is clearly mentioned in the Act that the information in the Register must be available for inspection by any person. This could be achieved by providing reasonable access to a computer terminal, with the inspector either reading the information on the screen or obtaining a printed copy of the entry.[196]

---

[188] See Division 6, Space Activities Act 1998.
[189] Sections 11, 13 and 46, Space Activities Act 1998. See also Freeland, Steven, "Australian National Space Legislation and Policy", *supra* note 155, at 104.
[190] Section 46A, Space Activities Act 1998.
[191] See Part 5, Space Activities Act 1998.
[192] See Section 76, Space Activities Act 1998.
[193] *Id*.
[194] Section 77, Space Activities Act 1998.
[195] Section 78, Space Activities Act 1998.
[196] Section 79, Space Activities Act 1998.

(d) Constant Monitoring and Supervision

The Space Activities Act 1998 also instituted a regime aimed at implementing a constant monitoring and supervision obligation. For such purpose, the Act requires the Minister to appoint a Launch Safety Officer (hereinafter 'the LSO') for every licensed launch facility.[197] The LSO is issued with an identity card, which must be returned after the person has ceased to be the LSO.[198] The main duty of the LSO is to monitor the compliance of the launch operator with the terms and conditions of the space licence. Apart from that, the LSO has a duty to ensure that no persons or property are endangered by any launch or return. Moreover, the LSO has a responsibility to ensure that notice is given, in accordance with the regulations, with respect to launches and returns of space objects.[199]

Beside the aforementioned duties, there is also a wide range of powers available to the LSO. The possibility of constant monitoring and controlling of space activities occurs when the Act prescribes that the LSO may do anything reasonable that is necessary to perform his/her function. Furthermore, the LSO has been granted powers, among others, to enter and inspect the launch facility, the space object, and other equipment at the facility, provided such inspection is executed with the consent of the licence or permit holder. The LSO can require the licensee or permit holder to provide necessary information or assistance, as well as give the necessary direction with respect to the launch or return of the space object.[200] However, in exercising the power prescribed under this Act, the LSO must comply with the instructions given by the Minister. In such cases, the Minister may give different instructions for the different licensed launch facilities in order to monitor the activities, if necessary.[201] With respect to the aforementioned obligations, the LSO also has the power to appoint an assistant to help him/her in the performance of his/her duties under the Space Activities Act 1998.[202]

Apart from the above, it is noted that space activities are also controlled by the imposition of a rule that the holder of a space licence, launch permit, and other certificates must not

---

[197] Sections 50 and 8 (Meaning of Launch Safety Officer), Space Activities Act 1998.
[198] Section 58, Space Activities Act 1998.
[199] Section 51, Space Activities Act 1998.
[200] Section 52, Space Activities Act 1998.
[201] Section 55, Space Activities Act 1998.
[202] Section 57, Space Activities Act 1998.

contravene the conditions of the licence. Should this occur the holder will be liable to a civil penalty.[203]

(e) Liability and Indemnification

The Space Activities Act 1998 establishes a comprehensive liability regime to regulate Australian space activities.[204] The Act specifies the scope of the damage covered.[205] It applies to damage caused by a space object if: [206] (1) the object is launched from a launch facility in Australia; or (2) Australia is a launching state for the object; or (3) the object is returned to a place in Australia; or (4) the object is returned to a place outside Australia. Apart from that, the Act mentions, in general, that this also applies to damage occurring on earth, in the air, or in space. It further states that it applies to loss occurring either in or outside Australia. The same applies to the launch or return of the space object regardless of whether or not it was authorized under this Act and covered by an exemption certificate. It should be noted at this juncture that all losses must occur during a specified liability period, which will be mentioned later.

It is well understood that a state herself, including Australia, can be internationally liable under Article VII of the Outer Space Treaty and Article II of the Liability Convention 1972[207] for damage done as a result of space-related activities conducted by the state under the definition of launching state. Apart from that, pursuant to Article VI of the Outer Space Treaty 1967,[208] a state must also take responsibility for its national activities in outer space. In view of this, under the Space Activities Act 1998, the Australian Government has sought to pass on the Government's liability for its national activities to the responsible party.[209]

---

[203] Sections 21, 30, 37, 45, 46B, and Part 6, Space Activities Act 1998.
[204] See Part 4(Liability for damage by space objects), Space Activities Act 1998.
[205] Section 63, Space Activities Act 1998.
[206] *Id*.
[207] Read Article II, Liability Convention 1972 stipulates, '*A launching state shall be absolutely liable to pay compensation for damage caused by its space object on the surface of the Earth or to aircraft in flight'*. See also Article VII, Outer Space Treaty 1967, *supra* note 79.
[208] Article VI, Outer Space Treaty 1967, *supra* note 40.
[209] The 'responsible party' may mean 'the holder of the permit, or the holder of the permission, or the holder of the exemption certificate, or the holder of an overseas launch certificate'. However, in the event of the permit, permission, or certificate not being obtained, the responsible party may refer to the person who carried out the launch or return of the space object, or the person who owns the payload form part of the space object, or any other person specified in the regulations provided that they are Australian nationals if the launch was conducted outside Australia. For details, see Section 8 (Definition) and Section 74, Space Activities Act 1998. See also Lee, Ricky J., "The Liability Convention and Private Space Launch Service – Domestic Regulatory Responses", (2006) XXXI *Annals of Air and Space Law,* at 371.

There are two types of liability prescribed by the Act in relation to liability for third-party damage[210]. They are absolute or strict liability,[211] and fault liability.[212] This division of liability in fact reflects the liability rules establish in the Liability Convention 1972.[213] The rule of absolute or strict liability applies to damage or loss occurring on earth and in the air. The rule is that the responsible party is strictly liable for loss and damage caused by the space object to the third party on earth, or as a result of damage to aircraft in flight, unless it is proved that the third party is guilty of gross negligence or intentional conduct, in which case the responsible party is not liable to that extent.[214] However, the fault liability rule applies to damage or loss occurring in outer space. Thus, in the event of damage caused by the space object to another space object in outer space, the party responsible for the launch or return of the space object is liable according to that person's degree of fault for damage done to another space object. The same applies to damage to property of the third party on board a space object.[215]

It should be remembered that such a liability regime is only applicable during the specific 'liability period' of the launch and return of the space object. For the launch, the Space Activities Act 1998 establishes a fixed liability period of 30 days, commencing at the time of launch and continuing for 30 days after the launch. For the return, the period commences when the re-entry manoeuvre begins and ends when space object has come to rest on earth.[216] Therefore, claims are limited to these liability periods. With respect to insurance and financial requirements, the Act requires the holder of a launch permit, an overseas launch certificate, or a permit to return an object to Australia to either satisfy the insurance requirement or show direct financial responsibility for the launch and return.[217] If the person chooses the insurance requirement option, the holder must be insured against: (1) any liability

---

[210] 'Third party' for the launch or return of a space object means, '*a person who is not a responsible party for the launch or return and who is not a related party or any responsible party for the launch or return*'. See Section 8 (Definition), Space Activities Act 1998.
[211] Section 67, Space Activities Act 1998.
[212] Section 68, Space Activities Act 1998.
[213] See Articles II, and III, Liability Convention 1972.
[214] See Article VI, Outer Space Treaty 1967, *supra* note 40. Davies, Michael, *supra* note 144, at 172. See also Lee, Ricky J., *supra* note 151.
[215] See *supra* note 209.
[216] Section 8 (Definition of liability period), Sections 63(1)(b), 63(2)(b), and 63(2A)(c), Space Activities Act 1998. See also Davies, Michael, *supra* note 144, at 171.
[217] Division 7 (Insurance/financial requirements) of Part 3, Space Activities Act 1998. See also Davies, Michael, *supra* note 144, at 175.

to pay compensation for damage to a third party caused by the launch and return; and, (2) any Government liability under international law (including the Liability Convention 1972).[218]

The Space Activities Act 1998 also introduces a concept of monetary limit on liability. In such a situation, the responsible party is not liable to pay compensation in excess of the amount of insurance required under the legislation.[219] In the event of the responsible party being liable to pay further compensation to Australian nationals of an amount in excess of the insured amount, the Australian Government is liable to pay for the compensation up to an amount not exceeding three billion dollars.[220] However, this monetary limit on liability does not apply to a responsible party who did not hold or was in breach of the relevant space licence and launch permit.[221]

The Act provides the Australian Federal Court the power to hear and determine the action for compensation of damage caused by a space object.[222] The Act prescribes that such action may only be brought within one year after the day on which the damage occurred. However, if the claimant is not immediately aware that damage has occurred, he/she can bring an action within one year after the day he/she becomes aware of the damage, or would have become aware of the damage, had he/she exercised due diligence.[223]

(f) Safety, Peace, and Security Measurement

In view of the spirit of safety, peace and security introduced by international law,[224] the Space Activities Act 1998 institutes an investigation regime.[225] The regime deals with the investigation of an accident or incident[226] involving a space object that occurs during the

---

[218] Section 48, Space Activities Act 1998.
[219] The Act prescribes that the total insurance for each launch and return must be for an amount not less than the lesser of the amount of 750 million dollars (as indexed from time to time in accordance with the regulations), and the amount of the 'Maximum Probable Loss' (MPL) that might be incurred by the third party caused by the launch and return, as determined using the method set out in the regulations. Read Sections 48(3) and 69(3), Space Activities Act 1998. Davies, Michael, *supra* note 144, at 173.
[220] Section 69(4), Space Activities Act 1998.
[221] Section 69, Space Activities Act 1998.
[222] Section 72, Space Activities Act 1998.
[223] Section 73(1), Space Activities Act 1998.
[224] Article IX, Outer Space Treaty 1967.
[225] Part 7 (Investigation of accident), Space Activities Act 1998.
[226] An accident means an accident involving a space object when a person dies or suffers serious injury as a result of the space object operation. It also occurs when the object is destroyed, seriously damaged or causes damage to property. An incident means an occurrence associated with the operation of a space object that affects

liability period of its launch from Australia or its return.[227] By establishing a system of investigation, it is hoped that the occurrence of accidents or incidents can be prevented.[228] In such circumstances, among the rules imposed by the Act is the automatic suspension of the launch permit or other certificates, taking effect immediately after the occurrence of the accident.[229] Apart from that, in the investigation process, the procedure is that the Minister will appoint an investigator who is qualified and sufficiently experience for the task.[230] The investigator will then investigate the surrounding circumstances of the accident or incident. He may appoint assists to help him perform his functions.[231] During the investigation period, the investigator may, by written notice, require a person to attend an inquiry session and to provide him/her with any relevant documents and records.[232] A person who fails to attend the session is guilty of a criminal offence.[233] Upon completion of the investigation, the report shall be submitted to the Minister.[234] However, for the purpose of security and safety, the Act emphasizes that the record shall not be directly or indirectly disclosed to any person or court. A person contravening this rule shall be guilty of a criminal offence.[235] There are also specific rules regarding accidents occurring at the site. For instance, the Act gives the investigator the power to enter the site; it also prescribes various procedures to be observed before entering the site, the availability of assistance and the use of force in entering the site.[236]

The spirit of safety and peace is clearly revealed in the provisions for granting the space licence, space permit, overseas launch certificate, and authorization of return. On this point, it is noted that the element of environmental approval is required by the authority to approve the application. In addition, the applicant must demonstrate that the space activities would cause only a minimal amount of damage, if any, to public health, safety, and property.

---

or could affect the safety of the space object operation, or that involves situations indicating that an accident nearly occurred. See Sections 85 and 86, Space Activities Act 1998.

[227] Section 84, Space Activities Act 1998.

[228] Section 87, Space Activities Act 1998.

[229] Section 95, Space Activities Act 1998.

[230] Section 88, Space Activities Act 1998.

[231] Sections 89 and 90, Space Activities Act 1998.

[232] For further information refer Section 91, Space Activities Act 1998.

[233] Section 92, Space Activities Act 1998.

[234] Section 94, Space Activities Act 1998.

[235] Safety record may mean: (a) all oral or written statements taken by the investigator during the investigation; (b) all communications between persons involved in the investigation; (c) medical and personal information about the persons involved in the investigation, including the deceased person. Section 96, Space Activities Act 1998.

[236] See Division 3 (Accidents site power) of Part 7, Space Activities Act 1998.

Moreover, the space object must not contain any nuclear weapon or other weapon of mass destruction.[237]

The spirit of safety is also reflected in the Act in that the Launch Safety Officer has been awarded power to assign any direction in relation to the launch or return of the space object that is executed in order to avoid any danger either to public health, persons, or property. Such direction may include, for instance, instructions to stop the launch or return of the space object, and even to destroy such objects.[238] A person who fails to comply with such direction is guilty of a criminal offence.[239] Apart from that, in an emergency situation the Launch Safety Officer, if finding reasonable grounds, has the power, among others, to search the facility or seize items at the launch facility.[240]

The Act also grants power to the Minister to suspend the licence, permit, and other certificates if the holder contravenes the conditions stipulated in the licence. Such action can also be taken in furtherance of Australia's national security, foreign policy, or the country's international obligations.[241]

(g) Other Provisions

Among other provisions set forth in the Space Activities Act 1998 are the implementation of space cooperation agreements and miscellaneous provisions. The implementation of space cooperation agreement deals with the implementation of the intergovernmental agreement with Russia.[242] The miscellaneous part deals with delegation provisions, operation of other laws, immunity, and others.[243]

[237] Read Sections 18, 26, 35, and 44, Space Activities Act 1998.
[238] Section 52, Space Activities Act 1998.
[239] Section 53, Space Activities Act 1998.
[240] Section 56, Space Activities Act 1998.
[241] Sections 25, 34, 41, and 45C, Space Activities Act 1998.
[242] See Part 5A (Implementation of space cooperation agreement), Section 8 (Definition of 'intergovernmental agreement with Russia'), Space Activities Act 1998.
[243] See Part 8 (Miscellaneous), Space Activities Act 1998.

3.3.4. Concluding Remarks

Australia is a party to all five United Nations outer space treaties. In such circumstances, it is concluded that Australia has agreed to be bound by the international obligations set forth in the United Nations space treaties. As in the United Kingdom, the international legal obligations imposed by the treaties only bind the state at the international level. They have no legal effect at the domestic level, unless the rules are incorporated into the Australian domestic law. This situation, among others, led to the establishment of the Australian Space Activities Act 1998. Besides these facts, it is also noted that the passing of the Act is in response to the evolution of the Australian commercial space launch industry.

The Space Activities Act 1998 establishes a comprehensive licensing regime accompanied by a set of rules that provide clarity, especially on the launch operators' legal rights and obligations. Apart from that, the Act establishes the liability regime called strict and fault liability, which mirrors the liability rules established by the United Nations treaties. It also introduces a fixed liability period and a monetary limit concept on liability. Most importantly, this regime was designed to ensure the Australian Government is indemnified against international claims.

With respect to the registration of space objects, the Act prescribes the duty of the Minister to allocate a specific registration number to a space object when granting a launch permit. The Minister must also maintain a Register of Space Objects. In terms of government-related bodies responsible for dealing with space-related matters, Australia has the Launch Safety Officer, the Space Policy Unit, and the Space Industry Innovation Council. Following the United Nations space treaties, it is noted that the Australian Space Activities Act 1998 instils some of its rules, the spirit of safety, peace, and security.

3.4. UNITED STATES OF AMERICA

3.4.1. An Overview

The United States of America (hereinafter, ‘the United States’) is made up of fifty states and a federal district. Politically, the United States is a federal constitutional republic state[244] with a written constitution. The federal government comprises three branches, each of which has its own power and influence. These branches are: (1) Legislative; (2) Executive; and (3) Judiciary. The Legislative branch consists of Congress, which comprises two houses: the Senate and the House of Representatives. The Executive is headed by a President who is the commander-in-chief of the military and has the power to appoint the members of the Cabinet, subject to the Senate’s approval. The President of the United States is also the head of the state and the United States Government. The Judiciary consists of the Supreme Court and federal courts, whose judges are appointed by the President with the Senate’s approval.[245] The United States legal system, apart from Louisiana,[246] is based on the common law legal system, which is derived from the common law system of English law. Its judicial sources of law are constitutional law, statutory law, administrative regulations, and the common law.

Economically, the United States has the world’s largest national economy. Its nominal gross domestic product (GDP) was estimated at $15.8 trillion in 2012.[247] It has been the world’s largest national economy since the 1890s, and the world’s largest manufacturer.[248] It is also home to the world’s largest stock exchange, the New York Stock Exchange, a home to 133 of the world’s 500 largest companies.[249] The state is the third largest producer of oil in the

[244] A constitutional republic is a state where the head of state and other officials are representatives of the people. The republic has a constitution that limits its power with an elected head of state. See http://en.wikipedia.org/wiki/Constitutional_republic; see also Peterson, Daneen G., “America is a Constitutional Republic … NOT a Democracy”, Speech Given in Salt Lake City, Utah, 9 September 2006, http://www.stopthenorthamericanunion.com/NotDemocracy.html, both accessed: 14 May 2014.

[245] The Legislative branch is responsible for making federal laws. The Executive is responsible for executing, enforcing, and administering the laws and policies. The Judiciary is responsible for interpreting the laws and applying them through the cases brought before them. Kelly, Martin “Overview of United States Government and Politics: Foundation and Principles”, http://americanhistory.about.com/od/governmentandpolitics/a/amgovoverview.htm. See also http://en.wikipedia.org/wiki/Politics_of_the_United_States, both accessed: 23 January 2013.

[246] The legal system of the state of Louisiana is based upon French and Spanish civil law. See http://en.wikipedia.org/wiki/List_of_national_legal_systems, accessed: 23 January 2013.

[247] http://en.wikipedia.org/wiki/US_economy#cite_note-GDP-1, accessed: 23 January 2013.

[248] It represents close to 21 per cent of the world’s manufacturing output. See Vargo, Frank, “U.S. Manufacturing Remains World’s Largest”, 14 March 2011, http://shopfloor.org/2011/03/u-s-manufacturing-remains-worlds-largest/18756, accessed: 23 January 2013.

[249] See http://money.cnn.com/magazines/fortune/global500/2010/countries/US.html, accessed: 23 January 2013.

world, as well as electrical and nuclear energy, liquid natural gas, sulphur, and phosphates. Aerospace and telecommunications are its main industries besides steel, motors, vehicles, chemicals, creative industries, food processing, and others.

The space industry is an essential dimension of the United States economy. Apart from the United States aeronautic industry, the aerospace industry is viewed as a significant contributor to the United States' economic wellbeing. Furthermore, it is a symbol of the international prestige, influence and competitiveness of the country. The United States Space Report 2011 reveals that its Global Positioning System (GPS) and satellite television revenues continue to fuel overall growth in the country's space sector, helping the industry to overcome the challenging economic conditions.[250] Moreover, the commercial activities of private sectors are observed as potential contributors that play important roles in strengthening the United States economy.[251] Reacting to this, the United States Government declared, under the principles of its National Space Policy 2010,[252] that it is committed to encouraging and facilitating the growth of its commercial space sector. The Government has indeed signalled its goal of energizing the country's domestic space industries by participating in global markets and advancing the development of its satellite manufacturing, satellite-based services, space launches, terrestrial applications and increasing entrepreneurship.[253]

As a matter of fact, the evolution of the United States' space activities started from the beginning of the space rivalry between the country and the Soviet Union, which occurred between 1957 and 1975.[254] Such intense competition began when the Soviet Union successfully launched its Sputnik, the world's first artificial satellite, on 4 October, 1957. Driven by this success, about four months later on 31 January 1958, the United States successfully launched its first satellite named Explorer 1. In the 1960s, the United States continued its space programme and, on 5 May 1961, the state managed to send the first

---

[250] "The Space Report 2011 Reveals Continued Space Sector Growth Driven by Commercial Businesses", *27th National Space Symposium Press Releases,* 6 April 2011, http://2011.nationalspacesymposium.org/media/press-releases/space-report-2011-reveals-continued-space-sector-growth-driven-commercial-busin, accessed: 23 January 2013.

[251] Dempsey, Paul Stephen, "Overview of the United States Space Policy and Law", *National Regulation of Space Activities,* ed., Jakhu, Ram S., (Dordrecht: Springer, 2010), at 389.

[252] National Space Policy of the United States of America (June 28, 2010), at 3. The full text is available at http://www.whitehouse.gov/sites/default/files/national_space_policy_6-28-10.pdf, accessed: 23 January 2013.

[253] See *id*., at 4.

[254] See http://en.wikipedia.org/wiki/Space_Race, accessed: 23 January 2013

American, Alan Shepard, into space.[255] On the United States first manned Mercury mission, Alan Shepard was launched by a Redstone rocket on a sub-orbital flight.[256] Other United States space programmes include the Gemini Programme, Apollo Programme, Apollo-Soyuz Test Project, and Skylab. The Gemini Programme was aimed at studying the biological effect of a long flight in orbit, developing techniques for rendezvousing and docking with another spacecraft.[257] It bridged the gap between the Mercury and Apollo programmes. It was also intended as a stepping stone to Apollo. The Gemini spacecraft carried two astronauts. It was the first to use a hydrogen fuel cell to generate electricity.[258] The Apollo programme's aim was to land a man on the moon and return him safely to the Earth, and also to gather lunar rocks and soil samples. On 20 July 1969, the first moon landing was accomplished by the Apollo 11 crew when Neil Armstrong became the first human to set foot on the moon.[259] The Apollo-Soyuz Test Project was the last Apollo mission. It was the first international partnership in space and involved the United States and the Soviet Union in a space flight in July 1975.[260] Skylab was the first United States space station; it was launched on 14 May 1973 and became a manned orbiting workshop. It was occupied by three crews for 171 days and 13 hours. It was the site of nearly 300 scientific and technical experiments.[261] Other programmes included the Space Shuttle programme[262] and the International Space Station (ISS).[263] According to records, the United States has launched 2127 objects into outer space

---

[255] Alan Shepard was the first person in space to exercise manual control over his spacecraft's altitude and retro-rocket firing. This event happened three weeks after the Soviet Union sent its cosmonaut, Yuri Gagarin, into space on 12 April 196; he was the first to orbit the Earth. The first American to orbit the Earth was astronaut John Glenn, on 20 February 1962. See *id*.

[256] Several other missions were accomplished under the Mercury Project. For details, see Davies, J.K., *Space Exploration*, Chambers Encyclopaedic Guides Series, (Edinburgh: W & R Chambers, 1992), at 123-125. See also http://www.thespacerace.com/encyclopedia/programs/american/mercury/, accessed: 23 January 2013.

[257] Davies, J.K., *id.,* at 65.

[258] For details of the Gemini Programme, see Davies, J.K., *supra* note 256, at 63–67. See also http://www.thespacerace.com/encyclopedia/programs/american/gemini/, accessed: 25 January 2013.

[259] For details of the Apollo Programme, see Davies, J.K., *supra* note 256, at 6–9; see also, http://www.thespacerace.com/encyclopedia/programs/american/apollo/, accessed: 25 January 2013.

[260] See Davies, J.K., *supra* note 256, at 10–12; see also http://www.nasa.gov/mission_pages/apollo-soyuz/index.html, accessed: 25 January 2013.

[261] For more information on the skylab, see Davies, J.K., *supra* note 256, at 171–175.

[262] The Space Shuttle Programme, or Space Transportation System (STS), made its first flight on 12 April 1981. It was mankind's first reusable spacecraft. It carried people into orbit repeatedly. It also launched, recovered and repaired satellites, conducted cutting-edge research, and built the International Space Station (ISS). See Davies, J.K., *supra* note 256, at 209–213; Refer also http://www.nasa.gov/mission_pages/shuttle/flyout/index.html, accessed: 25 January 2013.

[263] The ISS is an internationally developed research facility being assembled in the low earth orbit. The United States, through NASA, is one of the countries contributing significantly to the project besides the European Space Centre (ESA), the Russian Federal Space Agency (RKA), the Japan Aerospace Exploration Agency (JAXA), and the Canadian Space Agency (CSA). Under President Obama's administration, and with the new budget announcement on 1 February 2010, the administration aims to extend the ISS lifetime through to 2020 despite the earlier plan to de-orbit the ISS in the first quarter of 2016 (as determined in 2004 by President George W. Bush). See Achenbach, Joel, "Space Station is Near Completion, May be the End", *The Washington*

between 1958 and December 2012. Most of the objects were registered with the United Nations, as prescribed by the United Nations treaties, but some of them were not registered.[264]

In relation to the United States space agency, six months after launching Explorer 1, the United States Government established 'National Aeronautics and Space Administration' (NASA)[265] on 29 July 1958. NASA is the United States Government's leading agency responsible for the state's civilian space programme and also for aeronautics and aerospace research.[266] It was established by the National Aeronautics and Space Act 1958[267] and its functions, among others, were to plan, direct, and conduct aeronautical and space activities.[268] It also deals with research and development in certain technologies such as ground propulsion, solar heating and cooling technologies.[269] NASA has led the United States Government's exploration of space since 1958. Considering NASA's numerous past, present, and future operations and missions,[270] the Agency has clearly contributed extensively to the evolution of the United States space programmes. Therefore, the United States Government decided to retain it as a multi-mission agency with a balanced and robust set of core missions in science, aeronautics, and human space flight and exploration.[271]

There are several others agencies involved in outer space activities. One of the most important is the Federal Aviation Administration (FAA).[272] This is a division of the United States Department of Transportation (DOT).[273] The FAA is authorized to regulate and oversee all aspects of civil aviation in the United States. One of its headquarters is the Office

---

Post, 13 July 2009, http://www.washingtonpost.com/wp-dyn/content/article/2009/07/12/AR2009071201977.html; see also http://www.nasa.gov/pdf/420994main_2011_Budget_Administrator_Remarks.pdf, and http://en.wikipedia.org/wiki/International_Space_Station#End_of_mission_and_deorbit_plans, all accessed: 25 January 2013.

[264] See http://www.oosa.unvienna.org/oosa/osoindex.html, accessed: 25 January 2013.

[265] NASA official website is available at http://www.nasa.gov/home/index.html, accessed: 25 January 2013.

[266] See http://en.wikipedia.org/wiki/NASA, accessed: 25 January 2013.

[267] National Aeronautics and Space Act of 1958, Pub. L. 85-568, 72 Stat. 426 (July 29, 1958). The full text is available at NASA official website at http://history.nasa.gov/spaceact.html, accessed: 25 January 2013.

[268] Section 203(a), National Aeronautics and Space Act of 1958, *id*. See also Section 20112(a)(1), National Aeronautics and Space Act 2010, *infra* note 326.

[269] Section 20112(b), National Aeronautics and Space Act 2010, *infra* note 326.

[270] For information on its mission, refer to http://www.nasa.gov/missions/index.html, accessed: 25 January 2013.

[271] Section 2(3), National Aeronautics and Space Administration Authorization Act of 2010, *infra* note 310.

[272] The FAA official website is available at http://www.faa.gov/, accessed: 27 January 2013.

[273] The DOT official website is available at http://www.dot.gov/, accessed: 27 January 2013.

of Commercial Space Transportation (AST).[274] It was established particularly to regulate, encourage, facilitate, and promote the country's commercial space transportation industry and also to ensure the USA's compliance with international obligations. The Office has a mission to safeguard the protection of the public, property, and national security as well as foreign policy interests of the United States during commercial launch or re-entry activities. Moreover, the Office can recommend appropriate changes to the United States Federal statutes, treaties, regulations, policies, plans, and procedures.[275] It should also be noted that one its main responsibilities is the issuance of licences, including managing the licences of private space vehicles and spaceports within the United States. [276] This distinguishes it from NASA, which is a research and development agency of the United States federal government. The FAA also has an advisory board, the Commercial Space Transportation Advisory Committee (COMSTAC). This provides information, advice and recommendations with respect to the commercial space transportation industry.[277] Other agencies worth mentioning include the Department of State (DOS),[278] Department of Commerce (DOC),[279] Department of Defense (DOD),[280] and Federal Communications Commission (FCC).[281]

[274] The Office of Commercial Space Transportation (AST) was established in 1984 by the Commercial Space Launch Act 1984, as part of the office of the Secretary of Transportation within the Department of Transportation (DOT). In November 1995, it was transferred to the Federal Aviation Administration (FAA). The AST manages its licensing and regulatory works through the Office of the Associate Administrator with five other main divisions: (1) Space Transportation Development Division; (2) Licensing and Evaluation Division; (3) Regulations and Analysis Division; (4) Safety Inspection Division; (5) Operation Integration Division. Its authorising legislation is the Commercial Space Launch Act, 51 USC Chapter 509, Sections 50901-23 (2011). See http://www.faa.gov/about/office_org/headquarters_offices/ast/about/, accessed: 27 January 2013; http://www.faa.gov/about/office_org/headquarters_offices/ast/legislation_policies/; accessed: 14 May 2014.

[275] See *id*.

[276] For more information on licensing, read Chapter 3 of the thesis: (3.4.3(b) Authorization: Licensing and Procedure).

[277] See http://www.faa.gov/about/office_org/headquarters_offices/ast/advisory_committee/, accessed: 14 May 2014.

[278] The DOS has jurisdiction over export controls and negotiates bilateral and multilateral treaties. Its official website is available at http://www.state.gov/, accessed: 14 May 2014. See also Dempsey, Paul Stephen, *supra* note 251, at 373.

[279] The DOC, through one of its commerce bureaux, engages in remote sensing, gathers data, conducts research, and makes predictions about the Earth's environment, among others. Its official website is at http://www.commerce.gov/, accessed: 14 May 2014. See also Dempsey, Paul Stephen, *supra* note 251, at 374.

[280] The DOD uses space for intelligence gathering, communications and, potentially, for missile defence. Its official website is at http://www.defense.gov/, accessed: 14 May 2014. See also Dempsey, Paul Stephen, *supra* note 251, at 374.

[281] The FCC regulates the radio frequencies for telecommunications, broadcasting, and other purposes. Its official website is at http://www.fcc.gov/, accessed: 14 May 2014. See also Dempsey, Paul Stephen, *supra* note 251, at 373.

In parallel with the United States' national space policy goals, the country's leading role in space,[282] in particular, has helped to create the emergence of various United States space launch sites. In brief, there are a number of United States Government-operated launch sites, including the Kennedy Space Centre (Florida)[283] and the Wallops Flight Facility (Coast of Virginia).[284] Other Government launch sites include Cape Canaveral Air Force Station (Florida), [285] Vandenberg Air Force Base (California), and the Ronald Reagan Ballistic Missile Defense Test Site (Kwajalein, Marshall Islands). Apart from these, there are also various privately operated spaceports, including Corn Ranch (West Texas), Kodiak Launch Complex (Alaska), Mojave Spaceport (California), Spaceport America (New Mexico), and Oklahoma Spaceport (Oklahoma).

3.4.2. Five Outer Space Conventions: The United States of America's Status

Overall, the United States is a party to four outer space conventions.[286] In respect of the first convention, the Outer Space Treaty 1967,[287] the United States signed the Treaty on 27 January 1967, the date on which it was opened for signature to all states. When the Outer Space Treaty 1967 came into force on 10 October 1967, the United States Government ratified the Treaty the very same day.[288] Such ratification reflects, under the United States'

---

[282] Some information on the United States space policies with respect to its leadership in space is available in, Dempsey, Paul Stephen, *supra* note 251, at 374-377. See also Section 20102(d)(5), National Aeronautics and Space Act 2010, *infra* note 326.

[283] The Kennedy Space Centre is the main launch site operated by NASA. Its headquarters are in Meritt Island, Florida. Its former name was Launch Operation Centre, established in July 1962. In late 1963, it was renamed the John F. Kennedy Space Centre to honour the President who put America on the path to the moon. See http://www.nasa.gov/centers/kennedy/about/history/index.html, accessed: 25 January 2013.

[284] Wallops Flight Facility is NASA's small launch centre. See http://en.wikipedia.org/wiki/Wallops_Flight_Facility, accessed: 26 January 2013.

[285] Cape Canaveral Air Force Station is governed by the United States Department of Defense. It is located at the southeast of NASA's Kennedy Space Centre on the adjacent Merritt Island. It is an installation of the United States Air Force Space Command's 45th Space Wing, and a primary launch head of the United States Eastern Range with several launch pads currently active. A number of major United States early space explorations were launched from this station. These include the first United States satellite (1958), the first United States astronaut (1961), and many others. However, when a gradual decline occurred in most operations, and it could no longer house new rocket facilities, most operations were transferred to the nearby Kennedy Space Centre. See http://www.nps.gov/nr/travel/aviation/cap.htm, and http://en.wikipedia.org/wiki/Cape_Canaveral_Air_Force_Station, both accessed: 25 January 2013.

[286] The conventions are: the Outer Space Treaty 1967, the Rescue Agreement 1968, the Liability Convention 1972, and the Registration Convention 1975, except the Moon Agreement 1979. See United Nations, *United Nations Treaties and Principles on Outer Space and Related General Assembly Resolutions: Status of International Agreements Relating to Activities in Outer Space as at 1 January 2010*, Addendum, Ref.: Sales No. E.08.1.10, ST/SPACE/11/Rev.2/Add.3, (Vienna: United Nations, 2009).

[287] Outer Space Treaty 1967, *supra* note 24.

[288] See http://www.oosa.unvienna.org/oosatdb/showTreatySignatures.do, accessed: 27 January 2013.

international obligation, the state's consent to be bound by the legal rules set forth in the Outer Space Treaty 1967.

The second agreement is the Rescue Agreement 1968.[289] The United States Government signed this Agreement on 22 April 1968, the same date the Agreement was opened for signature to all states. The Agreement was then ratified by the United States on 3 December 1968, the date it came into force.[290] The third convention is the Liability Convention 1972.[291] The Convention was signed by the state on the same date it was opened for signature, on 29 March 1972. However, ratification of the Convention was not executed until 9 October 1973, approximately one year after the Convention came into force on 1 September 1972.[292] The United States thus took about eighteen months, from the signing date, to consider becoming a party to the Liability Convention 1972. The last convention to which the United States became a party was the Registration Convention 1975.[293] It is noted that the United States signed the Convention on 24 January 1975, ten days after it was opened for signature (14 January 1975). One year later, ratification took place, on 15 September 1976, the date it came into force.[294]

As for the last United Nations outer space convention, the Moon Agreement 1979,[295] the United States has not signed, ratified or acceded to this Agreement. Thus, the United States is not a party to the Moon Agreement. Even though the state is not a party to the Agreement, it was observed that, during the early development of the Moon Agreement 1979, the United States Government seemed to be in favour of it. This was evident when, during the early development of the Agreement, the United States Government made a significant contribution, along with other countries, to drafting the Moon Agreement 1979. For instance, in 1970 the United States backed Argentina's proposal entitled 'Draft Agreement on the Principles Governing Activities in the Use of the Natural Resources on the Moon and Other Celestial Bodies'.[296] Moreover, throughout the course of negotiations on the drafting of the Agreement, the United States Government submitted a variety of proposals and working

[289] See Rescue Agreement 1968, *supra* note 27.
[290] See *supra* note 288.
[291] See Liability Convention 1972, *supra* note 29.
[292] See *supra* note 288.
[293] See Registration Convention 1975, *supra* note 31.
[294] See *supra* note 288.
[295] See Moon Agreement 1979, *supra* note 34.
[296] See UN Doc. A/AC. 105/C.2/L.71 and Corr.1, 1970. See Reijnen, G.C.M., "The History of the Draft Treaty on the Moon", (1976) 19 *IISL Colloquium on the Law of Outer Space*, 357.

papers for the UNCOPUOS Legal Subcommittee to consider.[297] Indeed, the United States delegate, Mr. Hosenball, made remarks that were in favour of and supported the formation of the Agreement.[298] It is noted that these positive remarks were made during the presidency of Jimmy Carter, whose administration was in favour of approving the Agreement. However, when a change of presidency occurred in 1981 and Ronald Reagan was elected as the United States President, the Moon Agreement was then considered a 'dead issue'.[299] Reagan was against the Agreement and did not plan to ratify it. Since then, the Moon Agreement has not been considered in the best interests of the United States Government as it claims it would deprive the United States of opportunities for development in space technology and resources.

Regarding the treaty-making process, pursuant to Article II of the United States Constitution, treaty-making power is actually vested in the President, who shall act with the consent and advice of the United States Senate.[300] The President has the power to negotiate and sign international agreements, and the Senate shall give its consent for ratification, for which a two-thirds majority is needed.[301] Such international treaties to which the United States is a party, together with the Constitution itself and the laws of the United States, are then treated as the supreme law of the Land according to Article VI of the Constitution.[302]

In summary, the United States is a state party to four United Nations outer space treaties: the Outer Space Treaty 1967, the Rescue Agreement 1968, the Liability Convention 1972, and the Registration Convention 1975. However, the country is a non-party state to the Moon Agreement 1979, which the country has neither signed nor acceded to. The United States

[297] See (A/A.105/C.2 (XI), (UN Doc. A/AC.105/115 of 27.4.1973); (UN Doc. A/AC.105/C.2/L.91 and Corr.1); see also *id*. at 360.

[298] Mr. Hosenball mentioned that, '… My Government will, … , make every effort to see that such regime is successfully negotiated', (UN Doc. A/AC.105/PV.203, dated: 16.7.1979). He also quoted, '… the Committee agreed that Article VII [Moon Treaty 1979] is not intended to result in prohibiting the exploitation of natural resources … but rather to minimise any disruption of or adverse effects to the existing balance of the environment'. Other statements include, '… Our delegation accepted … the Moon Treaty with the understanding that it in no way derogates from or limits the provisions of the 1967 Outer Space Treaty', (UN Doc. A/AC.105/PV.203). See also Edward R. F., Jr., "1979 United Nations Moon Treaty Encourages Lunar Minning & Space Development", (1979) *22 IISL Colloquium on the Law of Outer Space* 123.

[299] See "UN Moon Treaty Falling to US Opposition Groups", (March 1985), *National Space Society,* at http://www.nss.org/settlement/L5news/1982-opposition.htm, accessed: 27 January 2013.

[300] See Article II, Section 2 (Clause 2), the United States Constitution. The full text is available at http://uscode.house.gov/pdf/Organic%20Laws/const.pdf, accessed: 27 January 2013.

[301] See *id*. See also Hermida, Julian, *Legal Basis for a National Space Legislation,* Space Regulations Library Series, vol. 3, (Dordrecht: Kluwer Academic Publisher, 2004), at 76.

[302] Article VI, Clause 2, the United States Constitution, *supra* note 300.

only became a party to all four conventions by means of ratification. No mode of accession was used in becoming a party to the treaties. Being a party to the four treaties, the United States is bound under its international obligation legally, politically, and morally to respect, abide by and comply with the rules stipulated in those outer space treaties from the moment of their ratification.

3.4.3. The United States National Space Legislations and Regulations

Apart from contributing to scientific and technological achievements, the United States also plays a leading role in the establishment of rules and regulations governing outer space activities.[303] This was proved when the country became the first state to adopt national space legislation to regulate outer space activities. That first law was the National Aeronautics and Space Act 1958.[304] It was signed on 29 July 1958 by President Eisenhower.[305] In this Act, the United States announced that its activities in space would be devoted to peaceful purposes for the benefit of all mankind.[306] It is noted that the rules regulating the United States' national space activities are not contained in a single or primary legislative instrument. However, such activities are regulated by various national laws and regulations of the USA. Such national laws and regulations evolved as the need arose. Some examples of the United States' domestic laws relevant to outer space activities include the Commercial Space Launch Act,[307] the Commercial Space Transportation Regulation,[308] the amended version of the National Aeronautics and Space Act,[309] the National Aeronautics and Space Administration Authorization Act[310], and the Commercial Space Act of 1998.[311] Other related laws include

[303] Gorove, S., "The Growth of Domestic Space Law: A U.S. Example", (1990) 18 (No.2) *Journal of Space Law* 99, at 99.
[304] See *supra* note 267.
[305] Prior to the enactment, the responsibility for space exploration was deemed primarily a military venture. The endorsement of the Act was in fact prompted by a lack of response by the United States military infrastructure, which seemed incapable of keeping up with the space race. As a matter of fact, the President of the United States is the dominant force in directing development of the United States space law. See Goldman, Nathan C., *American Space Law: International and Domestic,* (Ames: Iowa State University Press, 1988), at 124. See also http://en.wikipedia.org/wiki/National_Aeronautics_and_Space_Act, accessed: 28 January 2013.
[306] Section 102(a), National Aeronautics and Space Act 1958, *supra* note 267.
[307] 51 USC Chapter 509, *infra* note 320. See also 49 USC Chapter 701, *infra* note 321.
[308] 14 e-CFR Chapter III, *infra* note 323.
[309] See *infra* note 326.
[310] National Aeronautics and Space Administration Authorization Act of 2010, (hereinafter, 'NASA Authorization Act'), Pub. L. No.111-267, 124 Stat. 2807, 42 USC 18301 (Oct. 11, 2010). The Act aims to authorize the NASA programmes for the fiscal years 2011 to 2013 with the same budget values as requested by the United States President Barack Obama. The full text is available at http://www.gpo.gov/fdsys/pkg/PLAW-111publ267/html/PLAW-111publ267.htm, accessed: 25 January 2013.
[311] See *infra* note 332.

the Communication Act of 1934,[312] the Communication Satellite Act of 1962,[313] and the Land Remote Sensing Policy Act 1992.[314]

(a) Nature and Scope

The United States has various laws and regulations to govern the country's outer space activities. It is recognized that, even though the country is a party to almost all the United Nations space treaties,[315] which are regarded as among the supreme law of the Land pursuant to Article VI of the United States Constitution, the country still has to enact its own national space laws. This is done to regulate its national space activities. The requirement to have domestic laws in the United States, apart from the international space treaties, is considered vital since not all outer space treaties' rules are binding on their nationals. This becomes evident when one refers to the purpose of the treaties' domestic application in the United States where they are actually divided into two categories:[316] (1) non-self-executing agreement, and (2) self-executing agreement. A treaty is non-self-executing when it meets the following criteria: (a) when the treaty manifests an intention that it will only become effective as domestic law with the enactment of implementing legislation; (b) the Senate, in giving consent to a treaty, or Congress, by resolution, requires implementing legislation; or (c) implementing legislation is constitutionally required.[317] In such circumstances, such treaties

[312] The Communication Act was enacted in 1934 in respect of the United States' telecommunications in general. It established a legal base for regulating wired and wireless communications nationwide and worldwide. The Act replaced the Federal Radio Commission with the Federal Communications Commission (FCC). The FCC regulates radio frequencies for telecommunications, broadcasting, and other purposes. On 3 January 1996, the United States Congress amended or repealed sections in the Act with the new Telecommunications Act of 1996. The Act also experienced some other amendments. Pub.L. No. 416, Ch. 652, 48 Stat. 1064 (June 19, 1934), codified as Chapter 5 of the Title 47 of the United States Code, 47 USC, sec.151. See Dunk, F.G. von der, "Future Developments Relating to Outer Space Treaties", (1998) 40 *IISL Colloquium on the Law of Outer Space,* 449; see also http://en.wikipedia.org/wiki/Communications_Act_of_1934, accessed: 2 January 2013.

[313] The Communication Satellite Act was signed on 31 August, 1962. The purpose of its enactment was to establish a commercial communications satellite system as part of an improved global communications network. See Gorove, S., *supra* note 303, at 104.

[314] The Land Remote Sensing Policy Act 1992 repeals the Land Remote Sensing Commercialization Act of 1984. The Act deals with formulating certain changes to the United States Landsat system. See, Pub. L. No. 102-555, 106 Stat. 4163 (October 28, 1992), 15 USC Chap. 82. See Galloway, Jonathan F., "U.S. Space Law: An Overview VIS-A-VIS Commercialization", *2004 Space Law Conference Paper Assemble,* (Beijing: China Institute of Space Law, 2004), at 39-41; see also http://www.fws.gov/laws/lawsdigest/landrs.html, accessed: 3 February 2013.

[315] The United States is a party to four United Nations outer space treaties: the Outer Space Treaty 1967, the Rescue Agreement 1968, the Liability Convention 1972, and the Registration Convention 1975. For more information, read Chapter 3 of the thesis: (3.4.2. Five Outer Space Conventions: The United States of America's Status).

[316] See Hermida, Julian, *supra* note 301, at 77.

[317] Restatement of the Law, Third Foreign Relations Law of the United States, Section 111, as cited in Hermida, Julian, *supra* note 301, at 77.

require domestication in order to have legal effect at the national level. Thus, the United States relies on such reasons to enact various domestic space laws. In contrast to non-self-executing treaties, self-executing treaties are directly applicable and have a binding effect at the national level without the requirement for domestication. However, a treaty may also be partially self-executing. In fact, such practice has long been recognized by the United States courts.[318] Some instances of United Nations treaties' provisions that are treated as self-executing include freedom of exploration of outer space, freedom of use of outer space, prohibition of appropriation of outer space,[319] peaceful use and exploration of outer space, and applicability of international law to outer space activities. Meanwhile, for non-self-executing treaties, the provisions include authorization provision, monitoring and supervision, registration obligation, liability and indemnification. Such provisions thus call for legislative action for domestication. Such circumstances resulted in the enactment and implementation of various United States domestic space laws and regulations.

Since the rules regulating the space activities of United States nationals are not contained in a single legislative instrument, it is worth briefly highlighting some of the related laws and regulations. This is done to gain an idea of the laws and regulations directly or indirectly related to the United States' space activities. The first two that will be highlighted are those most frequently referred to in the subsequent discussion.

The first law is the Commercial Space Launch Act, as set forth in Chapter 509 (Commercial Space Launch Activities) of Title 51 (National and Commercial Space Programs), the United States Code.[320] It is important to note that Chapter 509 (Commercial Space Launch Activities) of Title 51 (National and Commercial Space Programs) was formerly numbered as Chapter 701 (Commercial Space Launch Activities) of Title 49 (Transportation).[321] The law

[318] Hermida, Julian, *supra* note 301, at 77.
[319] *Id*.
[320] 51 USC Chapter 509, Commercial Space Launch Act, Section 50901 – 50923. Title 51 (National and Commercial Space Programs), Subtitle V (Programs Targeting Commercial Opportunities), Chapter 509 (Commercial Space Launch Activities), the United States Code. Title 51 is a code dealing with the compilation of general laws regarding the United States space programme. It was promulgated by President Barack Obama on 18 December 2010 when he signed P.L. 111-314. Previously, no specific single title existed in the United States Code for the space programme. In fact, Title 51 does not modify or repeal existing programmes. However, it restates the existing laws in a manner that adheres to the policy, intent and purpose of the original laws, whilst improving the organizational structure of the law and removing imperfections. The text is available at http://uscode.house.gov/browse/prelim@title51/subtitle5/chapter509&edition=prelim; see also http://en.wikipedia.org/wiki/Title_51_of_the_United_States_Code, both accessed: 4 May 2014.
[321] 49 USC Chapter 701, Sections 70101-70121. Title 49 (Transportation), Subtitle IX (Commercial Space Transportation-Transferred), Chapter 701 (Commercial Space Launch Activities-Transferred), the United States

regulates the United States' commercial space industry, particularly with respect to the United States' private space activities. It authorizes the United States Department of Transportation (DOT), which sub-delegated such authority to the United States Federal Aviation Administration (FAA), to license the launch of launch vehicles, re-entry of vehicles, and operation of launch and re-entry sites, as well as promoting public space travel. Among its significant purposes, the Act aims to encourage the United States private sector to provide launch and re-entry vehicles, and, thus, associated services by: (1) simplifying and expediting the issuance and transfer of commercial licences; (2) facilitating and encouraging the use of Government-developed space technology; and (3) promoting the continuous improvement of the safety of launch vehicles designed to carry humans.[322]

The second law is the Commercial Space Transportation Regulation set forth in Chapter III, Title 14 (Aeronautics and Space), of the electronic Code of Federal Regulations.[323] This is one of the most significant regulations. The Regulation was established based on the Commercial Space Launch Act of 1984 and the applicable treaties and international agreements to which the United States has become a party. In terms of its scope, it sets forth the procedures and requirements applicable to the authorization and supervision of commercial space launch activities and commercial space transportation activities conducted in the United States or by a United States citizen. The Regulation does not, however, apply

---

Code. Title 49 is a code that deals with the role of transportation in the United States. Chapter 701 (Commercial Space Launch Activities-Transferred) of Title 49 (Transportation) was renumbered Chapter 509 (Commercial Space Launch Activities) of Title 51 (National and Commercial Space Programs). Thus, former sections 70101-70105a, 70106-70109a, and 70110-70121, Chapter 701 (Commercial Space Launch Activities) of Title 49 (Transportation), were renumbered sections 50901-50923, Chapter 509 (Commercial Space Launch Activities) of Title 51 (National and Commercial Space Programs). The full text of former Chapter 701 (Commercial Space Launch Activities) of Title 49 (Transportation) is available at http://www.gpo.gov/fdsys/granule/USCODE-2009-title49/USCODE-2009-title49-subtitleIX-chap701/content-detail.html; and also http://stage.tksc.jaxa.jp/spacelaw/country/america/date/b_1_syougyouuchiage_hou(eng).pdf; refer also http://uscode.house.gov/view.xhtml?req=granuleid:USC-prelim-title49-chapter701&num=0&edition=prelim, all accessed: 4 May 2014.

[322] 51 USC Chapter 509, Section 50901(b)(2), *supra* note 320; 49 USC Chapter 701, Section 70101(b)(2), *supra* note 321.

[323] 14 e-CFR Chapter III, Electronic Code of Federal Regulations (Data is updated as of January 30, 2013). The United States Commercial Space Transportation Regulation, Title 14 (Aeronautics and Space), Chapter III (Commercial Space Transportation, Federal Aviation Administration, Department of Transportation). The author refers to a regularly updated editorial compilation of the electronic Code of Federal Regulations (e-CFR) material and Federal Register amendments produced by the National Archives and Record Administration's Office of the Federal Registrar (OFR) and the Government Printing Office. For full text, refer: http://www.ecfr.gov/cgi-bin/ECFR?page=browse; see also http://www.faa.gov/about/office_org/headquarters_offices/ast/licenses_permits/media/Part_400_Compilation.pdf, both accessed: 28 January 2013.

to amateur rocket activities[324] or to space activities carried out by or on behalf of the United States Government.[325]

The third is the National Aeronautics and Space Act 2010.[326] It was passed for the purpose of enacting certain laws relating to United States nationals and the country's commercial space programmes.[327] It consists of three subchapters: Subchapter I (Short title, Declaration of policy, and Definitions); Subchapter II (Coordination of aeronautical and space activities); and Subchapter III (General administrative provisions). In this Act, the state declares that NASA will seek and encourage, to the fullest extent, the commercial use of space, to the maximum extent possible.[328] The fourth law is the National Aeronautics and Space Administration Authorization Act of 2010 (hereinafter, 'NASA Authorization Act').[329] It was enacted to authorize the NASA programmes for the fiscal years 2011 to 2013, and for other purposes.[330] The long-term goal of the Act is to expand the permanent human presence beyond low-earth orbit in a manner that involves international partners. Other objectives include sustaining the capability of long-duration presence in low-earth orbit initially through continuation of the International Space Station and full utilization of the United States' segment of the space station. Other objectives are to maximise the role so that human exploration of space can advance the overall knowledge of the universe, and to support the United States' national and economic security and its global competitive posture.[331] The NASA Authorization Act comprises 12 titles: Title I (Authorization and appropriations); Title II (Policy, goals, and objectives for human space flight and exploration); Title III (Expansion of human space flight beyond the international space station and low-earth orbit); Title IV (Development and use of commercial crew and cargo transportation capabilities); Title V

[324] 'Amateur rocket activities' means unmanned rockets that: (1) are propelled by a motor or motors having a combined total impulse of 889,600 Newton-seconds (200,000 pound-seconds) or less; and (2) cannot reach an altitude greater than 150 kilometres (93.2 statute miles) above the Earth's surface. See 14 e-CFR 1.1, Chapter I, Electronic Code of Federal Regulations.

[325] 14 e-CFR 400.1, and 400.2, Chapter III, Electronic Code of Federal Regulations.

[326] See National Aeronautics and Space Act 2010, Pub. L. No. 111–314, 124 Stat. 3328 (December 18, 2010). The full text is available at the NASA official website at http://www.nasa.gov/offices/ogc/about/space_act1.html, accessed: 3 February 2013.

[327] See Preamble, National Aeronautics and Space Act 2010, *id*.; see also Title 51 (National and Commercial Space Program) United States Code, *supra* note 320.

[328] Section 20102(c), National Aeronautics and Space Act 2010, *supra* note 326.

[329] See National Aeronautics and Space Administration Authorization Act of 2010, Pub. L. No.111-267, 124 Stat. 2807, 42 USC 18301 (October 11, 2010). Title 42 (The Public Health and Welfare), Chapter 159 (Space Exploration, Technology, and Science), Section 18301 (Findings). The full text is available at http://www.gpo.gov/fdsys/pkg/PLAW-111publ267/html/PLAW-111publ267.htm, accessed: 4 February 2013.

[330] See the Preamble, National Aeronautics and Space Administration Authorization Act of 2010, *id*.

[331] Section 202, National Aeronautics and Space Administration Authorization Act of 2010, *supra* note 329. Refer also 42 USC 18312.

(Continuation, support, and evolution of the international space station); Title VI (Space shuttle retirement and transition); Title VII (Earth science); Title VIII (Space science); Title IX (Aeronautics and space technology); Title X (Education); Title XI (Re-scoping and revitalizing institutional capabilities); and Title XII (Other matters). The last Act is the Commercial Space Act of 1998.[332] This Act aims to encourage the development of the United States' commercial space industry and other purposes.[333] It consists of only two titles: Title I (Promotion of commercial space opportunities); and Title II (Federal acquisition of space transportation services).

(b) Authorization: Licensing and Procedure

The mode of authorization employed by the United States Government with respect to the United States' space-related activities is through the issuance of licences or experimental permits.[334] When the United States Congress finds that private applications of space technology in the country have achieved a significant level of commercial and economic activity and also offer potential for growth in the future, the United States Government then encourages the private sector to provide launch and re-entry space vehicles, and other associated services. Such efforts are made, among others, by simplifying and expediting the issuance and transfer of licences.[335] In the United States, participation in launch-related activities is prohibited without the appropriate licence issued by the United States Government. A licence or experimental permit is required, as a mode of authorization by the Government, in order to carry out space launches or to operate launch sites. In such circumstances, the United States Government, through the Commercial Space Launch Act,[336] authorizes the Secretary of Transport, who is sub-delegated to the Federal Aviation Administration (hereinafter the 'FAA') under its Office of Commercial Space Transportation,[337] to issue or transfer commercial licences and experimental permits. The Office is headed by an Associate Administrator who has the power to exercise the Secretary

[332] The Commercial Space Act of 1998, Pub. L. No. 105-303, 112 Stat. 2843 (October 28, 1998). The text is available at http://www.nasa.gov/offices/ogc/commercial/CommercialSpaceActof1998.html, accessed: 5 February 2013.
[333] Preamble of the Commercial Space Act 1998, *id*.
[334] 51 USC Chapter 509, Sections 50905 and 50906, *supra* note 320; 49 USC Chapter 701, Sections 70105 and 70105a, *supra* note 321; see also 14 e-CFR 413.1-413.23 and 437.1-437.95, Chapter III, Electronic Code of Federal Regulations, *supra* note 323.
[335] 51 USC Chapter 509, Sections 50901(a)(2) and 50901(b)(2), *supra* note 320; 49 USC Chapter 701, Sections 70101(a)(2) and 70101(b)(2), *supra* note 321.
[336] 51 USC Chapter 509, *supra* note 320; 49 USC Chapter 701, *supra* note 321.
[337] See *supra* note 274.

of Transport's authority to regulate the United States' commercial space transportation industry, including issuance of the relevant licences and experimental permits.[338]

There are at least four situations for which a licence is required. These situations are as follows: (1) for any person, regardless of their nationality, who conducts a launch or re-entry of a space vehicle or operates a launch or re-entry site in the United States;[339] (2) for any United States citizen, or any entities organized under the United States laws or any State, who launches or re-enters a space vehicle or operates a launch or re-entry site outside the United States;[340] (3) for any foreign entity, in which a United States citizen has a controlling interest, who launches or re-enters a space vehicle or operates a launch or re-entry site in any place outside the territory or territorial waters of any nation, unless there is an agreement between the United States and a foreign nation stating that the foreign nation has jurisdiction over the launch or re-entry of the space vehicle or the operation of the launch or re-entry site;[341] and, lastly, (4) for any foreign entity, in which a United States citizen has a controlling interest, who launches or re-enters a space vehicle or operates a launch or re-entry site in the territory of any foreign nation, including its territorial waters, if there is any agreement between the United States and that foreign nation stating that the United States has jurisdiction over the launch or re-entry of the space vehicle or the operation of the launch or re-entry site.[342] It is

[338] 51 USC Chapter 509, Section 50901(b)(3), *supra* note 320; 49 USC Chapter 701, Section 70101(b)(3), *supra* note 321; see also 14 e-CFR 401.3, Chapter III, Electronic Code of Federal Regulations, *supra* note 323 [Doc. No. FAA–2006–24197, 72 FR 17016, Apr. 6, 2007].

[339] 14 e-CFR 413.3(b), Chapter III, Electronic Code of Federal Regulations, *supra* note 323 [Doc. No. FAA–2006–24197, 72 FR 17017, Apr. 6, 2007]. For details of the rules, refer *infra* note 369; see also 51 USC Chapter 509, Section 50904(a)(1), *supra* note 320; 49 USC Chapter 701, Section 70104(a)(1), *supra* note 321.

[340] 14 e-CFR 413.3(c), Chapter III, Electronic Code of Federal Regulations, *supra* note 323 [Doc. No. FAA–2006–24197, 72 FR 17017, Apr. 6, 2007]; for details of the rules, refer *infra* note 370. See also 51 USC Chapter 509, Section 50904(a)(2), *supra* note 320; 49 USC Chapter 701, Section 70104(a)(2), *supra* note 321.

[341] 14 e-CFR 413.3(d)(1), and 413.3(e)(1), Chapter III, Electronic Code of Federal Regulations, *supra* note 323; [Doc. No. FAA–2006–24197, 72 FR 17017, Apr. 6, 2007]; for details of the rules, refer *infra* note 367. Compare also with the rules prescribed in: 51 USC Chapter 509, Sections 50904(a)(3) and 49 USC Chapter 701, Sections 70104(a)(3), which stress that a licence is required by a United States citizen who launches or re-enters a space vehicle or operates a launch or re-entry site, outside the United States and outside the territory of a foreign country, unless there is an agreement between both states that the foreign country has jurisdiction over the said activities. The purpose of this provision is indeed to prevent any entities from setting up a corporation abroad and launching vehicles from the high seas, inner space or even from outer space. See 51 USC Chapter 509, Sections 50904(a)(3), *supra* note 320; 49 USC Chapter 701, Sections 70104(a)(3), *supra* note 321. See also Hermida, Julian, *supra* note 301, at 91.

[342] 14 e-CFR 413.3(d)(2) and 413.3(e)(2), Chapter III, Electronic Code of Federal Regulations, *supra* note 323; [Doc. No. FAA–2006–24197, 72 FR 17017, Apr. 6, 2007]; for details of the rules, refer *infra* note 366. Compare also with rules provided in: 51 USC Chapter 509, Sections 50904(a)(4) and also 49 USC Chapter 701, Sections 70104(a)(4). The rules stress that a licence is required by a United States citizen who launches or re-enters a space vehicle or operates a launch or re-entry site in the territory of a foreign country if there is an agreement between both states that the United States has jurisdiction over the said activities. See 51 USC Chapter 509, Sections 50904(a)(4), *supra* note 320; 49 USC Chapter 701, Sections 70104(a)(4), *supra* note 321.

also noted that a person, otherwise requiring a licence, may instead obtain an experimental permit to launch or re-enter a suborbital rocket.[343] This will be discussed in the subsequent paragraph.

There are two categories of launch or re-entry licences offered by the FAA: (1) specific licence, and (2) operator licence. The launch or re-entry specific licence authorizes the holders to conduct one or more launches or re-entries, having the same operational parameters of one type of launch or re-entry vehicle operating at one launch or re-entry site. Such licence will identify, by name or mission, each activity authorized under the licence. With this licence, its authorization to operate is considered terminated when all launches or re-entries authorized by the licence have been completed, or when the licence validity period has expired. However, the launch or re-entry operator licence authorizes the holder to conduct launches or re-entries from one launch or re-entry site within a range of operational parameters of launch or re-entry vehicles from the same family of vehicles transporting specified classes of payloads or performing specified activities. The main difference between those two licences is that the launch or re-entry specific licence allows only a specific launch or re-entry activity. On the other hand, the launch or re-entry operator licence allows the holder to perform multiple launches or re-entries of a similar type.[344]

Apart from the aforesaid licences, the FAA also offers licences in relation to sites. These are launch site licences and re-entry site licences.[345] These licences are part of the requirements of the United States law for operating a site for launch or re-entry of a space object.

[343] 14 e-CFR 413.3(f), Chapter III, Electronic Code of Federal Regulations, *supra* note 323; [Doc. No. FAA–2006–24197, 72 FR 17017, Apr. 6, 2007]. See also 14 e-CFR 437.1 – 437.95 (Part 437 – Experimental Permits), Chapter III, Electronic Code of Federal Regulations, *supra* note 323; 51 USC Chapter 509, Sections 50906 (Experimental Permits), *supra* note 320; 49 USC Chapter 701, Section 70105A (Experimental Permits), *supra* note 321.

[344] 14 e-CFR 415.3, Chapter III, Electronic Code of Federal Regulations, *supra* note 323; see also 51 USC Chapter 509, Sections 50904, and 50905, *supra* note 320; 49 USC Chapter 701, Section 70104, and 70105, *supra* note 321. See http://www.faa.gov/about/office_org/headquarters_offices/ast/licenses_permits/launch_reentry/, accessed: 13 February 2013.

[345] For more information on application of the launch site licence, refer to 14 e-CFR 420, Chapter III, Electronic Code of Federal Regulations, *supra* note 323. And, for the re-entry site licence, refer to 14 e-CFR 433, Chapter III, Electronic Code of Federal Regulations, *supra* note 323; see also 51 USC Chapter 509, Sections 50904, and 50905, *supra* note 320; 49 USC Chapter 701, Section 70104, and 70105, *supra* note 321. See http://www.faa.gov/about/office_org/headquarters_offices/ast/licenses_permits/launch_site/, accessed: 14 February 2013.

As permitted by the United States laws, instead of applying for a licence, a person may apply for an experimental permit.[346] An experimental permit is issued only to a person who wishes to launch or re-enter a reusable suborbital rocket solely for: (1) research and development to test new design concepts, new equipment, or new operating technique; (2) showing compliance with requirements for obtaining a licence; or (3) crew training prior to obtaining a licence for a launch, or re-entry using rocket designed in accordance with the permit issued.[347] In respect of the activities carried out according to such purposes, the permit may be under the United States laws for an unlimited number of launches or re-entries.[348] Such a permit will last for one year from the issuing date, but it can be renewed yearly.[349]

There are various stages in the licensing and experimental permit application procedure. These procedures include[350] (1) pre-application consultation, (2) submission of application, (3) initial screening, (4) review period, (5) complete application, and (6) issuance of licence. Firstly, the pre-application consultation stage shall be executed prior to the formal submission of a licence or permit application. The applicant must consult the FAA before submitting his/her application to discuss the process and possible issues relevant to the licence or permit. This stage allows the applicant to familiarize him/herself with the application process, and acquaint the FAA with the applicant's proposals. This early consultation may, indeed, help the applicant identify possible regulatory issues with regard to his application, thus avoiding delay in processing such application.[351]

---

[346] 14 e-CFR 413.3(f), and 437.1 – 437.95, Chapter III, Electronic Code of Federal Regulations, *supra* note 323; [Doc. No. FAA-2006-24197, 72 FR 17017, Apr. 6, 2007]; see also 51 USC Chapter 509, Sections 50906, *supra* note 320; 49 USC Chapter 701, Section 70105A, *supra* note 321. See also Dempsey, Paul Stephen, "United States Space Law: Commercial Space Launches and Facilities", (2007) *49 IISL Colloquium on the Law of Outer Space* 76.

[347] 14 e-CFR 437.5, Chapter III, Electronic Code of Federal Regulations, *supra* note 323; see also 51 USC Chapter 509, Sections 50906(d), *supra* note 320; 49 USC Chapter 701, Section 70105A(d), *supra* note 321.

[348] 14 e-CFR 437.9, Chapter III, Electronic Code of Federal Regulations, *supra* note 323; see also 51 USC Chapter 509, Sections 50906(e), *supra* note 321; 49 USC Chapter 701, Section 70105A(e), *supra* note 321.

[349] 14 e-CFR 437.11, and 413.23, Chapter III, Electronic Code of Federal Regulations, *supra* note 323.

[350] The explanation of procedures for application for a licence and experimental permit is enshrined in 14 e-CFR Part 413 (License Application Procedures), Part 420 (License to Operate a Launch Site), Part 433 (license to Operate a Re-entry Site), and Part 437 (Experimental Permits), Chapter III, Electronic Code of Federal Regulations, *supra* note 323; see also 51 USC Chapter 509, Sections 50905 and 50606, *supra* note 320; 49 USC Chapter 701, Sections 70105 and 70105A, *supra* note 321. The complete licence application process for launch and re-entry vehicles can be viewed at http://www.faa.gov/about/office_org/headquarters_offices/ast/licenses_permits/launch_reentry/; and for launch sites licence is at http://www.faa.gov/about/office_org/headquarters_offices/ast/licenses_permits/launch_site/; for the experimental permit is applicable at http://www.faa.gov/about/office_org/headquarters_offices/ast/licenses_permits/sub_orbital_rockets/, all accessed at: 18 February 2013.

[351] See 14 e-CFR 413.5, Chapter III, Electronic Code of Federal Regulations, *supra* note 323; [Doc. No. FAA–2006–24197, 72 FR 17018, Apr. 6, 2007]. See also for expendable launch vehicle pre-application consultation:

Secondly, in the submission application stage, the applicant must submit a written application in English. Information required at this stage includes the applicant's name and address, and the type of licence or permit the applicant wishes to apply for. If an applicant proposes to include the safety element for which the FAA issues a safety approval,[352] the applicant must then identify the safety approval in the application and explain the use of the safety element.[353]

Thirdly, during the initial screening stage, the application will be screened by the FAA in order to determine whether it is sufficiently complete to begin the review. If the application is complete and accepted, the applicant will be notified in writing that the FAA will initiate the review stage. However, if it is rejected for being incomplete, notification will be sent to the applicant, explaining the reason. Thus, the applicant may rectify any deficiencies.[354]

Fourthly, in the review period stage, the FAA will review and make decisions on the application within 180 days of receiving it. In the event of the application failing to provide sufficient information, written notification will be sent to the applicant, requiring him/her to provide the missing information.[355]

Fifthly, when the application is accepted at the complete application stage, this does not mean that the application is entirely complete. The FAA is still allowed to ask for other information

---

http://www.faa.gov/about/office_org/headquarters_offices/ast/licenses_permits/launch_reentry/expendable/preapp_consult/; for reusable launch vehicle: http://www.faa.gov/about/office_org/headquarters_offices/ast/licenses_permits/launch_reentry/reusable/preapp_consult/; for launch site: http://www.faa.gov/about/office_org/headquarters_offices/ast/licenses_permits/launch_site/preapp_consult/; for experimental permit see http://www.faa.gov/about/office_org/headquarters_offices/ast/licenses_permits/sub_orbital_rockets/, all accessed: 18 February 2013.

[352] A discussion on the safety approval and safety review is provided in Chapter 3 of the thesis, (3.4.3(f) Safety, Peace, and Security Measurement). The guidance is applicable in: US Federal Aviation Administration, *Safety Approval: Guide for Applicants, Version 1.1, (July 20, 2012)*, (Washington D.C., 2012), available at http://www.faa.gov/about/office_org/headquarters_offices/ast/licenses_permits/safety_approvals/media/Safety_Approval_Guide_1.1.pdf, accessed: 18 February 2013.

[353] For more information, refer to 14 e-CFR 413.7(d), Chapter III, Electronic Code of Federal Regulations, *supra* note 323. Read also United States Federal Aviation Administration, *Safety Approval: Guide for Applicants, Version 1.1, (July 20, 2012)*, *id*.

[354] 14 e-CFR 413.11 [Doc. No. FAA–2006–24197, 72 FR 17018, Apr. 6, 2007], and 413.21 [Amdt. 413-03, 64 FR 19614, Apr. 21, 1999, as amended by Amdt. 413-9, 72 FR 17019, Apr. 6, 2007], Chapter III, Electronic Code of Federal Regulations, *supra* note 323.

[355] 14 e-CFR 413.15, Chapter III, Electronic Code of Federal Regulations, *supra* note 323, [Doc. No. FAA-2006-24197, 72 FR 17018, Apr. 6, 2007].

necessary for determining whether public health and safety, safety of property, national policy, and the United States foreign policy interests will be protected during the conduct of the activities.[356] The applicant must also ensure that the continuing accuracy and completeness of information is maintained during the process of the licensing application. Failure to observe this will lead to denial of such application.[357]

The sixth and final stage is the issuance of the licence. After the FAA has completed its review and the applicant has satisfied all the requirements, the FAA will then issue a licence or permit to the applicant.[358] Actually, the FAA has the right to make a determination on issuing a licence within 180 days of receiving a complete application. However, for an experimental permit, the process takes only 120 days.[359] The licence issued is eligible for renewal at least 90 days before it expires, and for the experimental permit at least 60 days before it expires.[360]

(c) Registration Obligation

The United States Government implements the registration obligation, as prescribed by Article IV of the Registration Convention 1975,[361] in relation to space objects owned by United States citizens or its entities. Under the registration obligation imposed by United States law, the licensee is required to register all objects placed in outer space in the course of conducting activities authorized by the licence, except for objects owned and registered by the United States Government and any object owned by a foreign entity. The registration should take place no later than thirty days following the licensed launch. Thus, the licensee has to submit to the Office of Commercial Space Transportation[362] data including the

---

[356] 14 e-CFR 413.13, Chapter III, Electronic Code of Federal Regulations, *supra* note 323, [Doc. No. FAA-2006-24197, 72 FR 17018, Apr. 6, 2007].
[357] 14 e-CFR 413.17, Chapter III, Electronic Code of Federal Regulations, *supra* note 323, [Doc. No. FAA–2006–24197, 72 FR 17018, Apr. 6, 2007].
[358] 14 e-CFR 413.19, Chapter III, Electronic Code of Federal Regulations, *supra* note 323, [Doc. No. FAA-2006-24197, 72 FR 17019, Apr. 6, 2007].
[359] Refer Commercial Space Launch Amendments Act of 2004; and also http://www.faa.gov/about/office_org/headquarters_offices/ast/licenses_permits/sub_orbital_rockets/, accessed: 18 February 2013.
[360] 14 e-CFR 413.23, Chapter III, Electronic Code of Federal Regulations, *supra* note 323, [Doc. No. FAA-2006-24197, 72 FR 17019, Apr. 6, 2007].
[361] See Registration Convention 1975, *supra* note 31.
[362] See *supra* note 274.

following: date and location of the launch; general function of the space object; and final orbital parameters including its nodal period and inclination.[363]

With respect to the provision that the licensee does not need to provide registration information for objects placed in space when they were owned by a foreign entity,[364] it has come to the attention of the FAA that this rule needs clarification.[365] Such a situation, in fact, leads to further debate as United States law prescribes that a foreign entity, in which a United States citizen has a controlling interest, that conducts space activities either in the foreign state or its territorial waters,[366] or outside the territory or territorial waters of any state, is required to obtain a licence from the United States (unless certain conditions are satisfied).[367] In other words, the foreign entity, controlled by a United States citizen, must obtain a licence under the United States law in order to conduct space activities. However, in the event of the

[363] The rule on the registration of space objects was previously prescribed under Section 415.81 (Registration of Space Object), Subpart E of Title 14 e-CFR. However, at the time of writing, Subpart E including Section 415.81, is marked as 'reserved'. Section 415.81 mentioned:
(a) To assist the U.S. Government in implementing Article IV of the 1975 Convention on Registration of Objects Launched into Outer Space, each licensee shall provide to the FAA the information required by paragraph (b) of this section for all objects placed in space by a licensed launch, including a launch vehicle and any components, except: (1) Any object owned and registered by the U.S. Government; and, (2) Any object owned by a foreign entity.
(b) For each object that must be registered in accordance with this section, not later than thirty (30) days following the conduct of a licensed launch, a licensee shall submit the following information:
(1) The international designator of the space object(s); (2) Date and location of launch; (3) General function of the space object; and, (4) Final orbital parameters, including: (i) Nodal period; (ii) Inclination; (iii) Apogee; and (iv) Perigee. See 14 e-CFR Subpart E [Reserved], Chapter III, Electronic Code of Federal Regulations, *supra* note 323. See Hermida, Julian, *supra* note 301, at 98.

[364] Instead of space objects owned by the foreign entity, the registration of information on the object is also not required when the object is owned and registered by the United States Government. See *id*.

[365] See http://www.faa.gov/about/office_org/headquarters_offices/ast/licenses_permits/media/14cfr-401-417.pdf, accessed: 15 February 2013.

[366] 14 e-CFR 413.3(d)(2), and 413.3(e)(2), Electronic Code of Federal Regulations, *supra* note 323. Section 413.3 states: *Who must obtain a license or permit: (d) A foreign entity in which a United States citizen has a controlling interest must obtain a license to launch a launch vehicle from or to operate a launch site in – (2) the territory of any foreign nation, including its territorial waters, if there is an agreement in force between the United States and that foreign nation providing that the United States has jurisdiction over the launch or the operation of the launch site. (e) A foreign entity in which a United States citizen has a controlling interest must obtain a license to re-enter a re-entry vehicle or to operate a re-entry site in – (2) the territory of any foreign nation if there is an agreement in force between the United States and that foreign nation providing that the United States has jurisdiction over the re-entry or the operation of the re-entry site.*

[367] 14 e-CFR 413.3(d)(1), and 413.3(e)(1), Electronic Code of Federal Regulations, *supra* note 323. Section 413.3 states: *Who must obtain a license or permit: (d) A foreign entity in which a United States citizen has a controlling interest must obtain a license to launch a launch vehicle from or to operate a launch site in – (1) Any place that is outside the territory or territorial waters of any nation, unless there is an agreement in force between the United States and a foreign nation providing that such foreign nation has jurisdiction over the launch or the operation of the launch site. (e) A foreign entity in which a United States citizen has a controlling interest must obtain a license to re-enter a re-entry vehicle or to operate a re-entry site in – (1) Any place that is outside the territory or territorial waters of any nation, unless there is an agreement in force between the United States and a foreign nation providing that such foreign nation has jurisdiction over the re-entry or the operation of the re-entry site.*

launched object being owned by the foreign entity, it is not required under United States law to register to their authority the information on such an object even though, originally, the licensee was indeed regulated under United States law. For further illustration, consider, for instance, the case of Sea Launch,[368] which operates launch services from international waters. Under United States law, if a United States company, namely the Boeing Commercial Space Company, has a controlling interest over the Sea Launch, the Sea Launch is then required to obtain a United States launch licence to operate its services. Nevertheless, in the event of the object placed by Sea Launch in outer space being owned by a foreign entity, the registration of information on the object is not required. This situation may indeed have legal implications in that the United States authority originally authorizes the licensee to conduct its activities through issuance of a licence under United States law. However, the United States authority is then seen as non-compliant with the registration obligation when there is no legal requirement for the licensee to register all the objects the licensee has placed in space, especially when they are owned by a foreign entity. The same implication also applies in circumstances where the object is owned by a foreign entity but was launched from United States territory by a licensee who was given an authorization under United States law. Such licensee may either be a United States citizen or a foreign entity that conducts the launch within the United States,[369] or a United States citizen who conducts the launch from outside United States territory.[370]

(d) Constant Monitoring and Supervision

The United States Government observes constant monitoring and supervision obligations in their outer space activities. In order to implement this principle, the United States gave the Secretary of Transportation the power to monitor activities of the licensee. For this purpose,

[368] Sea Launch is a spacecraft launch service that uses a mobile sea platform for equatorial launches. It was established in 1995 as a consortium of four companies from the United States, Norway, Russia, and Ukraine. Boeing Commercial Space Company (the United States Company) has a 40 per cent ownership share, RSC Energia (Russia) has 25 per cent, Aker Kvaerner (Norway) owns 20 per cent and SDO Yuzhnoye/PO Yuzhmash (Ukraine) owns 15 per cent. See http://www.sea-launch.com/index.html, and also http://en.wikipedia.org/wiki/Sea_Launch#Launches, accessed: 19 February 2013.

[369] Section 413.3(b), Title 14 of e-CFR, states: *A person must obtain a license to: (1) Launch a launch vehicle from the United States; (2) Operate a launch site within the United States; (3) re-enter a re-entry vehicle in the United States; or (4) Operate a re-entry site within the United States. Refer* 14 CFR 413.3(b), Electronic Code of Federal Regulations, *supra* note 323.

[370] Section 413.3(c), Title 14 of e-CFR, prescribes: *A person who is a United States citizen or an entity organized under the laws of the United States or any State must obtain a license to: (1) Launch a launch vehicle outside the United States; (2) Operate a launch site outside the United States; (3) re-enter a re-entry vehicle outside the United States; or, (4) Operate a re-entry site outside the United States.* Refer 14 e-CFR 413.3(c), Chapter III, Electronic Code of Federal Regulations, *supra* note 323.

an officer will be designated by the Secretary as an observer at the launch or re-entry site. The licensee must allow the designated officer to access the licensed facilities and observe the related activities. These facilities and the related activities may refer to the launch or re-entry sites, as well as manufacturing, production, testing, and training facilities. They may also refer to assembly sites used by any contractor, licensee or permit holder for the purposes of producing, assembling or testing a launch or recovering a vehicle at a site used for crew or space flight participant training or at a site at which the payload is integrated with launch or re-entry vehicles. These observations are conducted to monitor those activities at such times to a reasonable extent. It is observed that this action is necessary in order to determine the licensee's compliance with the licence issued. The licensee, therefore, must cooperate with the officer in charge for fulfilment of such purpose.[371]

(e) Liability and Indemnification

The United States law prescribes the general rule that no person may commence or conduct any launch or re-entry activity that requires a licence or permits unless such person demonstrates compliance with the United States insurance requirements or otherwise demonstrates the required amount of financial responsibility.[372] The Commercial Space Launch Act[373] rules that when a launch or re-entry licence is issued, the licensee shall either obtain liability insurance or demonstrate financial responsibility in amounts sufficient to compensate for maximum probable losses[374] that may arise from two types of claims. These claims might be made by: (1) a third party for death, bodily injury, or property damage, or loss resulting from an activity carried out under the licence; and (2) the United States Government against a person for damage or loss to Government property, resulting from an activity carried out under the licence.[375]

[371] 14 e-CFR 405.1 (Monitoring of licensed, permitted, and other activities) [Doc. No. FAA–2006–24197, 72 FR 17016, Apr. 6, 2007], and 437.93 (Compliance monitoring), Chapter III, Electronic Code of Federal Regulations, *supra* note 323. See also 51 USC Chapter 509, Sections 50907, *supra* note 320; 49 USC Chapter 701, Section 70106, *supra* note 321.

[372] 14 e-CFR 440.5 [Docket No. FAA-2005-23449, 71 FR 75632, Dec. 15, 2006, as amended by Amdt. 440-3, 77 FR 20533, Apr. 5, 2012], and 440.9, Chapter III, Electronic Code of Federal Regulations, *supra* note 323. See also 51 USC Chapter 509, Sections 50914, *supra* note 320; 49 USC Chapter 701, Section 70112, *supra* note 321.

[373] 51 USC Chapter 509, *supra* note 320; 49 USC Chapter 701, *supra* note 321. Refer also *id*.

[374] Maximum probable loss means the greatest dollar amount of loss for bodily injury or property damage that is reasonably expected to result from a licensed or permitted activity. See 14 e-CFR 440.3, Chapter III, Electronic Code of Federal Regulations, *supra* note 323.

[375] 51 USC Chapter 509, Sections 50914(a)(1), *supra* note 320; 49 USC Chapter 701, Section 70112(a)(1), *supra* note 321.

Regarding the first type of claim, which is made by a third party, the risks of losses are allocated up to the amount of the maximum probable loss, which may not exceed US$500,000,000 (US$500 million) or the maximum liability insurance available on the world market at a reasonable cost, as determined by the FAA.[376] In such circumstances, the licensee is only responsible for compensating losses up to the amount of US$500 million. In the event of the claim made by the third party exceeding the above amount, the licensee will not be accountable for compensation of such amount.[377] In other words, if the claim is in excess of the prescribed amount of the licensee's insurance, and it is a successful claim, the licensee will be liable to pay compensation to the third party up to US$500 million only. In such circumstances, payment of the balance exceeding US$500 million is the responsibility of the United States Government. The rule is, nevertheless, applicable to the licensee with respect to the third-party claim, with the condition that the additional compensation amount is not more than US$1,500,000,000 (US$1,500 million) (as adjusted for inflation occurring after 1 January 1989).[378] Any claim above this upper limit of the Government indemnification is the responsibility of the licensee or legally responsible party. This rule applies to the third-party claim made against a licensee, transferee, contractor, sub-contractor, or customer of the licensee or transferee, or a contractor or sub-contractor of a customer, but not against a space flight participant, resulting from an activity carried out under the licence issued that caused death, bodily injury, property damage, or loss resulting from the activity carried out under the licence.[379] The Secretary of Transportation, however, will not pay a part of the claim for which losses or damage resulted from the wilful misconduct of the licensee.[380]

For the second set of circumstances, in which the licensee conducts space operations from United States Governmental bases, it is a legal requirement that the licensee retain adequate

[376] 14 e-CFR 440.9(c), Chapter III, Electronic Code of Federal Regulations, *supra* note 323. See also 51 USC Chapter 509, Sections 50914(a)(3), *supra* note 320; 49 USC Chapter 701, Section 70112(a)(3), *supra* note 321.
[377] 14 e-CFR 440.5(c)(2) [Docket No. FAA-2005-23449, 71 FR 75632, Dec. 15, 2006, as amended by Amdt. 440-3, 77 FR 20533, Apr. 5, 2012], Chapter III, Electronic Code of Federal Regulations, *supra* note 323; 51 USC Chapter 509, Sections 50915(a)(1)(A), *supra* note 320; 49 USC Chapter 701, Section 70113(a)(1)(A), *supra* note 321.
[378] 14 e-CFR 440.5(c)(2), 440.19(a) and, 440.19(e)(1), Electronic Code of Federal Regulations, *supra* note 323. 51 USC Chapter 509, Sections 50915(a)(1)(B), *supra* note 320; 49 USC Chapter 701, Section 70113(a)(1)(B), *supra* note 321. See also Vorwig, Petra A., "Regulation of Private Launch Services in the United States", *National Regulation of Space Activities,* ed., Jakhu, Ram S., (Dordrecht: Springer, 2010), at 413.
[379] 14 e-CFR 440.19(a), Electronic Code of Federal Regulations, *supra* note 323; 51 USC Chapter 509, Sections 50915(a)(1), *supra* note 320; 49 USC Chapter 701, Section 70113(a)(1), *supra* note 321.
[380] 14 e-CFR 440.19(b), Chapter III, Electronic Code of Federal Regulations, *supra* note 323. 51 USC Chapter 509, Sections 50915(a)(2), *supra* note 320; 49 USC Chapter 701, Section 70113(a)(2), *supra* note 321.

liability insurance to cover all losses and damages that might occur. The main reason for this is to protect the assets of the Government. The laws[381] stipulate that, with respect to Government property, the risk of losses will be assumed up to the amount of the maximum probable loss, which may not exceed US$100,000,000 (US$100 million) or the maximum liability insurance available on the world market at reasonable cost, as determined by the FAA.[382] Therefore, when a claim is successful, the licensee is liable to pay the compensation up to only the aforesaid amount. However, in the event of the claim exceeding the aforesaid amount, the licensee has no responsibility to pay any amount that exceeds the US$100 million. This rule applies only for loss or damage that is not a result of the licensee's wilful misconduct.[383] In contrast, if the loss or damage resulted from the licensee's wilful misconduct, the licensee must then bear responsibility. However, if the loss or damage sustained by the United States Government results from the wilful misconduct of the United States or its agents, the licensee will not be accountable for the liability, loss or damage sustained.[384]

Instead of the insurance requirement, the licensee is alternatively allowed to demonstrate the required amount of financial responsibility. The amount of financial responsibility that the licensee must obtain is determined by the Secretary of Transportation, after consultation with the appropriate agencies.[385]

Apart from the above, as a condition of the issuance of the licence, the licensee is required to enter into reciprocal waivers of claim. The rule requires the licensee to implement such reciprocal waiver of claim with each of its contractors, subcontractors and customers, and the contractors and subcontractors of the customers involved in the launch or re-entry services. Under such waiver of claims, each party will agree to waive and release claims against all other parties to the waiver. Each of them will also agree to assume financial responsibility for any property damage or loss it sustains, and for bodily injury, property damage, or loss sustained by its own employees resulting from the activity conducted under the applicable

---

[381] See 14 e-CFR, Chapter III, Electronic Code of Federal Regulations, *supra* note 323; 51 USC Chapter 509, *supra* note 320; 49 USC Chapter 701, *supra* note 321.
[382] 14 e-CFR 440.9(e), Chapter III, Electronic Code of Federal Regulations, *supra* note 323; 51 USC Chapter 509, Sections 50914(a)(3)(ii), *supra* note 320; 49 USC Chapter 701, Section 70112(a)(3)(ii), *supra* note 321.
[383] 14 e-CFR 440.5(c)(3), Chapter III, Electronic Code of Federal Regulations, *supra* note 323.
[384] 14 e-CFR 440.5(c)(1), Chapter III, Electronic Code of Federal Regulations, *supra* note 323.
[385] 14 e-CFR 440.5(b), Chapter III, Electronic Code of Federal Regulations, *supra* note 323; 51 USC Chapter 509, Sections 50914(a)(2), *supra* note 320; 49 USC Chapter 701, Section 70112(a)(2), *supra* note 321.

licence, regardless of fault.[386] The Secretary of Transportation, however, shall instate for the Government a reciprocal waiver of claims with the licensee, transferee, contractors, subcontractors, crew, space flight participants, customers of the licensee, contractors and subcontractors of the customers involved in launch or re-entry services, so that each of them will agree to be responsible for property damage or loss sustained by its own employees or by the space flight participants resulting from the conducted activity applicable under the licence. The waiver applies only to the extent to which the claims are greater than the amount of insurance or the financial responsibility required.[387]

The exclusion of liability provided by United States law for the launch service provider under the scheme of the reciprocal waiver of claim is in fact seen as a practical alternative to the emergence of the United States private launch industry.[388]

(f) Safety, Peace and Security Measurement

In view of the spirit of safety, peace and security initiated by the international law,[389] the United States Government has instilled these elements in its domestic space legal frameworks. In the United States National Space Policy, the Government declares that the goal of its national space programme is, among other things, to strengthen stability in space through domestic and international measures for the purpose of promoting safe and responsible operations in space.[390] Furthermore, in the National Aeronautics and Space Act,[391] the United States Government pledges that its activities in space will be devoted to peaceful purposes for the benefit of all mankind.[392] The same Act also stresses that among the objectives of the United States aeronautical and space activities are the improvement of the safety and efficiency of aeronautical and space vehicles.[393]

---

[386] 14 e-CFR 440.17(a), and 440.17(b), Chapter III, Electronic Code of Federal Regulations, *supra* note 323; 51 USC Chapter 509, Sections 50914(b)(1), *supra* note 320; 49 USC Chapter 701, Section 70112(b)(1), *supra* note 321.

[387] 51 USC Chapter 509, Sections 50914(b)(2), *supra* note 320; 49 USC Chapter 701, Section 70112(b)(2), *supra* note 321.

[388] Hermida, Julian, *supra* note 301, at 62.

[389] Article IX, Outer Space Treaty 1967.

[390] National Space Policy of the United States of America (June 28, 2010), at 4, http://www.whitehouse.gov/sites/default/files/national_space_policy_6-28-10.pdf, accessed: 22 February 2013.

[391] National Aeronautics and Space Act, *supra* note 326.

[392] Section 20102(a), National Aeronautics and Space Act, *supra* note 326.

[393] Section 20102(d)(2), National Aeronautics and Space Act, *supra* note 326.

The licence application procedure, with respect to the launch or re-entry vehicle or site, involves the process of safety review and approval. The safety review procedure aims at determining whether the applicant is able to safely conduct the proposed application. This is done because the licence applicant should be responsible for the public's safety and property at all times.[394] Therefore, for a successful application, the applicant needs to demonstrate an understanding of the hazards involved and how the operation will be performed safely.[395] Pursuant to this, the Secretary of Transportation may establish procedures for safety approvals for the related activities, including the approval procedures for the purpose of protecting the health and safety of crews and space flight participants.[396] At this point, the Secretary may set up regulations requiring space flight participants to undergo, for instance, appropriate physical and medical examinations and training requirements prior to conducting the activities.[397] The United States law also prescribes that the Secretary has the responsibility to encourage, facilitate and promote the continuous improvement of the safety of launched vehicles designed to carry humans.[398]

Besides the safety review, the United States Government introduced an environmental review. Under the United States National Environmental Policy Act, the Office of Commercial Space Transportation[399] is required to integrate the environmental values into its decision-making process. In such a situation, the Office will analyse the environmental impacts of the proposed licensed and permitted actions, including the launch and re-entry activities and sites.[400] For security reasons, the Secretary of Transportation has the authority to prohibit, suspend or immediately end the launch or re-entry of space vehicles or the

---

[394] 14 e-CFR 417.7, Chapter III, Electronic Code of Federal Regulations, *supra* note 323.

[395] The procedures regarding the safety review are available as follows: (1) for the expendable launch vehicle (in 14 e-CFR 415.31- 415.43, Chapter III, Electronic Code of Federal Regulations, *supra* note 323); (2) for the reusable launch vehicle (in 14 e-CFR 431.31 - 431.47, Chapter III, Electronic Code of Federal Regulations, *supra* note 323). However, for the launch site safety review (in 14 e-CFR 420.19 - 420.29, Chapter III, Electronic Code of Federal Regulations, *supra* note 323). See also 14 e-CFR 417.9, Chapter III, Electronic Code of Federal Regulations, *supra* note 323, for the launch site responsibility. See Vorwig, Petra A., *supra* note 378, at 409; See also http://www.faa.gov/about/office_org/headquarters_offices/ast/licenses_permits/launch_reentry/expendable/safety/, accessed: 22 February 2013.

[396] 51 USC Chapter 509, Sections 50905(a)(2), *supra* note 320; 49 USC Chapter 701, Section 70105(a)(2), *supra* note 321. See also *id*.

[397] 51 USC Chapter 509, Section 50905(a)(6)(B), *supra* note 320; 49 USC Chapter 701, Section 70105(a)(6)(B), *supra* note 321. For more information on safety regulation refer 51 USC Chapter 509, Section 50905(a)(6)(C), *supra* note 320; 49 USC Chapter 701, Section 70105(a)(6)(C), *supra* note 321.

[398] 51 USC Chapter 509, Section 50903(c), *supra* note 320; 49 USC Chapter 701, Section 70103(c), *supra* note 321.

[399] See *supra* note 274.

[400] See http://www.faa.gov/about/office_org/headquarters_offices/ast/environmental/, accessed: 20 February 2013.

operation of sites if it has been decided that the operation is detrimental to public health and safety, safety of property, national policy and the foreign policy interests of the United States.[401]

It is construed that the spirit of safety, peace, and security has been given major consideration by the United States Government. This is evident since commercial space transportation licences or experimental permits will only be granted if the applicant can prove their operations will not jeopardize public health and safety, property, the United States' national security, foreign policy interests and the international obligations of the United States.[402] The Government can, indeed, modify, suspend or revoke the licence if the licensee fails to comply with the aforesaid requirements.[403]

(g) Other Provisions

Various other provisions are prescribed in the United States' national space laws and regulations. These include administrative hearings and judicial reviews, acquiring United States Government property and services, disclosing information, enforcement and penalties,[404] human space flight requirement,[405] and others.

3.4.4. Concluding Remarks

The United States is a party to just four outer space treaties: the Outer Space Treaty 1967; the Rescue Agreement 1968; the Liability Convention 1972; and the Registration Convention 1975. In such circumstances, it is concluded that the United States is willing to be bound by the international obligations set forth in these four treaties only. Article VI of the United States Constitution declares that the international treaties to which the country becomes a party, together with the United States Constitution and the other United States laws, are the supreme law of the land. With respect to the treaties' domestic application, the United States follows a mixed system: the self-executing and non-self-executing. For self-executing, the treaty is directly applicable and has a legally binding effect on United States nationals

[401] 51 USC Chapter 509, Section 50909(a), *supra* note 320; 49 USC Chapter 701, Section 70108(a), *supra* note 321; 14 e-CFR 417.11, Chapter III, Electronic Code of Federal Regulations, *supra* note 323.
[402] See http://www.faa.gov/licenses_certificates/commercial_space_transportation/, accessed: 27 February 2013.
[403] 51 USC Chapter 509, Section 50908, *supra* note 320; 49 USC Chapter 701, Section 70107, *supra* note 321.
[404] 49 USC Chapter 701, *supra* note 321.
[405] 14 e-CFR 460, Chapter III, Electronic Code of Federal Regulations, *supra* note 323.

without the requirement of domestication. However, for non-self-executing, the treaty is not directly applicable and has no legally binding effect on United States nationals unless the rules are domesticated into the States' domestic laws. The United States indeed recognizes that a treaty may be partially self-executing.

The legal rules governing the space activities of United States nationals are not accessible in a single legislative instrument. Nevertheless, they are governed by the United States' national space laws that are made up of a series of laws and regulations. This situation reflects the phenomenon that the United States' space laws developed based on the arising needs which commenced from the country's early involvement in the exploration of outer space activities up to the present day. In the United States, the law prescribes that the mode of authorization of outer space activities for its nationals is through the issuance of licences. Apart from licences, outer space activities can also be legalized by the issuance of experimental permits. In applying licences and experimental permits, various procedures involved. A registration obligation with respect to objects placed in space is also observed, as well as the obligation for constant monitoring and supervision. For the purpose of constant monitoring and supervision, the United States authority will designate and place an officer at the launch or re-entry site to monitor and ensure that the related activities are in compliance with the country's laws.

Regarding liability and indemnification, the United States Government imposes a monetary limit on liability. This is done to encourage the involvement of private sectors in space-related activities. Under such a scheme, a specific amount of the maximum probable loss will be determined by the authority in order to limit the liability of the licensee. In the event of loss or damage occurring, the licensee will only be responsible for compensation up to the amount of the maximum probable loss that is the amount covered by the insurance. This rule is applied with the condition that the loss has not resulted from the licensee's wilful misconduct. However, if the claim is in excess of the prescribed amount, the Government will then bear the responsibility, up to a certain amount as prescribed by United States law. This scheme is applied when the claimant is either the third party who suffers loss and damage or the United States Government that suffers the loss and damage to Government property resulting from the activities carried out under the licence. The United States law also introduces a system of reciprocal waiver of claim by which each party will agree to waive and release claims against all other parties to the waiver. The success of this system can only be achieved if all participants agree to be bound by the waiver.

Lastly, with regard to the elements of safety, peace and security, it is observed that the United States Government instils these aspects in its national legislative instruments. This was proved when the United States Government implemented various procedures, including safety review and safety approval, in the licensing application process. Such elements have been emphasized in the United States' domestic space laws and regulations as well as in its national space policy, particularly when the activities involve human space flights. In addition, there is a rule prescribing that the issuance of a licence or experimental permit will not be granted to the applicant if it has been proved that the proposed operation will jeopardize public health and safety, and the United States' national security.

3.5. INDIA

3.5.1. An Overview

India, conventionally known as the Republic of India, is made up of twenty-eight states and seven union territories.[406] Its capital city is New Delhi, and the official languages are Hindi and English. Politically, India is a federal constitutional republic state,[407] with a parliamentary democracy system.[408] The state is governed by the Constitution of India which came into force on 26 January 1950. This is the supreme law of the land and has been declared the longest written constitution of any sovereign state in the world.[409] The Indian Government consists of three main branches: executive, legislative and judiciary. The executive branch consists of the President, Vice-President, and the council of ministers led by the Prime Minister. The President of India is the head of the State, whereas the Prime Minister is the head of Government. In the legislative branch, the Parliament of India consists of the upper house called *Rajya Sabha* (Council of States) and lower house called the *Lok Sabha* (House of the People). The Judiciary comprises the Supreme Court, headed by the

---

[406] For the list of states and union territories of India, refer to http://en.wikipedia.org/wiki/List_of_states_and_union_territories_of_India_by_population, accessed: 28 February 2013.
[407] See *supra* note 244.
[408] See http://en.wikipedia.org/wiki/India, accessed: 28 February 2013.
[409] See http://en.wikipedia.org/wiki/Constitution_of_India, accessed: 28 February 2013.

Chief Justice, and a number of High Courts and trial courts.[410] The country's legal system, except for Goa, is largely based on the English common law legal system.[411]

Economically, India is the tenth largest economy in the world by nominal gross domestic product.[412] India has the world's second largest labour force after China.[413] Its major industries include telecommunications, petroleum, machinery, software, chemicals, transport equipment, and steel. Its telecommunications industry has become the world's most competitive and one of the fastest growing industries. This was evidenced by the fact that there were 227 million additional subscribers during 2010 to 2011.[414] Indeed, India has the world's third largest internet user base, with over 137 million as of June 2012.[415] Its service industry accounts for more than 50 per cent of the country's gross domestic product, followed by the industrial and agricultural sectors.

The Indian space sector is regarded as an emerging sector that contributes significantly to the Indian economy. The importance of the space sector to India is demonstrated by the Indian Government's allocation of budget which was increased every year since the early 2000's rising from $591 million in 2004 to 2005, to $1.3 billion in 2012 to 2013. It was reported that of 2013 budget, 55 percent was allocated to space applications like communication, navigation, and remote sensing, 36 percent to launch vehicles and just 9 percent to science and exploration missions including *Chandrayan-2* project, and lunar exploration missions.[416] This was then verified when India declared its attempt of another ten space missions within

[410] See *supra* note 408, and, http://www.tradechakra.com/india-political-system.html, both accessed: 29 February 2013.
[411] The state of Goa follows a civil law based on the Portuguese Civil Code. See http://en.wikipedia.org/wiki/Law_of_India, accessed: 17 June 2011.
[412] See http://en.wikipedia.org/wiki/Economy_of_India, accessed: 29 February 2013.
[413] Country Comparison: Labour Force, The World Fact Book, at https://www.cia.gov/library/publications/the-world-factbook/rankorder/2095rank.html, accessed: 29 February 2013.
[414] See http://www.trai.gov.in/WriteReadData/trai/upload/PressReleases/816/Press_release_feb%20-11.pdf, accessed: 23 May 2011.
[415] The Financial Express, "Internet Subscriber Base in India May Reach 150 mn: Report", 5 September 2012, http://www.financialexpress.com/news/internet-subscriber-base-in-india-may-reach-150-mn-report/998389; 'Internet Usage in Asia', 30 June 2012, *Internet World Stats Usage and Population Statistic,* http://www.internetworldstats.com/stats3.htm, both accessed: 27 February 2013.
[416] Jayaraman, K.S., "Indian Space Budget Boost Supports Existing Programs", *Space News*, 1 March 2011, http://www.spacenews.com/civil/110301-indian-space-budget-boost.html, accessed: 28 February 2013; "India Space Ambitions", Asia *Sentinel*, 08 March 2013, http://www.asiasentinel.com/society/indias-space-ambitions/, accessed: 4 May 2013.

one year.[417] Indeed, in terms of the budget and technology capabilities, the country is ranked among the top six spacefaring nations of the world.[418]

3.5.2. Space Bodies, Activities and Programmes

Historically, India's involvement in space dates back to the 1920s. This occurred when the Indian scientist S.K. Mitra conducted a series of experiments to sound the atmosphere using ground-based radio techniques. Shortly after the country's independence in 1950s, the Government of India started to invest in space. Starting from 1950 to 1962, the Government of India has funded space sciences research through its Department of Atomic Energy (DAE).[419] As a matter of fact, the country's space activities were initiated with the formation of the Indian National Committee for Space Research (INCOSPAR) in 1962, under the leadership of Dr. Vikram Sarabhai.[420] The INCOSPAR was assigned to take over the responsibilities of the DAE with respect to space science and research, as well as to formulate the Indian Space Programme.[421] In the same year, Thumba Equatorial Rocket Launching Station (TERLS) was then established with support from the United States, the Soviet Union and France.[422] In November 1963, a NASA Nike-Apachie Rocket was successfully launched from TERLS, which marked the beginning of the Indian space programme.[423]

In 15 August 1969, the INCOSPAR was then reconstituted to form an organization called the Indian Space Research Organization (ISRO).[424] Later, in 1972, the Government of India formed the Department of Space and the Space Commission, and ISRO was then transferred to this Department. At present, ISRO is the research and development arm of the Department

---

[417] "India steps up space program with big budget, bigger satellites and a leap to Mars", *RT.com,* 30 September 2012, http://rt.com/news/india-space-satellite-budget-331/, accessed: 29 February 2013.

[418] See Jayaraman, K.S., *id*., at 8.

[419] See, "Overview of Indian Space Sector 2010", at 6, http://115.113.225.49/webcms/Upload/Antrix-CII-Deloitte%20report%20on%20Indian%20Space%20Sector%202010.25Aug102.pdf, accessed: 23 May 2011.

[420] Dr. *Vikram Sarabhai* has been considered the father of the Indian Space Programme. See *id*., at 16; see also http://www.isro.org/scripts/Aboutus.aspx, accessed: 28 February 2013.

[421] See *supra* note 419, at 16. See also http://en.wikipedia.org/wiki/Indian_National_Committee_for_Space_Research, accessed: 28 February 2013.

[422] The setting up of a rocket range at Thumba was done for the launching of sub-orbital rockets for scientific purposes. Davies, J.K., *Space Exploration*, Chambers Encyclopaedic Guides Series, (Edinburgh: W & R Chambers, 1992), at 76.

[423] Reddy, V. Balakista, "Space Law and Space Policy in India", Recent *Trends in International Space Law and Policy,* Eds., Mani, V.S., S. Bhatt and V. Balakista Reddy, (New Delhi: Lancers Books, 1997), at 118.

[424] ISRO official website is available at http://www.isro.org/index.aspx. See also http://planetarysocietyindia.blogspot.com/2009/08/historical-40th-anninversary-of-isro.html, both accessed: 28 February 2013.

of Space,[425] and has emerged as the main body managing the Indian space programme. ISRO's prime objective is to develop space technology and its applications to various national tasks.[426] Its long-term plan 'Vision 2025' for the Space Research Programme encompasses the development of reusable launch vehicles, human space flight, enhanced imaging capability, and satellite-based communication and navigation systems, as well as planetary exploration.[427]

In performing its tasks, ISRO has established various centres with their respective areas of work throughout the country. These centres include Vikram Sarabhai Space Centre (VSSC), ISRO Satellite Centre (ISAC), Satish Dhawan Space Centre (SDSC) SHAR, Space Application Centre (SAC), and many others. The VSSC is ISRO's major centre for the development of satellite launch vehicles and sounding rockets. It conducts research and development in fields like as launch vehicle design, propellants, solid propulsion technology, and vehicle integration and testing. Meanwhile, ISAC is concerned with developing satellite technology and implementing satellite systems for scientific, technological and application missions. SDSC SHAR is ISRO's main launch centre. It has two launch pads with infrastructure for launching satellites into low earth, polar, and geostationary orbits. It also has a facility for launching sounding rockets. SAC engages in the development of payloads for communication, meteorological and remote sensing satellites. It also conducts research and development on various space application programmes.[428]

Apart from ISRO, the Department of Space implements its programmes through the Antrix Corporation, which was established in 1992 as an Indian Government-owned company. It is a commercial wing of ISRO, dedicated to the promotion and commercial exploitation of space products, technical consultancy services, and transfer of technology developed by ISRO.[429]

Regarding the Indian space programmes and activities, major areas of focus include the following: (1) satellite communication for telephony, television broadcasts, radio broadcasts,

---

[425] The Indian Department of Space official website is available at, http://dos.gov.in/about-dos.aspx; see also http://dst.gov.in/stsysindia/space.htm, both accessed: 1 March 2013.
[426] See http://www.isro.org/scripts/Aboutus.aspx, accessed: 1 March 2013.
[427] See *supra* note 419, at 11.
[428] See http://www.isro.org/isrocentres/isrocenters.aspx, accessed: 1 March 2013.
[429] Reddy, V. Balakista, "Commercialization and Privatization of Space Industry in India: Legal Issues and Challenges", (2008) 50 *IISL Colloquium on the Law of Outer Space* 545. Reddy, V. Balakista, "Space Law and Space Policy in India", supra note 423, at 127. See also http://www.antrix.gov.in/aboutus.html, accessed: 1 March 2013.

mobile communications, satellite-aided search and rescue, meteorology and others; (2) remote sensing for resource surveys and management, environment monitoring, and meteorological services; (3) development and operation of indigenous satellites' launch vehicle, and ground systems for supporting the services.[430] In respect of satellite technology development, its first satellite, *Aryabhata*, was launched on 19 April 1975 by a Soviet rocket. It was built by ISRO mainly to gain experience in building and operating satellites in space. Nevertheless, it also carried out some astronomical experiments.[431] Four years later, the country's first experimental earth observation satellite, *Bhaskara 1*, was launched on 7 June 1979, also by a Soviet rocket. It was designed to observe the ocean. Afterwards, many other satellites were launched by the Indian Government.[432] The first Indian cosmonaut to travel into space was *Rakesh Sharma*. The mission was launched on 3 April 1984 as part of a joint programme by ISRO and the Soviet space programme.[433] It is expected that another Indian astronaut will be launched into space, as India has reportedly signed, with Russia, a 'Memorandum of Understanding on Joint Activities in the Field of Human Spaceflight Programme'.[434] This plan involves putting the first ever Indians into space using an Indian rocket from Indian soil.[435] If it is successful, the country will become the fourth nation, after the United States, Russia, and China, to have indigenous capabilities of sending a man into space.[436]

One of the major achievements of the Indian Government in satellite technology is its successful operation of two major satellite systems: (1) Indian National Satellites system (INSAT); and (2) Indian Remote Sensing (IRS) satellites. INSAT is designed for

---

[430] For more information on the Indian space programmes, refer to Lochan, Rajeev, "Indian Space Programme and Its Policy Dimension", *Proceedings of United Nations/International Institute of Air and Space Law Workshop, 'Capacity Building in Space Law,' in The Hague, Netherlands, 18-21 Nov. 2002,* (New York: United Nations, 2003), 240. See also, *supra* note 419, at 11.
[431] See Davies, J.K., *supra* note 422, at 76. See also http://en.wikipedia.org/wiki/Aryabhata_%28satellite%29, accessed: 1 March 2013.
[432] For more information on various categories of launched satellites, see Reddy, V. Balakista, "Space Law and Space Policy in India", *supra* note 423, at 122-125.
[433] See Davies, J.K., *supra* note 422, at 76-77.
[434] See "Russia to Take Indian Astronaut on Space Mission In 2013", *Space Travel Exploration and Tourism*, http://www.space-travel.com/reports/Russia_To_Take_Indian_Astronaut_On_Space_Mission_In_2013_999.html, 11 December 2008, accessed: 1 June 2011.
[435] NASA has offered India the use of the top-class facilities of its astronauts training programme for the Indian astronauts. Bagla, Pallava, "NASA praises ISRO, Offers Training for Indian Astronauts", 14 July 2012, http://www.ndtv.com/article/india/nasa-praises-isro-offers-training-for-indian-astronauts-243319, accessed: 1 March 2013.
[436] Ramesh, Randeep, "India to Launch Its First Astronauts into Space by 2015", 23 February 2009, http://www.guardian.co.uk/world/2009/feb/23/india-space-astronauts, accessed: 1 March 2014.

communication services, whereas IRS satellites is aimed at natural resources management.[437] The country's first operational communications satellite, known as INSAT 1A, was launched on 10 April, 1982. However, it was abandoned in September 1983 due to its altitude control propellant being exhausted.[438] It was then replaced by INSAT 1B, launched on 30 August 1983, also commissioned by the INSAT system. Many other launches took place after that, including INSAT 1C, launched on 21 July 1988, INSAT 1D on 12 June 1990, and others. Today, INSAT is the largest domestic communication satellite system in the Asia-Pacific region. Its space segment consists of 24 satellites, nine of which nine are in operation. They are INSAT-3C (launch date: 24 January 2002), KALPANA-1 (12 September 2002), INSAT-3A (10 April 2003), INSAT-3E (28 September 2003), INSAT-4A (22 December 2005), INSAT-4B (12 March 2007), INSAT-4CR (2 September 2007), INSAT-4G/GSAT-8 (21 May 2011), and GSAT-12 (15 July 2011). [439] In terms of application, the system provides telecommunications, television broadcasting, weather forecasting, and societal application services such as tele-medicine and tele-education.[440]

The IRS satellite system consists of a series of earth observation satellites. India's first operational earth observation satellite was IRS-1A, launched on 17 March 1988. On 29 August 1991, the next satellite, IRS-1B, was launched. It was followed by many other launches of remote sensing satellites including IRS-1C (1995), IRS-1D (1997), and others.[441] The IRS system is the largest constellation of remote sensing satellites in the world for civilian use,[442] with twelve satellites in operation. They are TES (launch date: 22 October 2001), IRS P6/RESOURCESAT-1 (17 October 2003), IRS P5/CARTOSAT-1 (5 May 2005), IRS P7/CARTOSAT-2 (10 January 2007), IMS-1 (28 April 2008), CARTOSAT-2A (28 April 2008), OCEANSAT-2 (23 September 2009), CARTOSAT-2B (12 July 2010), RESOURCESAT-2 (20 April 2011), MEGHA-TROPIQUES (12 October 2011), RISAT-1

[437] See http://www.isro.org/scripts/currentprogramme.aspx, accessed: 1 March 2013.
[438] See Davies, J.K., *supra* note 422, at 77. See also http://www.isro.org/satellites/insat-1a.aspx, accessed: 1 March 2013.
[439] See http://www.isro.gov.in/satellites/geostationary.aspx, accessed: 1 March 2013.
[440] The Indian space application sectors witnessed tremendous developments with the active involvement of private sectors. See Reddy, V. Balakista, "Commercialization and Privatization of Space Industry in India: Legal Issues and Challenges", *supra* note 429, at 545. See http://www.isro.org/scripts/currentprogrammein.aspx#INSAT, accessed: 1 March 2013.
[441] See Davies, J.K., *supra* note 422, at 76. See also http://eoedu.belspo.be/en/satellites/irs.htm, accessed: 1 March 2013.
[442] See http://www.un-spider.org/about-us/news/en/5121/2011-05-02t124700/india%E2%80%99s-latest-satellite-starts-beaming-pictures, and, ttp://en.wikipedia.org/wiki/Indian_Remote_Sensing_satellite, accessed: 1 March 2013.

(26 April 2012), and SARAL (25 February 2013).[443] Data from the IRS satellites are used in several applications including agriculture, water resources, urban development, mineral prospecting, environment, forestry, drought, food forecasting, ocean resources, and disaster management.[444]

According to UNOOSA records, India has launched 62 objects into space between 1975 and 2012.[445] Most of the space objects were registered with the United Nations in accordance with the Registration Convention 1975,[446] although a number of them were not.[447]

Another significant achievement of India's space activities is its space launch vehicle development programme. Its space programme has become self-reliant with the operation of its two satellites launch vehicles: Polar Satellite Launch Vehicle (PSLV), and Geosynchronous Satellite Launch Vehicle (GSLV). The PSLV is mainly used to launch the remote sensing class of satellites in polar orbits. However, the GLSV is used for launching communication satellites into geosynchronous transfer orbit.[448] With regard to India's space launch facilities, although the facilities are owned by the Indian Government, the launch services are offered to both national and foreign entities.[449]

India also commenced its first moon mission when it successfully launched *Chandrayaan-1* on 22 October, 2008. This event verified that India had managed to develop its own technology to explore the Moon, which then boosted the country's space programme. The spacecraft orbited the moon for chemical, mineralogical, and photo-geologic mapping of the Moon. It carried 11 scientific instruments built in India, the United States, United Kingdom, Germany, Sweden, and Bulgaria. However, it stopped sending signals on 29 August, 2009.[450]

---

443 See http://www.isro.org/scripts/currentprogrammein.aspx#IRS, http://en.wikipedia.org/wiki/Indian_Remote_Sensing, both accessed: 1 March 2013.
444 See *supra* note 442.
445 Data is of September 2012. See http://www.oosa.unvienna.org/oosa/showSearch.do, accessed: 1 March 2013.
446 Further information is provided in Chapter 3 of the thesis (3.5.4. India and the Five Outer Space Conventions).
447 From 62 Indian objects launched, only three were not registered with the United Nations. See http://www.oosa.unvienna.org/oosa/search.do, accessed: 3 March 2013.
448 See *supra* note 443.
449 Kaul, Ranjana, and Ram S. Jakhu, "Regulation of Space Activities in India", *National Regulation of Space Activities,* ed., Jakhu, Ram S., (Dordrecht: Springer, 2010), at 164.
450 See http://www.isro.gov.in/satellites/chandrayaan-1.aspx, and, http://en.wikipedia.org/wiki/Chandrayaan-1#Objectives, both accessed: 3 March 2013.

Apart from the past and current programmes, India is planning various future space programmes, including forthcoming satellites, future launches, reusable launch vehicles, human space flights, space science missions, and satellite navigations.[451]

3.5.3. Space-Related Policies, Laws, and Regulations

In general, there is no comprehensive Indian national space policy.[452] However, there are two space-related policies.[453] The first is concerned with satellite communication policy and is called ‘A Policy Framework for Satellite Communication in India’. This policy framework was approved by the Government of India in 1997. Its fundamental aim is to develop a healthy and thriving communication satellite and ground equipment industry and satellite communication service industry in India.[454] The second is related to the remote sensing data policy. This policy is known as ‘Remote Sensing Data Policy 2011’. It was endorsed in 2011 by the Government of India. The policy was introduced, *inter alia*, to provide guidelines for dissemination of satellite remote sensing data in India.[455]

Apart from the above, the Indian Department of Space issued a Citizen’s Charter[456]. The Citizen’s Charter embodied the citizen’s possible expectations of the organization that sets down the Department of Space vision with its objective of promoting the development and application of space science and technology to assist in the all-round development of the Indian nation. The Charter also prescribes, among other things, the organization’s types of activities, the services provided, and categories of clients involved.

In contrast to the United Kingdom, Australia, and the United States,[457] India has no specific single space legislation to govern its space activities.[458] At this point, national space

---

[451] For more information on future Indian space programmes, visit http://www.isro.org/scripts/futureprogramme.aspx, accessed: 14 May 2014.
[452] Information is as of 31 August 2013; read also Rajeswari Pillai Rajagopalan, “Should India Declare a Space Policy?”, *The Diplomat,* 31 August 2013, http://thediplomat.com/2013/08/should-india-declare-a-space-policy/, accessed: 14 May 2014.
[453] See http://dos.gov.in/space-policy.aspx, accessed: 1 March 2013.
[454] For full text of Policy Framework for Satellite Communication in India 1997, refer to http://www.isro.gov.in/news/pdf/satcom-policy.pdf, accessed: 1 March 2013.
[455] For full text of Remote Sensing Data Policy 2011, visit http://www.isro.gov.in/news/pdf/RSDP-2011.pdf, accessed: 1 March 2013.
[456] For full text of Citizen’s Charter see http://dos.gov.in/citizencharter.htm, accessed: 1 March 2013.
[457] For more information, read Chapter 3 of the thesis (3.2. United Kingdom); (3.3. Australia); and (3.4. United States of America).
[458] This fact is as of 1 March 2014.

legislation refers to the Indian space legislation that might impose the rules and obligations prescribed by the United Nations space treaties. However, Indian space-related matters are, in fact, regulated by many other domestic laws, rules, guidelines and procedures. They include the following:[459] the issuance of licences for private satellite telecommunications operators is governed by 'The Norms, Guidelines and Procedures for Implementation of the Policy-Framework for Satellite Communications in India 2000'.[460] By virtue of the aforesaid Guidelines and Procedures, the Department of Space designates the Department of Telecommunications[461] to function as a licensing authority for satellite and terrestrial telecommunications, whereas the Ministry of Information and Broadcasting[462] is the licensing authority for satellite and terrestrial broadcasting.[463] Other norms and guidelines provided include the INSAT capacity, which will be made available to private service providers on a commercial basis. In special cases, the use of foreign satellites is allowed until such capacity can be provided by Indian satellites. The Guidelines and Procedures also allow the establishment of Indian satellite systems by Indian companies with a foreign equity involvement of less than 74 per cent.[464]

The Indian space technology applications, such as telecommunications and broadcasting, have witnessed the highest rate of development of legal regulatory regimes.[465] For telecommunications, the principal statutes, as amended from time to time, are the Indian Telegraph Act 1885[466] and Indian Wireless Telegraphy Act 1933.[467] The Indian Telegraph Act 1885 provides the Indian Government with exclusive privileges and powers with respect to telegraphs and the power to grant licences. The Indian Wireless Telegraphy Act 1933 regulates the possession of wireless telegraphy devices. A telecommunications policy,

---

[459] See *supra* note 453.
[460] The Guideline was issued on 8 May 2000. The full text is available at http://www.isro.gov.in/news/pdf/SATCOM-norms.pdf; see also http://www.isro.org/pressrelease/scripts/pressreleasein.aspx?May08_2000, both accessed: 1 March 2013.
[461] Indian Department of Telecommunications is under Indian Ministry of Communications and Information Technology. Its official website is available at http://www.dot.gov.in/, accessed: 3 March 2013.
[462] The Indian Ministry of Information and Broadcasting website is available at http://mib.nic.in/, accessed: 3 March 2013.
[463] See *id*. See also Kaul, Ranjana, *supra* note 449, at 172.
[464] See "Norm, Guideline, and Procedures for Satellite Communications Announced by ISRO", *Asia.spaceref,* 8 May 2000, http://asia.spaceref.com/news/viewpr.html?pid=1762, accessed: 3 March 2013.
[465] Kaul, Ranjana, *supra* note 449, at 169.
[466] For full text of the Indian Telegraph Act 1885, see http://www.dot.gov.in/Acts/telegraphact.htm, accessed: 3 March 2013.
[467] The full text of the Indian Wireless Telegraphy Act 1933 is available at http://www.dot.gov.in/Acts/wirelessact.htm, accessed: 3 March 2013.

namely the Indian New Telecom Policy 1999,[468] affirms the importance of telecommunications to India. In this policy, the Indian Government recognizes that the provision of world-class telecommunications infrastructure and information is the key to rapid economic and social development of the country. This policy also provides, *inter alia*, the policy framework, objectives and targets for the industry. Its objectives include providing access to telecommunications, which is of the utmost importance for achieving the country's social and economic goals, and encouraging development of telecommunication facilities in remote areas. India also introduced the Indian National Telecom Policy 2012[469] to guide the industry. Its first objective is to secure affordable and high-quality telecommunication services to all citizens of the country.

To regulate broadcasting, the country has broadcasting acts and rules and also Codes Guidelines and Policies.[470] This includes Cable Television Network (Regulation) Act 1995[471]to regulate the operations of cable television networks in the country. The Act prescribes the legal rules, including prohibition on operating cable television networks before registration, powers of the authorized officer to seize operating equipment used in the operation in the event of the operator contravening the rules, and power of the Government to prohibit the operation should the Government consider it in the public interest to do so. The Indian Broadband Policy 2004[472] aims to provide an impetus to accelerate broadband services and internet penetration, as well as the use of personal computers throughout the country.[473] Several other guidelines have been issued by the Indian Government to regulate activities, including Guidelines for Up-linking from India.[474] This deals among other things with the power of the Ministry of Information and Broadcasting to issue licences permitting Indian private companies to set up up-linking hubs for the purpose of leasing or hiring out to other broadcasters.

---

[468] For full text of the Indian New Telecom Policy 1999, see http://www.dot.gov.in/ntp/ntp1999.htm, accessed: 3 March 2013.
[469] Full text of National Telecom Policy 2012 is available at http://www.dot.gov.in/ntp/NTP-06.06.2012-final.pdf, accessed: 3 March 2013.
[470] For details, refer to http://mib.nic.in/linksthird.aspx, accessed: 3 December 2013.
[471] Act No. 7 of 1995. For full text of Cable Television Network (Regulation) Act 1995 (Updated up to 31.08.2007), see http://mib.nic.in/linksthird.aspx, accessed: 1 December 2013. Read also Negi, Chitranjali, "Broadcast Law in India: Indian Laws about Broadcasting Industry", *Santaniello and Partners, International Law Firm,* 23 March 2012, http://www.legalsl.com/en/broadcast-law-in-india.htm, accessed: 1 November 2013.
[472] For full text of the Indian Broadband Policy 2004, refer to http://www.indiantelevision.com/indianbrodcast/legalreso/uplink.htm, accessed: 6 March 2013.
[473] Kaul, Ranjana, *supra* note 449, at 174.
[474] For full text of the Guidelines for Up-linking from India, see http://www.trai.gov.in/uplinkingPolicy.asp, accessed: 1 June 2011.

In relation to remote sensing or earth observation satellites, there is no specific law to govern the earth observation satellite services in India, including the phases of processing and distribution of data collected by the satellites.[475] However, after recognizing that remote sensing data provide much essential and critical natural resource information, among other things, the Indian Government introduced the Remote Sensing Data Policy 2001. This contains policies to manage the acquisition and dissemination of remote sensing data in support of India's developmental activities. The Department of Space was the agency that was given authority under the Policy. However, in 2011, the Policy was replaced by a new remote sensing data policy known as Remote Sensing Data Policy 2011.[476] This new Policy allows all data of resolutions up to 1 meter to be distributed on a non-discriminatory basis and on a request basis.[477]

3.5.4. India and the Five Outer Space Conventions

Of the five United Nations outer space conventions, four have been joined by India.[478] The first United Nations outer space convention that India joined was the Outer Space Treaty 1967.[479] India signed the Treaty on 3 March 1967. The signing was executed about two months after the Treaty was opened to signature for all states on 27 January 1967. Nevertheless, India only ratified the Outer Space Treaty 1967 on 18 January 1982.[480] The state took almost 15 years to consider ratification of the Treaty.

---

[475] Kaul, Ranjana, *supra* note 449, at 184.

[476] For full text of the Remote Sensing Data Policy 2011, see http://www.isro.gov.in/news/pdf/RSDP-2011.pdf, accessed: 6 March 2013.

[477] "Government Unveils New Remote Sensing Data Policy", 5 July 20111, http://www.dnaindia.com/india/report_government-unveils-new-remote-sensing-data-policy_1562713, accessed: 6 March 2013.

[478] The four conventions are: the Outer Space Treaty 1967, the Rescue Agreement 1968, the Liability Convention 1972, and lastly the Registration Convention 1975. See United Nations, *United Nations Treaties and Principles on Outer Space and Related General Assembly Resolutions: Status of International Agreements Relating to Activities in Outer Space as at 1 January 2010*, Addendum, Ref.: Sales No. E.08.1.10, ST/SPACE/11/Rev.2/Add.3, (Vienna: United Nations, 2009).

[479] Treaty on Principles Governing the Activities of States in the Exploration and Use of the Outer Space, Including the Moon and Other Celestial Bodies (1967) (Resolution 2222 (XXI)), adopted on 19 December 1966, opened to signature on 27 January 1967, entered into force on 10 October 1967. (1967) 610 UNTS 205, 18 UST 2410, TIAS 6347; (1967) 6 ILM 386; (1967) 61 AJIL 644.

[480] See http://www.oosa.unvienna.org/oosatdb/showTreatySignatures.do, accessed: 27 January 2013.

The second agreement was the Rescue Agreement 1968.[481] India became a party to this Agreement by accession on 9 July 1979, having taken 11 years to accede to the Agreement after it entered into force on 3 December 1968.[482] The third convention was the Liability Convention 1972,[483] of which India became a member by accession on 9 July 1979.[484] It is interesting to note that this date was also the date of India's accession to the Rescue Agreement 1968. In other words, India acceded simultaneously, on the same date, to two United Nations conventions: the Rescue Agreement 1968 and the Liability Convention 1972. However, in contrast to the Rescue Agreement 1968, the accession to the Liability Convention 1972 took only seven years after its entry into force on 1 September 1972.

The last convention to which India became a party was the Registration Convention 1975[485]. The membership started from its accession date on 18 January 1982. India acceded to the Convention roughly six years after it came into force on 15 September 1976. It is noted that, on 18 January 1982, the accession date of the Registration Convention 1975, India also signed the Moon Agreement 1979.[486] Thus, in a single day, India acceded to the Registration Convention 1975 and signed the Moon Agreement 1979. Thus, the signature of the Moon Agreement 1979 took place three years after it was opened for signature to all states in 1979, and two years prior to the Agreement coming into force on 11 July 1984. However, the Agreement has not yet been ratified.[487]

To summarize, India is a state party to four United Nations outer space treaties: the Outer Space Treaty 1967, the Rescue Agreement 1968, the Liability Convention 1972, and the Registration Convention 1975. However, India is a signatory state only to the Moon Agreement 1979. India became a party to those treaties by two means: accession and ratification. Three treaties - the Rescue Agreement 1968, the Liability Convention 1972, and

[481] Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space (1968) (Resolution 2345 (XXII)), adopted on 19 December 1967, opened to signature on 22 April 1968, entered into force on 3 December 1968. 19 UST 7570, 672 UNTS 119, TIAS 6599.

[482] See *supra* note 480.

[483] Convention on International Liability for Damage Caused by Space Objects (1972) (Resolution 2777 (XXVI)), adopted on 29 November 1971, opened to signature on 29 March 1972, entered into force on 1 September 1972. 24 UST 2389, 961 UNTS 187, TIAS 7762.

[484] See *supra* note 480.

[485] Convention on Registration of Objects Launched into Outer Space (1974) (Resolution 3235 (XXIX)), adopted on 12 November 1974, opened to signature on 14 January 1975, entered into force on 15 September 1976. 28 UST 695, 1023 UNTS 15, TIAS 8480.

[486] Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (1979) (Resolution 34/68), adopted on 5 December 1979, opened to signature on 18 December 1979, entered into force on 11 July 1984. 18 ILM 1434, 1363 UNTS 3.

[487] See *supra* note 480.

the Registration Convention 1975 - were joined by India through accession. Only one treaty, the Outer Space Treaty 1967, was joined by ratification. Being a party to those treaties, India is bound legally, politically and morally to abide by the legal rules stipulated therein.

3.5.5. Legal Implications

Although India is a party to four United Nations outer space conventions, it currently has no domestic space legislation to give legal effect at the domestic level in relation to the obligations prescribed by the United Nations conventions. As stipulated earlier, when India ratified the United Nations outer space treaties, such treaties actually bound the state. Non-fulfilment of the treaties' obligations by the Government can be considered a breach of international law. Apart from implementation of the treaties' obligations at the international level, such obligations should also be implemented at the domestic level if they are to be effective.

Since India is among the active space participants, the absence of Indian domestic space legislation may have several implications. The most obvious is in terms of liability. The Indian Government, besides being responsible for its own space activities, will be held responsible for all its national space activities at the international level.[488] Thus, in the event of damage or loss resulting from the activities of its nationals in foreign states, the Indian Government would have to bear the liability, as prescribed by the international rules. In the absence of a domestic space law, the Indian Government cannot exempt, limit, or even transfer the liability to its national wrongdoer, which in fact could be executed at the domestic level for the purpose of indemnification. Absence of such law might result in the Indian Government being held liable for full payment of compensation claimed by the victim. Moreover, such circumstances would also leave the Government facing the legal problem of improper claim procedure, especially in relation to compensation for damage or loss suffered by the Indian entity as a result of their space activities.

Other implications include the possibility of non-compliance with the requirement to obtain liability insurance or demonstrate sufficient financial responsibility before conducting space activities. The absence of legal rules on such matters might lead to non-compliance by the

[488] Article VI, the Outer Space Treaty 1967, *supra* note 40.

national in obtaining liability insurance or proving financial responsibility. In fact, this requirement is important to ensure that Indian nationals are able to compensate the victim in the event of damage or loss resulting from outer space activities. Such circumstances are indeed crucial in order to indemnify the Indian Government in situations where the Government pays compensation on behalf of the national to the victim.

Additionally, in the absence of domestic space legislation, the Indian Government will encounter difficulties in ensuring that the space activities conducted by its national are in conformity with the United Nations space treaties. Hence, the state is unable to observe the treaties' obligations. As a state party to the United Nations treaties, India is obliged to ensure that the space activity carried out by its nationals are in conformity with the provisions of the treaties.[489] With the enactment of a domestic space law, India would be able to control the activities of its nationals, for instance by imposing legal rules including a constant monitoring system and continued supervision of related activities.[490] To ensure effective compliance with its national space law, the Indian Government could also impose sanctions on those who violate its law at the national level.

Regarding the registration obligation imposed by the United Nations space treaties, it is noted that India has registered most, but not all, of its space objects. This indicates that India has not fully observed its international obligation to register all its objects launched into space with the United Nations, as prescribed by the United Nations treaties. The same circumstances may occur at the domestic level, as the absence of a domestic space makes it difficult for India to impose the obligation for its nationals to register objects launched into space.

Although India has no specific space legislation, Indian law prescribes certain obligations for the Indian Government to observe concerning the international treaties it has ratified. Article 51 of the Indian Constitution 1950[491] stipulates the following: the Indian Government is obliged to foster respect for international law and treaty obligations; the Government is required to maintain just and honourable relations between the nations; and the Government

[489] See *id*.
[490] See *id*.
[491] See Indian Constitution 1950. For full text refer http://www.wipo.int/wipolex/en/details.jsp?id=6771, accessed: 7 March 2013.

is obliged to strive for promotion of international peace and security.[492] As the Indian Government has a duty to foster respect for treaties' obligations, this may imply that it has a duty to observe such treaties' obligations at the international as well as the national level. In other words, such circumstances may impose on the Indian Government a duty to implement the treaties' obligations at the domestic level as well. To implement the obligations at the domestic level more effectively, the Government therefore has a further duty to domesticate the treaties' obligations in accordance with the Indian national laws.

Article 53 of the Indian Constitution 1950 empowers the President to exercise the executive power of the Union of India, or delegate such authority to the Vice-President or the Governor of State.[493] Meanwhile, Article 73 extends the executive power to exercise such rights, authority, and jurisdiction as are exercisable by the Indian Government by virtue of any treaty and agreement.[494] It is noted that the mandate in Article 51, read with Article 53[495] and Article 73, enables the Indian Government to accomplish the treaties' obligations through the exercise of the executive power even without the enactment of the national law. However, in specific circumstances the treaties' obligations still require domestication in order to legalize them at the national level. In short, such situations include the following:[496] (1) if the treaty obligation provides for payment to a foreign entity, withdrawn from the Indian Consolidated Fund;[497] (2) if the treaty obligation affects the rights of a citizen;[498] and (3) if the treaty obligation modifies any law of India.[499] At this juncture, it is noted that, when the treaties' obligations fall under the prescribed categories, such obligations then require domestication. Therefore, the enactment of the Indian domestic legislation is required. In responding to this, the Indian Parliament may, by virtue of Article 253 of the Indian Constitution 1950, enact domestic law for the implementation of treaties, international agreements, and conventions.[500] In other words, by virtue of Article 253, the Indian Parliament has the power to domesticate such treaties' obligations in order to legalize them at the domestic level. Some instances of

---

[492] See Article 51, Indian Constitution 1950. See also Reddy, V. Balakista, "Space Law and Space Policy in India", *supra* note 423, at 129. Kaul, Ranjana, *supra* note 449, at 157.
[493] Article 53, Indian Constitution 1950.
[494] Article 73, Indian Constitution 1950.
[495] Kaul, Ranjana, *supra* note 449, at 158
[496] *Id*.
[497] See Allahabad High Court's decision in *Moti Lal vs. U.P.,* 1951 All. 257 F.B., as cited in Kaul, Ranjana, *supra* note 449, at 158.
[498] See Indian Supreme Court's decision in *Maganbhai vs. Union of India,* A.1969 SC 783 (789,807), and in *Beubari Union, in re.* A 1960 SC 845, as cited in Kaul, Ranjana, *supra* note 449, at 158.
[499] See Indian Supreme Court's decision in *State of W.B. vs. Jugal,* A 1969 SC 1171 (para. 6), as cited in Kaul, Ranjana, *supra* note 449, at 158.
[500] Article 253, Indian Constitution 1950.

United Nations outer space treaties' obligations that need domestication include liability and indemnification,[501] and the obligation to rescue and protect the rights of astronauts.[502] However, the treaties' obligations that do not require domestication and can be exercised by the executive power in India include the obligation to conduct outer space activities in a peaceful manner, the prohibition of appropriation of outer space, and freedom of exploration of outer space.[503]

3.5.6. Concluding Remarks

The Government of India is paying serious attention to developing space technology for its citizens, and it is involved in various international space activities. This is evident as the state has managed to conduct various space programmes and activities, and seems to have a long list of future space programmes. Many of its activities contribute significantly to the growth of space technology and simultaneously boost the country's space programmes. As a result, the state has emerged as one of the world's pre-eminent space actors.

The Indian space programmes and activities have evolved with the establishment of Indian space-related bodies. This began with the Indian Department of Atomic Energy, which is responsible for space sciences and research; the task was then taken over by the INCOSPAR, which was then reconstituted as ISRO. The ISRO was next transferred to the Indian Department of Space. The ISRO, with its various centres, continues to manage numerous Indian space programmes. Among the most notable are the two major fleets of satellite systems: the INSAT (designed for communication services) and the IRS satellites (designed for earth observation services). Apart from these, other highlighted programmes include the launch space vehicles programmes and the Moon mission programmes.

In terms of regulatory regimes regulating Indian space activities, the state has no specific and comprehensive outer space legislation to control the activities in accordance with the obligations stipulated in the United Nations' outer space treaties. Since India is a state party to four United Nations outer space conventions, the enactment of such legislation at its domestic level is crucial; moreover, the state is an active participant in outer space activities.

---

[501] See Article VI, *supra* note 40, and VII, *supra* note 79, Outer Space Treaty 1967. See also Liability Convention 1972.
[502] See Article V, Outer Space Treaty 1967. See also Rescue Agreement 1968, *supra* note 481.
[503] See Article I, II, and IV, Outer Space Treaty 1967.

The lack of legislation might have various legal implications and cause an imbalance between development of outer space activities and regulatory regimes. However, with respect to Indian outer space applications, the state is governed by a number of laws, regulations, and policies, especially in relation to the telecommunications and broadcasting areas.

It is noted also that the Indian Constitution of 1950, in its Article 51, requires the state to observe certain obligations in relation to the international treaties ratified by the Indian Government. This includes the obligation to foster respect for the international law and treaty obligations. Such circumstances may therefore signify the duty of the Indian Government to implement the treaties' obligations at both the international and domestic levels. This situation may further lead to the requirement for the enactment of a specific law at the Indian domestic level for the purpose of implementing such obligations.

As regards the implementation of the treaties' obligations, it is observed that Articles 53 and 73 of the Indian Constitution, rather than Article 51, provide the Indian Government with the power to accomplish treaties' obligations by exercising its executive power without the requirement of national law. However, there are some exceptions to this rule, as prescribed by Indian case law. In other words, if the treaties' obligations are classified under such exceptional categories, they need to be domesticated before they can be legally implemented at the Indian domestic level. Hence, the Indian Parliament may, by virtue of Article 253 of the Indian Constitution 1950, domesticate the treaties' obligations for the purpose of their implementation.

3.6. THE NEIGHBOURING COUNTRIES

This part deals with countries neighbouring Malaysia. These countries are Thailand, Singapore and Brunei. As mentioned earlier, Indonesia is excluded from this category even though it is a neighbour of Malaysia.[504] This section presents an overview of each country, including their political, economic and legal aspects. The discussion then moves to each country's space-related bodies and activities, the status of the state in relation to the United Nations space conventions, the space-related policies, laws and regulations, and finally some possible legal implications for these countries. It is hoped that such a discussion will

[504] For the reasons for exclusion, read Chapter 3 of the thesis (3.1. Introduction).

illuminate the current scenario of Malaysia's neighbouring countries with respect to the aforesaid matters, which might then encourage Malaysia to formulate its own domestic space legislation.

3.6.1. Thailand

(a) Overview

Thailand is officially known as the Kingdom of Thailand, and its capital city is Bangkok. It is the only country to share a land border with Peninsular Malaysia. Politically, Thailand is a unitary parliamentary democracy state[505] with a constitutional monarchy system.[506] Under Thailand's constitutional monarchy system, the state is headed by a hereditary monarch, and the Government is leaded by a Prime Minister. The Government is made up of three branches: (1) Executive; (2) Legislative; and (3) Judiciary.[507] The Executive consists of the Prime Minister and a list of Ministries under the Cabinet of Thailand. The Legislative comprises the Senate and House of Representatives. The Judiciary is composed of the Supreme Courts of Justice, the Administrative Courts, and the Constitutional Court.[508] Thailand's legal system is based on civil law, but it has been influenced by the common law legal system. This is evident since Thailand's Supreme Court decisions have a significant influence on the courts themselves, as well as on the lower courts in the hierarchy.[509] The sources of Thai law include the constitution, the codified laws, acts, treaties and administration of laws, and the judicial decisions.[510]

Economically, Thailand is a newly industrialized economy. Its main industries include automobiles and automotive parts, electrical appliances and components, agricultural processing, and others. The country is heavily export-dependent, with exports accounting for

---

[505] For more information on unitary system, read *supra* note 5.
[506] For more information on constitutional monarchy system, read *supra* note 109.
[507] Read also *supra* note 110.
[508] For further information, see http://en.wikipedia.org/wiki/Government_of_Thailand#Executive, accessed: 8 March 2013.
[509] The decisions, known as Supreme Court Opinions, were published and numbered according to the year issued. See Leeds, Joe, "Introduction to the Legal System and Research of the Kingdom of Thailand", *GlobaLex, Hauser Global Law School Program,* http://www.nyulawglobal.org/globalex/Thailand.htm. See also "Thailand Supreme Court Opinion Summaries", *Supreme Court Opinion,* Thailand Law Forum, http://www.thailawforum.com/supremecourtopinions.html; and http://en.wikipedia.org/wiki/Law_of_Thailand#Sources_of_Law, all accessed: 8 March 2013.
[510] See Leeds, Joe, *id*.

more than two thirds of its gross domestic product. Major exports include computers, electrical appliances, fishery products, and Thai rice. It was classified as the second largest economy in Southeast Asia after Indonesia, as well as having the lowest unemployment rates in the world.[511] Thailand's space sector is one of the emerging sectors, as the Government has deemed the space application sector an integral part of the country's comprehensive development strategy. Moreover, the development of the country's space activities is supported and encouraged by the Government of Thailand, especially regarding the involvement of private sectors.[512]

(b) Space-Related Bodies and Activities

The growth of Thailand's space activities is largely assisted by two main Ministries: the Ministry of Information and Communication Technology (MICT)[513], and the Ministry of Science and Technology (MOST)[514]. Specifically, there are two main agencies involved directly in Thailand's space-related activities. They are the Space Affairs Bureau[515] under the MICT, and the Geo-Informatics and Space Technology Development Agency (GISTDA)[516] under the MOST. The Thailand Space Affairs Bureau was established in 1990 to formulate the country's action plan on national space activities. Its main tasks are to advise the Thailand Government on the state's space-related activities, to collect data on space activities and applications for the benefit of other governmental agencies, to coordinate the implementation and promotion of such activities in the country, and to cooperate with foreign countries and international organizations.[517] GISTDA was founded on 2 November 2002 as an organization involved in geo-informatics and space technology development.

Thailand's space activities mainly revolve around three major areas of space applications. They are: (1) communication, (2) remote sensing and earth observation, and (3) meteorology.

---

[511] See https://www.cia.gov/library/publications/the-world-factbook/rankorder/2129rank.html; and http://en.wikipedia.org/wiki/Economy_of_Thailand, accessed: 8 March 2013.

[512] Chitasombat, Nipant, "National Space Programme, Policies and Legislation in Thailand", *2004 Space Law Conference Paper Assemble,* (Beijing: China Institute of Space Law, 2004), at 96-97.

[513] The MICT official website is available at http://www.mict.go.th/, accessed: 8 March 2013.

[514] The MOST official website is available at http://www.most.go.th/, accessed: 8 March 2013.

[515] Thailand Space Affairs Bureau website is available at http://www.space.mict.go.th/home.php, accessed: 8 March 2013.

[516] GISTDA website is available at http://www.gistda.or.th/gistda_n/en/; see also http://www.most.go.th/eng/index.php/agencies-under-most/detail-gistda, both accessed: 8 March 2013.

[517] Noichim, C., *The Asean Space Organization: Legal Aspect and Feasibility,* Ph.D. dissertation, (Leiden, 2008), at 106. See also *supra* note 515.

Firstly, with respect to communications, Thailand has five geostationary communication satellites.[518] They are: Thaicom 1A, Thaicom 2, Thaicom 3, Thaicom 4, and Thaicom 5. This THAICOM system is Thailand's first communications satellite project.[519] Thaicom 1A is Thailand's first satellite and was launched on 17 December 1993.[520] Thailand's second satellite, Thaicom 2, was launched on 7 October 1994, and Thaicom 3 was launched on 16 April 1997.[521] All three of these satellites were de-orbited. However, the other two, Thaicom 4 and Thaicom 5, are still in operation.[522] Thaicom 4, also known as IPSTAR-1, was launched on 11 August 2005, and Thaicom 5 was launched on 27 May 2006.[523] None of these five satellites are registered with the United Nations.[524] They are under the operation of Thaicom Public Company Limited.[525] The company was formerly known as Shin Satellite Plc., founded on 7 November 1991, and it changed its name to Thaicom Public Company Limited on 10 April 2008. It is the first Thailand satellite operator, and it was granted a 30-year licensing period by Thailand's Ministry of Transport and Communication (now transferred to MICT) to launch and operate communication satellites.[526] The company has announced its next project, the Thaicom 6 satellite, which is scheduled for launch around mid-2013.[527] These communication satellites offer services including telecommunications, television broadcasting, internet via satellite, tele-education, and tele-medicine.

Secondly, Thailand has been involved in remote sensing and earth observation areas of application since 1971 through the Thailand Remote Sensing Programme. The Programme was elevated in 1979, and became a division, the Thailand Remote Sensing Centre (TRSC),

---

[518] See http://en.wikipedia.org/wiki/Thaicom_%28company%29, accessed: 11 March 2013.

[519] For more information on early development of THAICOM project see Mektrakarn, Wichian, "THAICOM SYSTEM Thailand's First Communications Satellites", *Conference on the South East Asia Regional Computer Confederation, in Kuala Lumpur, 11-14 August 1992* (Kuala Lumpur: Gabungan Komputer Nasional Malaysia, 1992), 5.01.

[520] Thaicom 1A was relocated between May to June 1997. For more information on Thaicom 1A, refer to http://tcns.thaicom.net/t1a.asp, accessed: 11 March 2013.

[521] Thaicom 3 was de-orbited on 2 October 2006 after experiencing power loss. For more information on this satellite, see http://tcns.thaicom.net/t3.asp, accessed: 11 March 2013.

[522] See http://tcns.thaicom.net/satellites.asp, accessed: 11 March 2013.

[523] See http://tcns.thaicom.net/ipstar1.asp; See also, http://tcns.thaicom.net/t5.asp , all accessed: 11 March 2013.

[524] See http://www.oosa.unvienna.org/oosa/search.do, accessed: 11 March 2013.

[525] The company website is available at http://www.thaicom.net/, accessed: 11 March 2013.

[526] See http://tcns.thaicom.net/company.asp, accessed: 11 March 2013. For further information on Thaicom satellites, see Charoenvimolkul, Kobchai, "Thailand's Communication Satellites, Current Status and Guideline for Space Affairs Development", Space Affairs Bureau, Ministry of Information and Communication Technology Thailand, http://www.aprsaf.org/data/aprsaf15_data/csawg/CSAWG_5f.pdf, accessed: 11 March 2013.

[527] See "THAICOM Announces the THAICOM 6 Satellite Project", 31 May 2011, http://www.thaicom.net/eng/press.aspx?id=287; also http://www.thaicom.net/SAT_THCOM6.aspx, both accessed: 11 March 2013.

under the Thailand National Research Council (NRCT).[528] In 1982, Thailand built its Ground Receiving Station, which is capable of receiving data from LANDSAT, RADARSAT, MOS-1, SPOT-2, 4, 5, and many others. The station is operated by TRSC. Apart from the operation of the ground station, TRSC became a remote sensing satellite data distributor to worldwide users. TRSC's other functions include coordinating with local agencies and those abroad in matters of research in natural resources by remote sensing, and developing remote sensing technology.[529] On 1 October 2008, Thailand launched its satellite, Thailand Earth Observation Satellite (THEOS).[530] It is also known as Thaichote.[531] It was the first Thailand operational earth observation satellite, launched from Russia. It is noted that THEOS is the first Thai satellite to be registered with the United Nations.[532]

Thirdly, meteorology was first introduced to Thailand as early as 1905 when the discipline was included in the navigation courses of the Royal Thai Navy. In 1923, Thailand established its first meteorological service, known as the Meteorological and Statistics Section.[533] At present, the country has a specific department to perform its meteorological administrations and managements, known as the Meteorological Department,[534] which operates under the MICT. Its tasks include supplying weather forecasts and publicizing weather warnings for the country, building people's awareness about natural disasters, and improving and developing related research work.[535] In performing its tasks, the Department uses images, for instances, from meteorological satellites such as GMS-5 and NOAA.[536]

Apart from space applications, Thailand is engaged in a micro-satellite programme. The project first started in 1996. It is a technology transfer programme involving Thailand

---

[528] NRCT official website is at http://www.nrct.go.th/, accessed: 12 March 2013.
[529] See http://www.eoportal.org/directory/info_ThailandRemoteSensingCenterTRSC.html, accessed: 12 March 2013.
[530] THEOS programme was developed by GISTDA and EADS Astrium. For more information on THEOS, see Peanvijarnpong, Chanchai, "THEOS: Thailand Earth Observation System", *Sharing of Space Technology for Satellite Development, 4th Sentinel-Asia Joint Project Team Meeting, 7 September 2007*, *Manila,* http://www.aprsaf.org/data/jptm4_pdf/Special_Session_Satellite_Development_in_Thailand.pdf; see also http://en.wikipedia.org/wiki/THEOS_%28satellite%29, all accessed: 12 March 2013.
[531] "Thaichote, the First Thai Earth Observation Satellite", http://www.gistda.or.th/gistda_n/en/index.php?option=com_content&view=article&catid=3:newsflash&id=240:thaichote, accessed: 12 March 2013.
[532] See http://www.oosa.unvienna.org/oosa/search.do, accessed: 12 March 2013.
[533] See http://www.tmd.go.th/en/aboutus/history.php, accessed: 12 March 2013.
[534] Thailand Meteorological Department official website is available at http://www.tmd.go.th/index.php, accessed: 12 March 2013.
[535] See http://www.tmd.go.th/en/aboutus/vision.php, accessed: 12 March 2013.
[536] Thailand Concept Paper, *The 47th Session of the United Nations Committee on the Peaceful Uses of Outer Space*, June 2-11, 2004, Vienna, Austria, at 7.

Mahanakorn University of Technology (MUT), which formed a joint venture with the United Communication Company of Bangkok and the University of Surrey, United Kingdom. It is a programme to design, construct and test a micro-satellite. The programme led to the birth of Thailand's first micro-satellite, THAI-PATH, which was launched on 10 July 1998.[537] The programme was enabled Thai engineers to gain expertise in satellite technology.[538]

From the previous discussion, it is noted that Thailand had successfully launched six major satellites (Thaicom 1A, Thaicom 2, Thaicom 3, Thaicom 4, Thaicom 5 and THEOS). The first five satellites, or the Thaicom series, were launched by Arianespace[539] of France from its spaceport. However, THEOS was launched from Dombarovsky, Russia, by International Space Company Kosmotras,[540] a joint project between Russia, Ukraine, and Kazakhstan. Thailand's micro-satellite, THAI-PATH, was launched by Surrey Satellite Technology (SSTL)[541] of the United Kingdom, from Baikonur Cosmodrome, Kazakhstan. Thus, it is construed that Thailand is indirectly involved in the launching of space objects as it uses the services of foreign companies. It is also noted that all seven satellites were recorded in the UNOOSA register. However, only one satellite, THEOS, was properly registered in the United Nations in accordance with United Nations space treaties, whereas the rest were not officially registered.[542]

(c) Five Outer Space Conventions: Thailand's Status

Thailand is a state party to two United Nations outer space conventions.[543] The first convention to which Thailand became a party was the Outer Space Treaty 1967.[544] Thailand signed the Treaty on 27 January 1967, which indicates the state's interest in being a member

[537] Jantarang, Sujate, "THAI-PAHT the Small Satellite for Education", *Cooperation in Space, Euro-Asian Space Week: Where East and West Finally Meet, 23-27 November 1998, Singapore,* http://adsabs.harvard.edu/full/1999ESASP.430..449J, accessed: 12 March 2013.
[538] See http://en.wikipedia.org/wiki/Mahanakorn_University_of_Technology, accessed: 12 March 2013.
[539] The Arianespace website is available at http://www.arianespace.com/, accessed: 12 March 2013.
[540] Kosmotras website is available at http://www.kosmotras.ru/; see also, "Russia Launches Thai Satellite on Converted Missile", *RIANOVOSTI,* 1 October 2008, http://en.rian.ru/russia/20081001/117363703.html, all accessed: 12 March 2013.
[541] SSTL is a spin-off company of the University of Surrey (United Kingdom), and now majority-owned by EADS-Astrium. See http://en.wikipedia.org/wiki/Surrey_Satellite_Technology_Ltd#Platforms; and http://www.sstl.co.uk/heritage/sstl-missions, all accessed: 12 March 2013.
[542] See United Nations Online Index of Objects Launched into Outer Space, http://www.oosa.unvienna.org/oosa/search.do, accessed: 12 March 2013.
[543] The two conventions are the Outer Space Treaty 1967 and the Rescue Agreement 1968. See United Nations, *supra* note 480.
[544] The Outer Space Treaty 1967, *supra* note 479.

state to the Treaty. Then, on 5 September 1968, Thailand finalized its decision to become a party to the Treaty by ratifying it.[545] Thailand thus took only a year and eight months, from the signing date, to ratify the Outer Space Treaty 1967. Such ratification reflects Thailand's consent to be bound by the legal rules stipulated in the Outer Space Treaty 1967.

The second treaty to which Thailand became a party was the Rescue Agreement 1968[546]. Thailand is a member state to the Agreement by accession. The membership started from its accession date on 29 May 1969. It is noted that Thailand took only 6 months to accede to the Convention after it came into force on 3 December 1968. However, Thailand has neither signed not acceded to the other three United Nations space conventions, namely the Liability Convention 1972, the Registration Convention 1975, and the Moon Agreement 1979.[547]

(d) Space-Related Policies, Laws, and Regulations

At present, Thailand has no specific or comprehensive national space legislation to govern the country's space activities, especially laws that deal with obligations stipulated by the United Nations' outer space treaties. There is also no precise law to regulate the launch of space objects belonging to Thailand. In fact, such circumstances were simply achieved through bilateral agreements arranged between the parties involved. Apart from that, Thailand has no space policy, despite various efforts to formulate such a policy.[548]

Although Thailand is deficient in the aforementioned laws, there are a number of other space-related laws that govern space-related activities. These include the Telecommunication Service Act 2001 and the Patent Act 1979 (as amended).[549]

(e) Concluding Remarks

Thailand is the only neighbouring country to Malaysia that shares a land border with Peninsular Malaysia. Thailand's space sector is viewed as an emerging sector in which activities revolve mainly around space applications including communications, remote

[545] See http://www.oosa.unvienna.org/oosatdb/showTreatySignatures.do, accessed: 12 March 2013.
[546] The Rescue Agreement 1968, *supra* note 483.
[547] See *supra* note 480.
[548] "Space Master Plan for Thailand 2004-2014", prepared by Chulalongkorn University, 28 February 2005, at 12, http://lerson.org/public/space/2005SpacePlan091E.pdf, accessed: 13 March 2013.
[549] See Chitasombat, Nipant, *supra* note 512, at 100.

sensing, earth observation, and meteorology. The country is also involved in programmes such as the launching of space objects and a micro-satellite programme. Thailand's space activities are assisted by two main agencies, the Space Affairs Bureau and GISTDA. At present, the country has no specific national space legislation to control the activities in accordance with the rules and obligations prescribed by the United Nations' space treaties. Pertaining to the United Nations' outer space treaties, Thailand is a party state to only two treaties: the Outer Space Treaty 1967 and the Rescue Agreement 1968.

3.6.2. Singapore

(a) Overview

Singapore is officially known as the Republic of Singapore. Its capital city is Singapore city. The country consists of 63 islands including the main island.[550] Singapore is a neighbour to Malaysia as it is located at the southern tip of Peninsular Malaysia, between Malaysia and Indonesia. It is separated from Malaysia by the Straits of Johor and is connected to Malaysia by two man-made connections: the Johor-Singapore Causeway and the Tuas Second Link. Politically, Singapore is a parliamentary republic state.[551] The head of state is the President and the head of the Government is the Prime Minister. The Government is composed of three branches: (1) Executive, (2) Legislative, and (3) Judiciary.[552] The Executive consists of a President, a Prime Minister, and a list of Ministries under the Cabinet of Singapore. The Legislative comprises Parliament, and the Judiciary comprises the Supreme Court and Court of Appeals.[553] Singapore's legal system is based on the English common law legal system. The sources of Singapore law include legislation, judicial precedents, and custom.[554]

---

[550] See http://en.wikipedia.org/wiki/Singapore, accessed: 12 March 2013.

[551] A parliamentary republic state is a state operating under a parliamentary system of government where the executive branch (the government) derives its legitimacy from and is accountable to the legislature (the Parliament). For information read http://en.wikipedia.org/wiki/Parliamentary_republic#List_of_current_parliamentary_republics, accessed: 12 March 2013.

[552] Read also *supra* note 110.

[553] For more information see http://geography.about.com/library/cia/blcsingapore.htm, accessed: 12 March 2013.

[554] See http://en.wikipedia.org/wiki/Sources_of_Singapore_law, accessed: 12 March 2013.

Economically, Singapore depends largely on exports and refining imported goods, especially in manufacturing.[555] Its main industries include electronics, petroleum refining, mechanical engineering, and biomedical sciences sectors. Singapore's space-related sector is an emerging and promising sector for the state, especially since the Singapore Government has opened its telecommunications area to Foreign Service providers.[556]

(b) Space-Related Bodies and Activities

At present, Singapore has no specific space agency.[557] However, there are certain government space-related bodies that deal with space-related matters of the state. They include the Ministry of Communications and Information (MCI), [558] and Infocomm Development Authority of Singapore (IDA).[559] MCI is in charge of, among other things, information and communications technology, media and design sectors, and the Government's information and public communication policies.[560] Its mission is to build a nation of connected people and achieve a better quality of life by developing vibrant infocomm, media and design sectors and cultivating learning communities..[561] Apart from MCI, the Singapore Government has IDA. IDA is one of the statutory boards under MCI.[562] It is responsible for the development of the information and communications technology sectors with the aim of developing Singapore into a dynamic global infocomm hub and leveraging infocomm for Singapore's economic and social development.[563] IDA offers licences such as telecommunication dealer's licences, service-based operator licences, and radio communication licences.[564]

---

[555] See http://en.wikipedia.org/wiki/Singapore#Economy, accessed: 5 August 2011.
[556] See http://en.wikipedia.org/wiki/Economy_of_Singapore, accessed: 12 March 2013.
[557] The fact is as of 12 March 2013. For the importance of the establishment of the Singapore space agency, see Goh, Gérardine Meishan, "Ethir: Singapore as a Delta for Space Law in the Asia-Pacific", (2005) 47 *IISL Colloquium on the Law of Outer Space* 71.
[558] Prior to 1 November 2012, MCI was known as Ministry of Information, Communications and the Arts (MICA). The official website of MCI is available at http://mic.gov.sg/, accessed: 12 March 2013.
[559] IDA official website is at http://www.ida.gov.sg/, accessed: 13 March 2013.
[560] See http://www.mci.gov.sg/content/mci_corp/web/mci/about_us.html; and http://en.wikipedia.org/wiki/Ministry_of_Communications_and_Information, both accessed: 12 March 2013.
[561] See http://www.mci.gov.sg/content/mci_corp/web/mci/about_us/our_organisation/vision_mission_values.html, accessed: 12 March 2013.
[562] See http://www.mci.gov.sg/content/mci_corp/web/mci/statutoryboards.html, accessed: 12 March 2013.
[563] See http://www.ida.gov.sg/About-Us/What-We-Do.aspx, accessed: 13 March 2013.
[564] For more information, refer to http://www.ida.gov.sg/Policies-and-Regulations/Industry-and-Licensees/Licensing/Online-Licence-Application.aspx, accessed: 13 March 2013.

There are several non-governmental bodies. For instance, in the telecommunications sector, one of the most significant is Singapore Telecommunications Limited (SingTel).[565] SingTel provides an internet service, internet protocol television, mobile phone, and fixed-line telephony services. The company owns a communication satellite, ST-1, launched on 25 August 1998.[566] Then, on 20 May 2011, ST-2 was launched into space as well. ST-1 and ST-2 satellites were recorded in the United Nations online database. However, they were not properly registered with the United Nations as required by the United Nations space treaties.[567] Besides ST-1 and ST-2, SingTel aims to enhance its satellite business with the launching of another satellite, ST-3, in the future.[568] Other Singapore telecommunication companies include M1 Limited and StarHub Limited.[569] In contrast, Singapore Space and Technology Association (SSTA)[570] is a Singapore non-profit association. It focuses on developing the country's space technology industry, and facilitates information and communication for government, industry and academia.

Singapore's space activities mainly revolve around three areas of space technology applications: (1) telecommunications and broadcasting; (2) remote sensing and earth observation; and (3) meteorology. Firstly, regarding telecommunications and broadcasting, Singapore has a high level of development in terms of both technology applications infrastructures as they cover nearly the entire state. The state has excellent facilities and services with regard to the telephone system, as well as radio, television, and internet services domestically and internationally.[571] In providing such services, Singapore has at least three satellite earth stations. The first Singapore earth station is Sentosa Satellite Earth Station located at Sentosa Island. The second is Bukit Timah Satellite Earth Station at Bukit Timah,

[565] SingTel official website is at http://info.singtel.com/; see also http://en.wikipedia.org/wiki/SingTel, accessed: 15 March 2013.
[566] SingTel jointly owns ST-1 with Chunghwa Telecom Company, Ltd., the largest telecommunication company in Taiwan. They jointly operate the satellite from earth stations in Seletar (Singapore) and Taipei (Taiwan). See http://en.wikipedia.org/wiki/ST-1, accessed: 15 March 2013.
[567] See *supra* note 542.
[568] Chua, Melissa, "SingTel Aims to Double Satellite Business", *Telecomasia.net,* 11 May 2011, http://www.telecomasia.net/content/singtel-aims-double-satellite-business, accessed: 15 March 2013.
[569] M1 Limited official homepage is at http://www.m1.com.sg/; StarHub Limited homepage is at http://www.starhub.com/; see also http://en.wikipedia.org/wiki/M1_Limited; and, http://en.wikipedia.org/wiki/StarHub, all accessed: 15 March 2013.
[570] SSTA website is at http://www.space.org.sg/, accessed: 15 March 2013.
[571] See http://en.wikipedia.org/wiki/Telecommunications_in_Singapore, accessed: 15 March 2013.

and the third is Seletar Teleport at Seletar, in north eastern Singapore.[572] All these stations are managed and owned by SingTel**.**

Secondly, regarding the remote sensing and earth observation areas of application, Singapore has a centre responsible for such fields. It is called the Centre for Remote Imaging, Sensing, and Processing (CRISP).[573] CRISP receives, processes and analyses data from satellites including SPOT, IKONOS, ERS, TERRA, and AQUA.

Thirdly, in regard to meteorology, Singapore has a division called Meteorological Services Division. It was set up under the National Environment Agency (NEA),[574] a statutory board under the Singapore Ministry of the Environment and Water Resources. Its tasks include providing meteorological services to the aviation, maritime and military communities, as well as weather information.[575]

Apart from space applications, Singapore is also engaged in developing a local micro-satellite namely X-Sat. It was developed and built by Nanyang Technological University (NTU) of Singapore in collaboration with Singapore Defence Science Organization (DSO).[576] The X-Sat was launched into orbit on 20 April 2011 from Satish Dhawan Space Centre, India.[577] It is designed, among other things, for earth observation and imaging for environmental applications such as forest fire monitoring, as well as satellite-based data acquisition and distribution. It was also recorded in the United Nations database, but was not properly registered.

---

[572] The Sentosa Satellite Earth Station was established in 1970, while for the Bukit Timah Satellite Earth Station it started operation in 1986. See http://en.wikipedia.org/wiki/Sentosa_Satellite_Earth_Station; http://en.wikipedia.org/wiki/Seletar_Teleport; and, http://en.wikipedia.org/wiki/Bukit_Timah_Satellite_Earth_Station, all accessed: 15 March 2013.
[573] CRISP website is available at http://www.crisp.nus.edu.sg/, accessed: 15 March 2013.
[574] NEA website is available at http://app2.nea.gov.sg/index.aspx; accessed: 15 March 2013.
[575] See also http://en.wikipedia.org/wiki/National_Environment_Agency, accessed: 15 March 2013.
[576] NTU official website is at http://www.ntu.edu.sg/; and DSO website is at http://www.dso.org.sg/, both accessed: 2 August 2011.
[577] "Singapore's First Locally Made Satellite Launched into Space", *AsiaOne News,* 20 April 2011, http://www.asiaone.com/News/AsiaOne+News/Singapore/Story/A1Story20110420-274651.html, accessed: 15 March 2013.

(c) Five Outer Space Conventions: Singapore's Status

Singapore is a state party to three of the United Nations outer space conventions.[578] The first convention is the Outer Space Treaty 1967.[579] Singapore joined the Treaty through accession. The Singapore Government acceded to the Treaty on 10 September 1976,[580] approximately nine years after the Treaty came into force in October 1967. Thus, the accession reflects the consent of Singapore to be bound by the Treaty's legal rules in relation to state space-related activities.

The second convention is the Rescue Agreement 1968.[581] Singapore became a party to this Agreement through accession as well, acceding to the Agreement on 10 September 1976.[582] Such accession took place roughly eight years after the Agreement came into force on 3 December 1968. The third convention to which Singapore became a party was the Liability Convention 1972.[583] The state signed the Liability Convention on 19 July 1972, about four months after the Convention was opened for signature to all states on 29 March 1972. The Liability Convention 1972 was then ratified by Singapore on 19 August 1975.[584] It is noted that Singapore took almost three years, from the signing date, to consider ratifying the Liability Convention 1972. Commencing from the ratification date, according to its international obligation, Singapore is bound by the legal rules stipulated in the Liability Convention 1972.

With respect to the other conventions, Singapore is not a party state.[585] The first is the Registration Convention 1975.[586] Singapore is a signatory state only to this Convention. The state signed the Convention on 31 August 1976, about 1 year 7 months after the Convention opened for signature to all states on 14 January 1975. This Convention has not been ratified.

---

578 Those conventions are: the Outer Space Treaty 1967; the Rescue Agreement 1968; and the Liability Convention 1972. See United Nations, *supra* note 478.
579 The Outer Space Treaty 1967, *supra* note 479.
580 See *supra* note 480.
581 The Rescue Agreement 1968, *supra* note 481.
582 See *supra* note 480.
583 The Liability Convention 1972, *supra* note 483.
584 See *supra* note 480.
585 See *id*.
586 The Registration Convention 1975, *supra* note 485.

As for the Moon Agreement 1979,[587] Singapore is also a non-party state.[588] The state has neither signed nor acceded to the Agreement.

(d) Space-Related Policies, Laws, and Regulations

At present, like Thailand, Singapore has no specific or comprehensive national space legislation to govern the state's space activities, particularly those dealing with obligations stipulated by the United Nations' outer space treaties. Moreover, Singapore has no space policy. However, although Singapore has no space legislation and policy, it has a number of other space-related laws that govern such activities. These include the Telecommunications Act (Cap.323), Info-communications Development Authority of Singapore Act (Cap.137A), and Electronic Transactions Act (Cap.88).

(e) Concluding Remarks

Singapore's space sector is an emerging and promising sector for the state. The state's activities revolve around space applications including communications, remote sensing, earth observation, and meteorology. Other activities include the launching of space objects and a micro-satellite programme. Since the state has no specific space agency, its space-related activities are mainly assisted by the Ministry of Communications and Information (MCI) and Infocomm Development Authority of Singapore (IDA). The country also lacks any specific space legislation to regulate such activities. Regarding the United Nations' outer space treaties, Singapore is a party state to three treaties: the Outer Space Treaty 1967, the Rescue Agreement 1968 and the Liability Convention 1972.

3.6.3. Brunei

(a) Overview

Brunei is officially known as the State of Brunei Darussalam. Its capital city is Bandar Seri Begawan. Brunei is located on the north Coast of Borneo Island. It is a neighbour to Malaysia as it is surrounded by Sarawak, a state of Malaysia. Politically, Brunei is a unitary

[587] The Moon Agreement 1979, *supra* note 486.
[588] See *supra* note 480.

parliamentary democracy state[589] governed by a constitution. The state political framework is an absolute monarchy in which the head of state and of the Government is the Sultan or King. The Government is made up of three branches: (1) Executive, (2) Legislative and (3) Judiciary.[590] The Executive consists of the Sultan, Privy Council, Council of Succession, Religious Council, and Council of Ministers. The Sultan has a full executive authority under the Brunei Constitution 1959. The Legislative comprises the Legislative Council, and the Judiciary is composed of the Civil Court and *Syariah* Court.[591] Brunei's legal system is based on the English common law legal system. The sources of the law of Brunei include statute law, common law of England, and the principle of equity.[592] The decisions of higher courts in the British Commonwealth, particularly in Singapore, Malaysia and the United Kingdom, have persuasive authority and are often used to interpret the statutes.[593]

Economically, even though Brunei is a small country, it is wealthy. Brunei's main industries include petroleum, petroleum refining, liquefied natural gas, and construction.[594] Others are agriculture, forestry and fishing. In the space-related sector, Brunei is involved in limited areas, but the country has the potential to engage further in this sector.

(b) Space-Related Bodies and Activities

At present, Brunei has no specific space agency. However, there are certain Government space-related bodies that deal with space-related matters of the state. They include Brunei Ministry of Communications,[595] Department of Civil Aviation,[596] and Brunei Meteorological Service[597]. The Department of Civil Aviation is one of the departments in the Brunei Ministry of Communications, while the Brunei Meteorological Service is a section under the Department of Civil Aviation.

---

[589] See *supra* note 5.
[590] Read also *supra* note 110.
[591] For further information see http://en.wikipedia.org/wiki/Politics_of_Brunei, accessed: 15 March 2013.
[592] See http://www.iflr1000.com/pdfs/Directories/1/Brunei_2009.pdf, accessed: 10 March 2013.
[593] Pg.Hj.Tahir, Pg.Kasmirhan, "Brunei Legal Regime on ICT: Are Our Laws Conducive Enough?", http://www.bruneiresources.com/pdf/nasis_s2_6.pdf, accessed: 18 March 2013.
[594] See http://en.wikipedia.org/wiki/Economy_of_brunei, accessed: 18 March 2013.
[595] The Ministry of Communications Brunei Darussalam's homepage is available at http://www.mincom.gov.bn/, accessed: 18 March 2013.
[596] The Department of Civil Aviation Brunei Darussalam's homepage is available at http://www.civil-aviation.gov.bn/, accessed: 18 March 2013.
[597] Brunei Darussalam Meteorological Service's homepage is available at http://bruneiweather.com.bn/, accessed: 18 March 2013.

As for space-related activities, it is observed that Brunei has had no space objects launched into space.[598] Its activities are mainly concerned with telecommunications and meteorological services. The telecommunication service was first introduced in Brunei as early as the 1920s.[599] Nowadays, the country has excellent telecommunication facilities.[600] Furthermore, the Brunei Ministry of Communications has a vision of creating a sophisticated society through excellence in communications, and a mission to establish and sustain hub activities in communications.[601]

Apart from the above, Telekom Brunei Berhad (TelBru)[602] is a telecommunications company in Brunei. Its duties include providing excellent telecommunications and information, as a technological product and service. Historically, the company was corporatized from the Department of Telecommunications, one of the departments previously under the Brunei Ministry of Communications.[603] Besides the telecommunications area, meteorology is another part of Brunei's space-related activities. The country has the Brunei Meteorological Service to deal with such activities. It provides meteorological information including daily weather forecasts for the public, as well as marine services. The Brunei Meteorological Service is also responsible for meteorological data collection, processing, and scientific analysis. It maintains a Weather Forecast Centre equipped with Doppler Weather Surveillance Radar and a Satellite Images Reception System.[604] The country has several weather stations, including Kuala Belait weather station.

(c) Five Outer Space Conventions: Brunei's Status

With respect to the five United Nations outer space conventions - the Outer Space Treaty 1967, the Rescue Agreement 1968, the Liability Convention 1972, the Registration Convention 1975, and the Moon Agreement 1979 - it is noted that Brunei is a non-party state to all those conventions.[605] The Brunei Government has neither signed, ratified, nor acceded to any of the United Nations' outer space conventions.[606] Such circumstances may reflect that

---

598 See http://www.oosa.unvienna.org/oosa/showSearch.do, accessed: 18 March 2013.
599 See http://www.telbru.com.bn/about-us/corporate-info/history, accessed: 18 March 2013.
600 See http://en.wikipedia.org/wiki/Telecommunications_in_Brunei, accessed: 18 March 2013.
601 See http://www.mincom.gov.bn/index.php/about-us/history-vision-mission, accessed: 18 March 2013.
602 TelBru official website is at http://www.telbru.com.bn/, accessed: 18 March 2013.
603 See http://www.mincom.gov.bn/index.php/history-vision-mission-2, accessed: 18 March 2013.
604 See http://www.brunet.bn/gov/dca/main.htm, accessed: 18 March 2013.
605 See United Nations, *supra* note 478. See also *supra* note 480.
606 See *id*.

the country is not ready to be bound by any obligations and legal rules set forth in the United Nations' outer space conventions to govern its outer space activities.

(d) Space-Related Policies, Laws, and Regulations

Like Singapore and Thailand, Brunei has no specific or comprehensive national space legislation, particularly legislation that deals with obligations as prescribed by the United Nations' outer space treaties to govern the state's outer space activities. Moreover, Brunei has no space policy.

Although Brunei lacks the aforementioned legislation and policy, it has a number of other space-related laws that govern these activities. These include the Brunei Telecommunications Act (Chapter 54), Broadcasting Act (Chapter 180), Internet Code of Practice, and Computer Misuse Order 2000.

(e) Concluding Remarks

Although Brunei has not yet launched any objects into space, the state's space sector has the potential to evolve as a promising sector. At present, the state's activities are concerned with space applications such as telecommunications and meteorology. Brunei has no specific space agency, and its space-related activities are mainly assisted by Brunei Ministry of Communications, Department of Civil Aviation, and Brunei Meteorological Service. The country also has no specific space legislation and policy. Brunei is a non-party state to all the United Nations' space treaties.

3.6.4. Legal Implications

Even though Thailand, Singapore and Brunei are non-active space participants, their lack of domestic space legislation may have several legal implications. As discussed earlier,[607] countries involved in outer space activities must take full responsibility for their activities, as well as the activities of their nationals at the international level. Thus, when damage results from the activities of their national, the legal implication is that the government of the state

[607] For more discussion, refer to Chapter 3 of the thesis (3.5.5. India: Legal Implications).

concerned has no possibility of transferring, limiting or exempting such liability to its national wrongdoer at national level. Consequently, the state will be fully liable for the actions of its national. Furthermore, Thailand, Singapore and Brunei may experience improper claims procedures in the event of claims for damages being brought against the state at the national level.

Apart from that, Thailand, Singapore and Brunei will face the risk of non-compliance with the liability insurance requirement or the demonstration of sufficient financial responsibility in the event of their nationals being involved in outer space activities. This is, in fact, vital for every state in order to ensure that nationals have the ability to compensate the victim when damage or loss occurs as a result of the activities. Additionally, the obligation to take out insurance is important for indemnifying the state government when payment of compensation is executed on behalf of the national to the victim.

The absence of legislation may also result in difficulty in controlling and monitoring the national space activities, particularly to ensure they are in conformity with the international legal rules. This scenario is crucial, especially when the states are parties to outer space international treaties and conventions requiring them to observe and implement the treaties' obligations at both international and national levels for an effective performance. Indeed, Thailand, Singapore and Brunei may face complications in imposing sanctions at the national level on nationals who violate the space law. The difficulty of effectively imposing the obligation to register objects launched into space is another legal implication. Registration of a space object is an obligation imposed by the international law that should be implemented at both international and national levels. Registration is crucial, among other things, in order to identify the space object, especially in the event of it causing damage to others.

As neighbouring countries to Malaysia, Thailand, Singapore and Brunei have a higher degree of responsibility towards one another, particularly in relation to their outer space activities. This circumstance is based on the nature of such activities; there is a strong possibility, for instance, that launches conducted from the territory of one country will have consequences for the neighbouring countries as well. In such circumstances, it is suggested that these countries formulate domestic space legislation to regulate such activities. At this juncture, these states might also consider, to some extent, the harmonization of their space legislations, especially for the purpose of facilitating international cooperation between them as neighbouring states.

3.7. CONCLUDING REMARKS

This section deals with two aspects: (1) the general conclusion drawn; (2) what Malaysia can learn, specifically, from the experience of the seven selected countries, to develop Malaysian domestic space legislation.

As for the first part, after discussing all seven countries - the United Kingdom, Australia, the United States of America, India, Thailand, Singapore and Brunei - there are several general conclusions to note.[608]

The first is in relation to the enactment of domestic space legislation, particularly regarding the implementation of the United Nations' space treaties obligations. It is noted that the first three countries - the United Kingdom, Australia, and the United States of America - are governed by specific domestic space legislation to regulate their national space activities. The other four countries - India, Thailand, Singapore and Brunei - have no such legislation to govern their space activities. At this point, it is observed that countries with specific domestic space legislations are capable of implementing the United Nations' outer space treaties obligations effectively, as well as controlling their national space activities in accordance with the international legal rules. This situation will then guarantee the sustainability of these countries' space activities at both national and international levels.

It is also noted that countries with space legislations, compared to those with no legislation, have certain and positive approaches to further developing their space activities. Their space sectors are growing confidently in parallel with the development of their national space laws. Moreover, such a stable legal environment has been seen to attract space investors and the involvement of private sectors in the activities, resulting in the expansion and growth of the economies of those countries. In contrast, countries with no specific legislation are facing uncertainty about the laws governing their space activities, particularly in the event of the

[608] A summary of Chapter 3 is available in points on the differences and similarities of those seven selected states. For further information, refer to "Appendix A: Table No. 3.1. Some Differences and Similarities of Seven Selected States".

involvement of private sectors. They will also experience an imbalance in the evolution of space legal rules and the growth of space activities.

Second, most states have specific governmental bodies or agencies to control their space-related activities. To deal with space activities and related matters, a state needs a specialized body to deal with such activities. This body will be responsible for controlling, monitoring and advising on the related activities in accordance with both the national and international law. Indeed, in some states, special posts have been created for an effective performance. For instance, in Australia, the Australian Space Licensing and Safety Office has a 'Launch Safety Officer' for every launch facility to ensure compliance with the legal rules.

Third, the first three states discussed - the United Kingdom, Australia and the United States - which have specific domestic space legislation, are parties to the first four United Nations outer space treaties at least (the Outer Space Treaty 1967, the Rescue Agreement 1968, the Liability Convention 1972, and the Registration Agreement 1975). This arguably reflects the seriousness with which these states go about fulfilling their international and national duties and obligations in relation to their outer space activities. This was proved when these three states, besides being members of most of the United Nations' space treaties, also successfully enacted their national space legislation. This circumstance does, in fact, mirror the states' position as responsible space actors.

Fourth, a variety of modes of authorization of space activities have been introduced and imposed by the states. These include licences, exemption of licences, permits, experimental permits and certificates. All these modes of authorization, despite having different names, have the same ultimate objective, which is to control the state's national space activities. The absence of a mode of authorization will lead to difficulty in controlling, monitoring and supervising such activities. This circumstance may therefore end in a breach of the international legal duty of states party to the United Nations' outer space treaties.

Fifth, countries with domestic space legislation are able to legally impose a registration obligation on their nationals. The registration of space objects is vital to ensure that the object is known and its owner identified. This is important, for instance, in cases of accidents or loss caused by the space object. For effective action, the states, via their space domestic law, have set up a National Registry of Space Objects, as stipulated by the United Nations' space treaties. The states shall impose legal rules on their nationals, requiring them to register at the national level the space objects they launch into space. Such circumstances, indeed, help the states to meet their further obligations to register such space objects with the United Nations at the international level. From the earlier discussion, it is noted that states with domestic legislation (except India) have greater potential to register their space objects with the United Nations compared to states with no domestic space legislation. It seems that such states are more aware of the importance of registering their space objects with the United Nations.

Sixth, states with domestic space legislation can impose constant monitoring and supervision obligations efficiently at state level. These legal rules are crucial, especially with the involvement of private sectors in space activities. Constant monitoring and continuous supervision are among the key factors that ensure that the activities of nationals are in conformity with domestic and international space legal rules. For effective implementation, it is observed that states designate, via their domestic space law, a specific officer or figure to perform such tasks. For instance, Australia has its ‘Launch Safety Officer’.

Seventh, states with domestic space legislation can deal proficiently with issues of liability and indemnification imposed by the international rules, in accordance with the states’ interests. The possible liability of states at the international level can be transferred, passed or limited to the responsible space actor at the national level. There are various types of practices performed by the states, including passing the liability without limitation to the responsible party, passing the limited liability based on the maximum probable loss scheme, fixing the liability period, and reciprocal waiver of claim. The rule of obligatory indemnification is imposed by certain states, such as the United Kingdom, through their domestic space laws to ensure that the state is indemnified against any claims brought against it. The requirement to take out liability insurance or demonstrate the financial responsibility of the national space actor is imposed to ensure the availability of funds in the event of obligations arising from the indemnification rule.

Eighth, states with domestic space legislation are capable of instilling values of safety, peace and security, initiated by the international space law, in their national space legislation in a comprehensive manner. Those values are critical in order to protect the space actors, safeguard their activities and related areas, and preserve the outer space remote environment. Various modes have been introduced by the states, such as the establishment of the investigation regime in Australia to ensure the safety of its future national space activities in the event of accidents occurring. In the United Kingdom, the state implements the technical safety assessment of its national space activities to prevent, for instance, outer space contamination. Numerous other legal rules and provisions, as discussed earlier, have been imposed by states via national legislation to secure the values of safety, peace and security when dealing with their space activities.

Ninth, all states, except Thailand, are governed by the common law legal system. Although Thai law is based on civil law, the state's legal system, as previously discussed, is still influenced to some extent by the common law legal system. At this juncture, it can be stated that, in all seven countries, besides having national space legislation (for those with such legislation), judge-made law and case precedent[609] are among the most important sources of law that make a significant contribution to developing their space legal systems at the national level.

Lastly, states with no specific domestic space law, in contrast to states with space legislation, will be faced with uncertainty regarding legal rules to govern their national space activities. In addition, such states cannot impose the United Nations' outer space treaties obligations effectively at the national level. Moreover, they cannot control and monitor the national outer space activities in order to ensure compliance with the national and international legal rules. The imbalance between the development of space technology and activities and the legal rules is an unhealthy environment that will fail to gain the confidence of space investors. This situation may affect the growth of space activities as well as the economy of the state.

The second part deals with this question: what can Malaysia learn from the experience of those seven countries, particularly the countries that have domestic space legislation, in developing and drafting the Malaysian space legislation? In the process of developing and drafting the domestic space law, there are a numbers of things that Malaysia can learn and should be aware of:

[609] In the common law legal system, a 'precedent' is a rule of law established for the first time by a court for a particular type of case and thereafter referred to in deciding similar cases. See Black's Law Dictionary (5th ed., 1979), at 1059, as cited in http://en.wikipedia.org/wiki/Precedent#cite_note-0, accessed: 22 June 2011.

First, to appear a serious and responsible space actor, Malaysia needs to enact its own specific domestic space law, as well as to seriously consider becoming a party to the first four of the United Nations' outer space treaties, at least.

Second, national space legislation is undoubtedly an effectual and efficient mechanism for implementing the United Nations' outer space treaties' obligations, and simultaneously regulating and controlling the space activities of Malaysia's national and private entities in accordance with the required legal rules.

Third, there are at least five major issues to cope with, in drafting the Malaysian space legislation. Those issues deal with: (1) authorization, (2) registration, (3) liability and indemnification, (4) constant monitoring and continuous supervision, and (5) safety, peace and security elements. Those issues should be dealt with in a way that suits the state's interests, as well as the international legal rules.

Fourth, a clear and definite authorization is required from a state government, as prescribed by the international rules, for nationals and private entities of the state when they are involve in any space-related activities. This is crucial in order to legalize their space activities.

Fifth, there are various types of authorization of space activities that Malaysia can adopt in its space legislation for the purpose of legalizing its national space activities in accordance with the international space legal rules.

Sixth, Malaysia needs to observe the registration obligation of its space objects at national and international levels. At the national level, Malaysia needs to impose a clear legal rule that all objects launched into space must be registered nationally. Moreover, the rule also prescribes a legal requirement for further registration of such space objects by the state government with the United Nations at the international level.

Seventh, states should be required to set up an official 'National Space Registry' to deal with the registration of space objects and other related matters at the national level.

Eighth, a state can either transfer or limit its international liability imposed by the United Nations' space treaties via legal rules enacted in the state's domestic space legislation.

Ninth, a state needs to impose a legal requirement to provide proof of liability insurance or financial ability on those involved in space activities. This is paramount in order to indemnify the state in the event of damage or loss resulting from space activities.

Tenth, a state needs to impose legal rules of constant monitoring and continuous supervision in its domestic space legislation with respect to its national space activities. This is to ensure its national space activities are continuously monitored and supervised in accordance with the requirement of the United Nations' outer space treaties.

Eleventh, a state needs to instil values of safety, peace and security in the provisions of the domestic space legislation. In so doing, the state will support the rule of international space law that space activities should be developed and expanded in a safe and peaceful manner at both national and international levels.

Twelfth, a state has the potential and capacity to define and make clear any ambiguous words mentioned in the United Nations' outer space treaties. This can be executed for the purpose of the state's domestic application. By doing so, any unclear issue at the international level relating to unclear words in the United Nations' space treaties can be resolved at the national level. For instance, Australia, in its Space Activities Act 1998, provides a specific demarcation point of outer space activities by defining the unclear term 'outer space' as an area beyond the distance of 100 km above sea level.

Thirteenth, even though the three neighbouring countries of Malaysia (Thailand, Singapore, and Brunei) discussed above have no specific domestic space law, the progress of their space activities may, more or less, affect and expedite the development and formation of Malaysian space law.

Lastly, since the neighbouring countries of Malaysia (Thailand, Singapore and Brunei) have no domestic space legislation, it is observed that Malaysia has the potential to become a pioneer in enacting national space legislation among its neighbouring Commonwealth countries. In such circumstances, Malaysia may further inspire its neighbours to perform the same actions.

4 THE PROPOSED LEGAL FRAMEWORK FOR MALAYSIAN SPACE LAW

4.1. INTRODUCTION

Enacting a domestic space law is one of the essential steps taken by many countries, especially those that participate in space-related activities. Apart from the United Kingdom, the Unites States of America, and Australia (as discussed in Chapter 3), a number of other countries have taken similar action, including Norway, Sweden, South Africa, Russian Federation, Ukraine, Korea, France, Austria and Kazakhstan.[1]

Undoubtedly, the development and enacting of national space laws occupies an important place on the agenda of the United Nations. This was evidenced when the UNCOPUOS began to organize various workshops on space law on an annual basis twelve years ago.[2] These programmes were held, among others, to encourage and emphasize the significance of national space legislation to the world community. Moreover, the UNCOPUOS Legal Subcommittee also stressed in its annual report a section on capacity-building in space law, in which the Subcommittee noted with appreciation the efforts made to assist in the development of national space legislation.[3]

---

[1] Different names are given by various states to their domestic space laws. For instance, Norway: Act on Launching of Space Objects from Norwegian Territory into Outer Space 1969, Act No. 38 (13 June 1969); Sweden: Act on Space Activities of 1982, Act No. 1982:963 (18 November 1982); South Africa: Space Affairs Act of 1993, Statutes of the Republic of South Africa – Trade and Industry No. 84 (24 June 1993), Space Affairs Amendment Act of 1995, No. 64 of 1995 (6 October 1995); Russian Federation: Law of Russian Federation on Space Activities 1993, Federal Law Decree No. 5663-1 (20 August 1993), Statute on Licensing Space Operations 1996, Federal Government Resolution No. 104 (2 February 1996); Ukraine: Law of the Supreme Soviet of Ukraine on Space Activities 1996, No. 503/96-VR 1996 (15 November 1996); Korea: Space Development Promotion Act 2005, Law No. 7538 (31 May 2005), Space Liability Act 2007, Law No. 8852 (21 December 2007); France: Space Operations Act 2008, Law No. 2008-518 (3 June 2008); Austria: Austrian Federal Law on the Authorization of Space Activities and the Establishment of a National Space Registry (Austrian Outer Space Act) 2011, Federal Law Gazette I No. 132/2011 (6 December 2011); Kazakhstan: Law of the Republic of Kazakhstan on Space Activities 2012, Law No. 528-IV ZRK (6 January 2012).

[2] These space law workshops have been held since 2002. They include workshops on 'Contribution of Space Law to Economic and Social Development' (2012, Buenos Aires); 'Activities of States in Outer Space in Light of New Developments: Meeting International Responsibilities and Establishing National Legal and Policy Frameworks' (2010, Bangkok); 'Status, Application and Progressive Development of International and National Space Law' (2006, Ukraine); 'Meeting International Responsibilities and Addressing Domestic Needs' (2005, Abuja); 'United Nations Treaties on Outer Space: Actions at the National Level' (2003, Daejeon).

[3] UNGA, Committee on the Peaceful Uses of Outer Space "Report of the Legal Subcommittee on its Forty-Ninth Session" (Vienna, 9-18 June 2010), A/AC.105/942, at 18.

Malaysia, as a space participant, is urged to seriously consider promulgating its national space legislation and putting the law into practice as soon as possible.[4] Thus, to help realise a feasible national space law for Malaysia, this chapter will focus on three matters, which will be discussed in three separate sections. Firstly, the discussion concentrates on reasons for the necessity of enacting Malaysian space legislation. Secondly, the discussion highlights some major aspects that Malaysia should consider while drafting the contents of the Malaysian space legislation. Thirdly, the section will propose a feasible legal framework for Malaysian space legislation.

4.2. REASONS FOR NECESSITY

National space legislation is a necessity for any state that has participated, participates, or intends to participate in outer space activities. In fact, this is the situation for Malaysia, particularly as the country has clearly been a participant and contributor to outer space-related activities (as evidenced in Chapters 1 and 2 of the thesis). Thus, this section will highlight numerous reasons for the importance of enacting domestic space legislation to Malaysia. It is hoped that, by presenting the reasons, this thesis will persuade Malaysia and other states lacking domestic space legislation to seriously consider the enactment of such legislation as soon as possible. Those reasons include the following:

The first concerns the application of the doctrine of transformation in Malaysia. Malaysia applies the doctrine of transformation in respect of the application of international law domestically. In Malaysia, the rule applied is that an international law is not *ipso facto* part of the municipal law of Malaysia; i.e. it is not automatically incorporated in the municipal law of Malaysia.[5] Therefore, when Malaysia becomes a party to an international treaty, such treaty actually has no domestic legal effect. Hence, for an international treaty to have a domestic legal effect, a municipal law on the matter should be enacted, or the treaty must be

---

[4] As of 14 May 2014.

[5] However, one case showed that a treaty can be implemented locally without any need for enactment of a statute. But it is a very rare case and it is done only if it does not affect the private person's rights or involve changes in Malaysian municipal law. See the case of *Heliliah bt Haji Yusof, Internal Application of International Law in Malaysia and Singapore (1969) 1 Singapore Law Review, 62-71 at 65*. This case involves the Treaty of Friendship between the Federation of Malaya and the Republic of Indonesia whereby the Treaty was implemented without the introduction of legislation. See Abdul Ghafur Hamid @ Khin Maung Sein, "Judicial Application of International Law in Malaysia: An Analysis", *The Malaysian Bar,* 31 March 2006, http://www.malaysianbar.org.my/international_law/judicial_application_of_international_law_in_malaysia_an_analysis.html, accessed: 14 May 2014.

domesticated. In other words, the rules of the treaties must first be transformed into Malaysian law before they can be legally applied municipally. This can be executed by means of statute made by the Malaysian Federal Parliament, by virtue of Article 74(1) and Item 1(a) and (b) of the Federal List of the Malaysian Federal Constitution.[6] Certain examples of statutes made by the Malaysian Parliament will demonstrate this situation. They include the following: the Malaysian Geneva Conventions Act 1962, to give legal effect to the Four Geneva Conventions for the Protection of the Victims of War of 1949; the Malaysian Exclusive Economic Zone Act 1984, to give legal effect to certain provisions of the United Nations Convention on the Law of the Sea 1982; the Malaysian Diplomatic Privileges (Vienna Convention) Act 1966, to give legal effect to the Vienna Convention on Diplomatic Relations 1961.[7] This is also believed to be the situation with regard to the international space treaties. Since Malaysia applies the doctrine of transformation for the application of international law, it is necessary for the country to transform the space treaties' rules by enacting the Malaysian municipal law (Malaysian Outer Space Act) in order to give valid domestic legal effect to the international space treaties it has ratified.

The second concerns the rules of international responsibility and liability. Any state that is a party to the Outer Space Treaty 1967[8] or Liability Convention 1972[9] is exposed to the rules of international responsibility and liability introduced by the treaties. Article VI of the Outer Space Treaty 1967[10] emphasizes that states shall bear international responsibility for their national activities in outer space. Thus, this signifies the recognition of the international space law in respect of the involvement of a state's nationals in space activities that might

---

[6] Article 74(1) of the Federal Constitution reads: *'... Parliament may make laws with respect to any matters enumerated in the Federal List or the Concurrent List ...'.* Item 1 of the Federal List of the Federal Constitution mentions: *'External affairs, including: (a) Treaties, agreements, and conventions with other countries ...; (b) Implementation of Treaties, agreements and conventions with other countries'.* Further discussion on the power of Parliament to make law on matters related to Malaysian external affairs (inclusive of international treaties, agreements, and conventions) is also available in Chapter 1 of the thesis (1.2.2. The Malaysian Federal Constitution).

[7] See Abdul Ghafur Hamid @ Khin Maung Sein, "Judicial Application of International Law in Malaysia: An Analysis", *supra* note 5.

[8] Treaty on Principles Governing the Activities of States in the Exploration and Use of the Outer Space, Including the Moon and Other Celestial Bodies (1967) (Resolution 2222 (XXI)), adopted on 19 December 1966, opened to signature on 27 January 1967, entered into force on 10 October 1967. (1967) 610 UNTS 205, 18 UST 2410, TIAS 6347; (1967) 6 ILM 386; (1967) 61 AJIL 644.

[9] Convention on International Liability for Damage Caused by Space Objects (1972) (Resolution 2777 (XXVI)), adopted on 29 November 1971, opened to signature on 29 March 1972, entered into force on 1 September 1972. 24 UST 2389, 961 UNTS 187, TIAS 7762.

[10] Article VI, Outer Space Treaty 1967 states: *'States Parties to the Treaty shall bear international responsibility for national activities in outer space… whether such activities are carried on by governmental agencies or by non-governmental entities …. The activities of non-governmental entities in outer space … shall require authorization and continuing supervision by the appropriate State Party to the Treaty'.*

incorporate either governmental or non-governmental entities. In such circumstances, in the event of Malaysia becoming a party to the treaties, the Malaysian Government shall be responsible internationally for all the space activities of its nationals. This means that the Malaysian Government will then be accountable for any space activities conducted by its staff members and the Malaysian private sector. At this juncture, it should be noted that the state party is not only accountable for such activities but may also be internationally liable for damage done to another state party during the course of its activities. This is verified in Article VII of the Outer Space Treaty 1967[11], which prescribed that each state party is internationally liable for damage to another state party. When Malaysia (as a state party) or its nationals carry out space activities and subsequently cause damage to another state party, the Malaysian Government shall be internationally responsible and liable for the damage resulting from the space activities. Space activities shall include launches or the procuring of launches of space objects into space; even when the states' or Malaysian territory or facilities are used to launch the object into space, the Malaysian Government will be internationally responsible and liable.[12] In fact, it is quite hard to monitor and control the space activities of private entities. This means that the Malaysian Government is highly exposed to the rules of international responsibility and liability, particularly with respect to private sector activities. For this reason, it is recommended that Malaysia enact the Malaysian space legislation. With this legislation in place, it can change, modify or transfer the rules of international responsibility and liability, which are likely to burden the Government of Malaysia, to the respective parties at the national level.[13] This action is crucial in order to safeguard the interest of the Malaysian Government, especially when dealing with the involvement of private entities in space activities.

The third concerns the application of customary international law. It is agreed that a space treaty's rules will only internationally bind a state when the state is a party to the space treaty. However, it should be remembered that, in certain circumstances, a state may also be bound by the treaty's rules, even though it is a non-party state. This can occur from the viewpoint of customary international law. Thus, it is observed that, since Malaysia is only a signatory state

---

[11] Article VII, Outer Space Treaty 1967 prescribes: *'Each State Party to the Treaty that launches or procures the launching of an object into outer space ..., and each State Party from whose territory or facility an object is launched, is internationally liable for damage to another State Party'.* See, *id*.
[12] *Id*.
[13] For more discussion, read Chapter 4 of the thesis (4.4.5. Liability and Indemnification Clauses).

and a non-party state to the space treaties,[14] the country is not in fact bound by any rules of the space treaties until it ratifies or becomes a party to the treaties. However, one should bear in mind that Malaysia, to some extent, may also be bound by the treaty's rules on the grounds of customary international law. At this juncture, when a treaty is declaratory of customary law in nature, a signatory state (even without ratification) and also a non-party state of the treaty may be bound by the treaty's rules and provisions. This is affirmed in Article 38 of the Vienna Convention on the Law of Treaty, which prescribes an exception to the general rule of a treaty (stated in Article 34 of the Vienna Convention)[15] that it does not create rights and obligations without the consent of a state unless the treaty becomes part of international custom. In such cases, the treaty then becomes binding upon them. On this point, it is argued that certain rules of space treaties have passed into international custom and hence become binding upon all states. Those rules include the following: rule of international responsibility (Article VI, Outer Space Treaty 1967); authorization and continuing supervision (Article VI, Outer Space treaty 1967); rule of international liability (Article VII, Outer Space Treaty 1967); freedom of exploration and use of outer space (Article I, Outer Space Treaty 1967); application of international law in outer space (Article III, Outer Space Treaty 1967), and many others.[16] Based on these facts, it is observed that those rules that passed into the customary international law have a higher prospect of become binding upon Malaysia, although the state is not a party to the treaties. Furthermore, this point is supported by the evidence that the application of customary international law has sometimes been accepted in the Malaysian courts when ruling on disputed cases.[17] This has again strengthened the possibility of accepting the application of the customary international law in Malaysia. Thus,

[14] The fact is as of 15 April 2013. For more information, read Chapter 2 of the thesis (2.3.3. Malaysia and the Five Outer Space Conventions).

[15] The Vienna Convention on the Law of Treaty establishes a general rule of the treaty in its Article 34: '*A treaty does not create either obligations or rights for a third state without its consent'.* However, it also prescribes an exception to the general rule in its Article 38: '*Nothing in Articles 34 to 37 precludes a rule set forth in a treaty from becoming binding upon a third State as a customary rule of international law, recognised as such*.' Lyall, Francis and Paul B. Larsen, *Space Law: A Treatise,* (Surrey: Asgate, 2009), at 173-174.

[16] More information on customary international law is available in Chapter 2 of the thesis (2.3.2(b) The Customary International Law). See Gál, Gyula, *Space Law,* Trans. Móra, (Leiden: A.W. Sijthoff, 1969), at 44; Matte, Nicolas Mateesco, ed. *Space Activities and Emerging International Law,* (Canada: Centre for Research of Air & Space Law, 1984), at 13; Vereshchetin, V.S. and Danilenko, Gennady M., "Custom as a Source of International Law of Outer Space", (1985) 13 *Journal of Space Law* 22, at 25; Lyall, Francis and Paul B. Larsen, *id*., at 54 and 71.

[17] There are some Malaysian cases that proved the acceptance of application of customary international law by the Malaysian courts' judges in deciding disputed cases, although the courts apply the customary international law as part and parcel of common law or through the medium of English common law. Those cases include: *Olofsen v Government of Malaysia [1966] 2 MLJ 300*; *PP v Oie Hee Koi [1968] 1 MLJ 148 (Privy Council Appeal from Malaysian Federal Court)*; *Village Holdings Sdn Bhd v Her Majesty the Queen in Right of Canada [1988] 2 MLJ 656 (High Court, Kuala Lumpur).* More information is available in Abdul Ghafur Hamid @ Khin Maung Sein, "Judicial Application of International Law in Malaysia: An Analysis", *supra* note 5.

relying on the above facts, it is submitted that Malaysia should enact the Malaysian space legislation because some space treaties' rules including the rules of responsibility and liability could be binding upon Malaysia on the grounds of international custom, although the state is not a party to any space treaties.

The fourth concerns the efficient implementation of space treaties' rules. Apart from implementation of the United Nations space treaties' legal rules at the international level, the treaties' rules may also be implemented at the state level. It is observed that merely implementing the space treaties at the international level is not a guaranteed means of successfully regulating space activities. However, the space treaties' rules are indeed becoming more effective when they are also observed at the state level. In other words, the international space treaties alone cannot become a successful mechanism for controlling and guiding space activities. In fact, the enactment of space legislation is also necessary to ensure the efficient implementation of the space treaties' rules, which should be done at the state level. This claim is made on the basis that, when a state becomes a party to the international space treaties, there is an obligation on the state's government to abide by the space rules stipulated therein only at the international level. There is no obligation on the state's nationals and private entities to legally observe the treaties' rules at the state level. This might lead to inefficient implementation of the space treaties' rules for regulating space activities at both international and state levels. Such a situation is likely to occur especially in states that apply the doctrine of transformation[18], such as Malaysia. In such a case, the Malaysian Government would have to transform the international treaties' rules into Malaysian municipal law through enactment of Malaysian space legislation to ensure that Malaysian nationals and private entities comply with the rules of space treaties. Consequently, the international space treaties' rules can be legally enforced at the state level, which then leads to the efficient implementation of the rules at the international level. For instance, the obligation imposed by the treaties' rules[19] requiring a state party to register or provide information to the United Nations regarding its space activities will not meet the purpose if the Malaysian Government

[18] For more information on the doctrine of transformation, read the first reason for the necessity of enacting the Malaysian space legislation, provided in Chapter 4 of the thesis (4.2. Reasons for Necessity).

[19] For instance, Article XI, Outer Space Treaty 1967 mentions: '… *State Parties agree to inform the Secretary-General … of the nature, conduct, locations and results of such activities …'*; Article II (1), Registration Convention 1975 states: *'When a space object is launched into Earth orbit … the launching state shall register the space object …'*; Article IV(1), Registration Convention 1975 prescribes: *'Each states of registry shall furnish to the Secretary-General of the United Nations … the following information …: (a) Name of launching state or states; (b) An appropriate designator of the space object or its registration number; (c) Date and territory or location of launch …'.*

is unable or fails to impose legal rules on its nationals or private entities requiring them to provide information to the Government on the object launched into space. This information obtained at the state level will then be transferred by the Malaysian Government to the United Nations in fulfilment of the state's international obligations. To conclude, it is necessary for Malaysia to enact space legislation municipally to ensure the effective implementation of the space treaties' rules internationally.

The fifth concerns the ability to control and monitor space activities. With the enactment of national space legislation, a state government can control and monitor the space activities of the country and its nationals. Since outer space is a new area with great potential for exploration by the state and private entities either for commercial purposes or on a non-commercial basis, it is vital for all states, including Malaysia, to control the activities of their nationals to ensure that they are in conformity with the international law provisions. Furthermore, the international space law[20] has indeed prescribed a rule that any space activities by private entities (non-governmental sector) must obtain authorization from the appropriate state. It further prescribes the obligation of the state to continue supervising such activities. In this circumstance, it is observed that Malaysia can control the activities of its nationals by including in its national space legislation the rules of authorization, as well as continuing to supervise the space activities.[21] The application of these rules of authorization and continuing supervision, which should be executed via the Malaysian space legislation, will certainly result in the Malaysian Government having the power and ability to control and monitor the space activities of the country as well as its nationals. This at last establishes the reasons for the necessity of enacting the Malaysian space legislation.

The sixth concerns the legal certainty and transparency of space legal rules. Malaysian space participants or any participants who conduct space activities in Malaysia shall be provided with legal certainty and transparency[22] of space legal rules. The law can offer definite guidelines on human activities, as well as defining illegal actions and possible penalties.[23]

---

[20] See Article VI, Outer Space Treaty 1967 states: *'... The activities of non-governmental entities in outer space ... shall require authorization and continuing supervision by the appropriate State Party to the Treaty ...'.*

[21] Zhao, Yun, "National Space Legislation, with Reference to China Practice", *Proceedings of the Space Law Conference 2006, Asian Cooperation in Space Activities: A Common Approach to Legal Matter, at Bangkok, Thailand, 2-3 August 2006,* (Montreal: Centre for Research of Air and Space Law, McGill University, 2007).

[22] UNGA, Committee on the Peaceful Uses of Outer Space, "Report on the United Nations/Ukraine Workshop on Space Law on the Theme "Status, Application, and Progressive Development of International and National Space Law," (Kyiv, 6-9 November 2006), A/AC.105/880, at 6.

[23] Zhao, Yun, "National Space Legislation, with Reference to China Practice", *supra* note 21.

With the enactment of Malaysian space legislation, Malaysian space actors or anyone else carrying out related activities in Malaysia or from Malaysian territory can confidently indulge in space activities. Any disputable and unclear matters including issues of ambiguous terms in the international space treaties can be resolved and defined at the municipal level via the space legislation. Indeed, such space legislation will provide a clear parameter of the dos and don'ts of space activities.

The seventh involves supporting the growth of space activities and space law. The enactment of Malaysian space legislation will indeed boost the development of Malaysian national space activities. Such enactment will also support the growth of national space legislation around the world by increasing the number of states that have domestic space legislation. Establishing space legislation to regulate the space activities of a state and its nationals will lead to a tremendous evolution of space activities in countries such as Malaysia. This claim is made on the basis that, with the existence of a comprehensive law to regulate activities, people will definitely become involved in such activities as they will naturally feel secure and protected under the law. As a result, many foreign investors will confidently invest their money in this sector, which may spontaneously boost the economy of Malaysia. Moreover, when Malaysia enacts space legislation, this automatically contributes to the development of national space legislation among the world space community.

The eighth is concerned with strengthening the rules of outer space. Space legislation can strengthen the rules of outer space. The space treaties are in fact only a basis and guideline on which space actors rely for their space activities. The treaties provide only the general legal rules, which require further interpretation and explanation. At this point, the role of space legislation comes to prominence as it can clarify and interpret the unclear or general matters mentioned by the treaties. For instance, Malaysia can clarify the unclear terms about outer space in the space treaties by defining its meaning in the Malaysian space legislation.[24] It can also resolve any issues on which the treaties offer no ruling. This can be done as long as it does not go against the spirit of international law. Such a situation is indeed important as the space legislation can rectify any inadequacies in the space treaties' rules and can thus be enforced at the state level. In short, these functions of national space legislation offer a

[24] For more information on suggestions regarding the meaning of outer space, refer to Chapter 4 of the thesis (4.4.1. The Scope of Law).

definite direction to space actors as well as strengthening the rules of outer space law as a whole.

The ninth concerns the contribution to the orderly use of outer space. The space legislation can contribute to the orderly use of outer space. It is well known that space is a very fragile place that needs constant preservation. It is an area of great potential in terms of exploration for commercial and non-commercial purposes. If such an area is used in a disorderly manner, such as being subject to contamination, it will be exposed to the danger of destruction. To resolve such a matter would surely involve great cost. To avoid such circumstances, space legislation is an effective option to support the international law in order to ensure the orderly use of outer space. The space legislation can be viewed as an efficient mechanism for states that have such legislation to monitor and control their nationals in respect of their space activities. From the perspective of Malaysia, the enactment of Malaysian space legislation will ensure that Malaysian nationals and private entities who conduct space activities from the state's territory comply with the rules and regulations; this will certainly contribute to the orderly conducting of space activities.

The tenth concerns the promotion of space commercialization activities. The space legislation can promote the space commercialization activities of states, particularly those involving private entities. Space commercialization is a new dimension of profit-making business that has great potential to burgeon in the future. Even at present, it has shown a positive development in the related area, especially the space tourism sector.[25] With the rapid evolution of space technology, it is expected that the cost of travelling to outer space will fall in the future. This phenomenon may boost the involvement of many private space enthusiasts, which will inevitably increase the commercialization of space activities. At this juncture, it is observed that the space legislation will play its role in regulating the commercialization of space activities conducted by states' nationals by ensuring that they are in conformity with the spirit and values of international law. This will be done particularly in relation to matters not covered by the United Nations space treaties, such as defining the meaning of 'space tourist'. In Malaysia, it is highly recommended that the Malaysian space legislation be enacted since there is evidence that Malaysian nationals and the private sector

---

[25] For information on space tourism, see http://en.wikipedia.org/wiki/Space_tourism, accessed: 14 May 2014; read also Phillips, Scott C., *Current and Future Legal Implications of Space Tourism and Beyond,* Master Thesis LL.M Air and Space Law, (Leiden: University of Leiden Faculty of Law, Institute of Air and Space Law, 2007).

have a great interest in venturing into the space tourism sector.[26] These circumstances will indeed encourage the commercialization of space activities in Malaysia.

The eleventh is the matter of a reliable supervisory space legal framework. It is necessary for a country such as Malaysia (with no specific space legislation) to have national space legislation in order to have a reliable supervisory space legal framework. In the process of developing Malaysian space legislation, there is a need for a certain process of discussion. This should be a thorough discussion involving all space actors and contributors inclusive of the governmental and private sector, as well as legal draftsmen. This national space legislation must be enacted in such a way that it is incorporated with legal rules that will strike a balance between safeguarding the interests of the Malaysian Government and encouraging the growth of space activities in the private sector. Simultaneously, it should be remembered that such rules must also be designed to uphold the international space law as prescribed by the international space treaties of the United Nations. This situation is crucial in order to ensure the best outcome or product for a state. A successful, reliable supervisory space legal framework will indeed be viewed as a successful guideline for ensuring the continuous growth of the country's national space activities. Hence, dependable Malaysian space legislation will be relied on by, for instance, Malaysian space actors or any others who conduct space activities within Malaysian jurisdiction. Furthermore, it will be considered a great achievement for a small country such as Malaysia, given that its neighbour states have yet to enact such a law.[27]

4.3. SOME MAJOR ASPECTS OF DRAFTING MALAYSIAN SPACE LEGISLATION

In the process of developing and drafting national space legislation, various major aspects need to be considered by a state in order to produce the best outcome for the legislation. An excellent outcome of space legislation may affect the involvement and participation of the state and its nationals in outer space activities. Furthermore, a comprehensible and transparent legal framework may also persuade foreign investors to invest in the country's related industries, consequently boosting the national economy.

[26] The Malaysian space activities of the private sector in Malaysia are discussed in Chapter 1 of the thesis (1.3.2. Non-Governmental Sector).
[27] For the development of space law, bodies, and activities of Malaysia's neighbouring countries, read Chapter 3 of the thesis (3.6. The Neighbouring Countries).

In view of the above, this section outlines at least seven points that Malaysia should take into account during the drafting process of its national space legislation. They are: the state national policy compliance, the state national interest, the national legal system compliance, the existing domestic law coordination, the international space law coordination, harmonization of certain legal aspects, and the sustainability of space activities.

4.3.1. The National Policy Compliance

The national policy compliance is one of the most important aspects that Malaysia needs to consider in drafting its space legislation. The national space legislation should be drafted in parallel with the country's national policy in order to achieve its future goals efficiently. In such matters, since there is no official formulation of a specific national space policy[28] available to Malaysia, this section will look into other available Malaysian national policies and programmes. These include the following: Malaysia's Vision 2020, Malaysia's Economic Transformation Programme, Tenth Malaysia Plan, Malaysia's New Economic Model, and other related policies, visions and missions of various relevant Malaysian Ministries.

Vision 2020 or *Wawasan 2020*[29] is a Malaysian ideal that calls upon the Malaysian nation to achieve its ultimate target: to become a fully developed country by the year 2020, not only in an economic sense but also in the political, social, spiritual, psychological, and cultural spheres.[30] Apart from the aim of becoming a developed country, Malaysia also aims to become a high-income nation by the same year through its Economic Transformation Programme.[31] In such circumstances, the Malaysian national space legislation should be

---

[28] The Malaysian national space policy's first draft is expected to be finalized in the final quarter of 2013. See Malaysia Permanent Mission to the United Nations, "Statement by Colonel Nazari Abd Hadi, Representative of Malaysia, on Agenda Item 51: International Cooperation in the Peaceful Uses of Outer Space, at the Fourth Committee of the 67th Session of the United Nations General Assembly, New York, 18 October 2012," http://www.un.int/malaysia/GA/67/2012-10-18%20Outer%20Space.pdf, accessed: 22 April 2013. For more information, read Chapter 1 of the thesis (1.2.1. The Malaysian Space Policy and the Malaysian Outer Space Bill).

[29] Vision 2020 was introduced by the former Malaysian Prime Minister, Tun Dr. Mahathir bin Mohamad, the fourth Prime Minister, during the tabling of the Sixth Malaysia Plan in 1991. See http://en.wikipedia.org/wiki/Wawasan_2020, accessed: 20 April 2013.

[30] For more information on Vision 2020, see http://www.wawasan2020.com/vision/p2.html, accessed: 22 April 2013.

[31] Malaysia's Economic Transformation Programme is an initiative by the current (sixth) Malaysian Prime Minister, Datuk Seri Najib Tun Razak. It consists of a comprehensive effort that will transform Malaysia into a high-income nation by 2020. It comprises four foundations: (1) 1Malaysia, People First, Performance Now; (2) Government Transformation Programme; (3) New Economic Model; and (4) Tenth Malaysia Plan. For more

drafted in a way that helps to achieve the vision by encouraging and supporting the establishment of a scientific and progressive society whose members will be both technology consumers and significant contributors to the future scientific and technological civilization.[32] Moreover, it should also be drafted in such a way that it will secure the establishment of Malaysia's competitive economy. This will be an economy that is technologically proficient, and fully able to adapt, innovate and invent, as well as move in the direction of advanced technology.

Aside from that, the development of the Malaysian national space law should also correspond to Malaysia's Vision 2020 in respect of the function of the private sector. Since the private sector is treated as a primary engine of the country's economic growth,[33] the national space law should be drafted in a way that will encourage the participation of the private sector in space activities. The significance of the private sector's involvement in increasing the Malaysian economy has been mentioned not only in the Vision 2020 but also in the Tenth Malaysia Plan[34] and Malaysia's New Economic Model.[35] At this juncture, Malaysia is recommended to encourage the involvement of its private sectors in outer space-related sectors, as well as other sectors. This can be implemented by providing them with the space legal framework that supports their engagement. By doing so, Malaysia would have a great opportunity to enlarge its economy, as space-related activities are regarded as potentially very lucrative profit-making activities.

The Tenth Malaysia Plan supports economic growth based on innovation and productivity;[36] thus, the enactment of the Malaysian space legislation can enhance the country's policy provided that it is drafted in a way that encourages innovation and productivity in the related

---

details, see http://etp.pemandu.gov.my/About_ETP-@-Part_Of_A_Comprehensive_Government_Agenda.aspx, accessed: 17 October 2011; http://etp.pemandu.gov.my/download_centre.aspx, accessed: 14 May 2014.

[32] See *supra* note 30.

[33] See *id*.

[34] Tenth Malaysia Plan is the Malaysian Government's development plan outlined for the five-year period 2011-2015. See Chapter 3, Tenth Malaysia Plan 2011-2015 (Putrajaya: The Economic Planning Unit, Prime Minister's Department, 2010), http://www.pmo.gov.my/dokumenattached/RMK/RMK10_Eds.pdf. See also Garis Panduan Pertama Penyediaan Rancangan Malaysia Kesepuluh, 2011-2015: Prospek Ekonomi dan Hala Tuju Strategik, at 4, http://www.epu.gov.my/html/themes/epu/html/RMKE10/rmke10_english.html, all accessed: 22 April 2013.

[35] Malaysia's New Economic Model comprises the Malaysian Government plan or strategic reform initiatives that will speed Malaysia's transition to a high-income country. Refer Ringkasan Eksekutif, Model Ekonomi Baru Untuk Malaysia, Bahagian I: Hala Tuju Dasar Strategik, (Kuala Lumpur: Majlis Penasihat Ekonomi Negara, 2011), at 24, http://www.kpkk.gov.my/pdf/artikel/model_ekonomi_baru,pdf, accessed: 22 April 2013.

[36] See Chapter 3, Tenth Malaysia Plan 2011-2015 and Garis Panduan Pertama Penyediaan Rancangan Malaysia Kesepuluh, *supra* note 34.

technology. This claim is made on the basis that the space sector could potentially be saturated with innovation and productivity. Meanwhile, the Malaysian New Economic Model highlights that the existence of fair and trusted legal rules will provide investors with the confidence to invest in the country.[37] At this point, in order to encourage investors to invest their money, particularly in Malaysian outer space activities, it is vital to develop excellent space legislation that not only supports the development of the related activities but also gives assurance that the rights of those involved will be protected.

Apart from the above, other policies, visions and missions of various related Malaysian Ministries, including Ministry of Science, Technology and Innovation (MOSTI) and Ministry of Higher Education, should also be considered. For instance, the National Science and Technology Policy 2,[38] formulated by the MOSTI, mentions that the national science and technology vision is to produce a nation that is competent, confident and innovative in harnessing, utilizing and advancing science and technology towards achieving the Vision 2020 goal. Its goal is to accelerate the development of science and technology capabilities with the aim of positioning Malaysia as a technology provider in certain industries including the aerospace industry. Indeed, the MOSTI has a mission to drive and manage science, technology and innovation for socioeconomic growth by sourcing and diffusing new technology, intensifying creativity and innovation, strengthening market-driven research and development, and strengthening collaborations and partnerships.[39] Again, the national space legislation should be developed to correspond to all these visions and missions.

It is also suggested that, apart from supporting the expansion of space technology, the Malaysian space law should be drafted in a way that supports and encourages the growth of space education in Malaysia. At this point, the Malaysian space legislation should consider the policy, visions and missions of Malaysian education as well. For instance, it should be drafted in parallel with the Ministry of Higher Education's vision to turn Malaysia into a centre of excellence for higher education by the year 2020.[40] In other words, the legal

[37] Garis Panduan Pertama Penyediaan Rancangan Malaysia Kesepuluh, *supra* note 34, at 18.
[38] See Dasar Sains Teknologi Negara 2, MOSTI, http://www.mosti.gov.my/index.php?option=com_content&view=article&id=2032&Itemid=611&lang=en, accessed: 22 April 2013.
[39] See http://www.mosti.gov.my/index.php?option=com_content&view=article&id=1764&Itemid=57&lang=en, accessed: 22 April 2013.
[40] See http://www.mohe.gov.my/portal/info-kementerian-pengajian-tinggi/misi-dan-visi.html, accessed: 22 April 2013.

framework should be drafted in a way that assists the Malaysian Government to achieve its goal in becoming a higher education centre of excellence, including for space legal and non-legal education.

4.3.2. The National Interest

National interest is another aspect that Malaysia needs to consider in drafting its national space legislation. The national legislation of a country should be developed in accordance with its national interest. Such legislation should, in fact, support its national interest as long as such interest is not against the law and policy of the government. With respect to the Malaysian outer space sector, as indicated in Chapter 1,[41] Malaysian nationals have shown great interest in participating in outer space-related activities. This includes certain groups in the Malaysian non-governmental sector. For instance, the Space Tourism Malaysia Chapter (STS-MC) is a Malaysian non-governmental organization actively involved in outer space-related activities nationally and internationally. MEASAT Satellite System Sdn Bhd is another example of a Malaysian non-governmental company involved in the industry.[42]

Even though the involvement of the Malaysian private sector in the related activities is not as large as that of the public sector, such participation can be viewed as a great contribution to the development of the Malaysian outer space industry. In fact, the Malaysian Government should offer more opportunities to the private sector to indulge further in the related activities. This can be achieved by providing the private sector with various relevant facilities and support, such as financial support. In such circumstances, the space-related industry would grow in a balanced way between the public and private sectors, in parallel with the policy and aim of the Malaysian Government to achieve its target of becoming a high-income and fully developed nation by the year 2020. Furthermore, the space sector could be a source of income for the Malaysian nation since the related technology would offer many opportunities for profit-making businesses.

There are many promising opportunities for Malaysian nationals to engage further in the space sector. These include various activities in which the public and private sectors are

[41] See Chapter 1 of the thesis (1.3.1. Governmental Sector; and, 1.3.2. Non-Governmental Sector).
[42] See Chapter 1 of the thesis (1.3.2(a) MEASAT Satellite System Sdn Bhd); and (1.3.2(b) Malaysian Institute of Aero and Space Studies (IKAM) and Space Tourism Society Malaysia Chapter (STS-MC).

already involved. But many other opportunities should also be considered as future ventures for the sake of the further development of Malaysian space activities. The activities engaged in by Malaysia include satellite manufacturing, satellite launching (*via* foreign launchers), sending men into space, conducting scientific research in space, telecommunications and broadcasting, meteorology, remote sensing, and navigation.

Apart from those activities, space tourism is another area of interest that is gaining the attention of the Malaysian private sector.[43] This is a new and promising commercial space activity that has the potential to develop in Malaysia in the future. At this juncture, Malaysia may progress further, for instance, by developing a commercial spaceport to launch space tourists into space. This possibility is based on the fact that Malaysia is located in a strategic area near the equator. This special circumstance should be particularly utilized by the space sector as launches are more efficient,[44] and the cost of travelling or sending people into space can be reduced. Moreover, it is also in the private sector's interest to develop a Malaysian-owned reusable launch vehicle with the aeroplane concept.[45] Besides the building of a reusable launch vehicle and a spaceport for launching tourists, there have also been suggestions on building a Malaysian spaceport that can accommodate the launch of Malaysian satellites.[46]

In view of the above, it is established that Malaysian nationals, in both the public and private sectors, have shown great interest in participating in space-related activities. Thus, it is submitted that the process of developing and drafting the Malaysian national space legislation should take into account the Malaysian national interest to become involved in the related matters by also considering the varying nature of such activities. By doing so, the Malaysian space legislation would not only assist the development of Malaysian space activities, in the sense that it would provide legal guidelines and protect the interests of Malaysian space actors, but would also support the growth of the related industry, which would contribute to the expansion of the Malaysian economy.

---

[43] See Chapter 1 of the thesis (1.4. Applications and Activities).
[44] Mazlan Othman, "Next Steps along Malaysia's Trajectory to Space", *TiungSAT-1, From Inception to Inauguration,* Eds., Mazlan Othman and Ahmad Sabirin Arshad, (Kuala Lumpur: Astronautic Technology (M) Sdn Bhd, 2001), at 225.
[45] For more information, read Chapter 1 of the thesis (1.3.2. Non-Governmental Sector and 1.4. Applications and Activities).
[46] See Chapter 1 of the thesis (1.4. Applications and Activities).

4.3.3. The National Legal System Compliance

Apart from considering the state's policies and the interest of nationals, compliance with the national legal system is another considerable aspect of developing national space legislation. In other words, a national space law should also comply with the domestic requirements of the state's legal system[47] in order to ensure the law is valid and authoritative. Malaysia is mainly governed by a written constitution: the Malaysian Federal Constitution.[48] Since it is considered the supreme law of the land, all laws and regulations inclusive of the Malaysian space law should comply with the Federal Constitution. Should the Malaysian space law contravene the Constitution, it will be declared null and void. A good example concerns the legislative competencies with regard to the country's outer space law. As discussed in Chapter 1,[49] the Malaysian Federal Constitution provides three lists (Federal List, State List, and Concurrent List) under its Ninth Schedule in relation to the distribution of legislative power. Such power was allocated to the two main legislative actors, namely the Federal Legislature (the Malaysian Parliament) and the State Legislatures (the Legislative Assembly).[50] As discussed earlier,[51] it is highly likely that the legislative jurisdiction and power in relation to space law matters will be a competence of the Federal Government. Thus, in the event of the enactment of the Malaysian space law being conducted beyond the competencies of the allocated legislature, such a law would be declared invalid.

The enactment of space legislation should also comply with the Malaysian national legal system in terms of its legislative process. The enactment of the Malaysian space legislation must follow certain procedures. In short, the legislative process involves two main stages. The first stage is called the pre-parliamentary stage. This stage involves proposal, consultation, and drafting stages. The proposal of space legislation may indeed come from

[47] UNGA, Committee on the Peaceful Uses of Outer Space "Report on the United Nations/Ukraine Workshop on Space Law on the theme "Status, Application, and Progressive Development of International and National Space Law" *supra* note 22.
[48] Discussion on the Malaysian Federal Constitution is available in Chapter 1 of the thesis (1.2.2. The Malaysian Federal Constitution).
[49] See *id*.
[50] Read Ninth Schedule, Article 44 - Article 68 (Federal Legislature), and Article 70 - Article 72 (The States) of the Malaysian Federal Constitution (Law stated is as at 20 June 2011), (Kuala Lumpur: Penerbitan Akta (M) Sdn Bhd, 2011).
[51] Read Chapter 1 of the thesis (1.2.2. The Malaysian Federal Constitution).

various sources.[52] Such a proposal will be subject to discussion and consultation with the relevant bodies and authorities. The outcome of the discussion, which takes the form of an outline proposal, will be sent to the Parliamentary Draftsperson in the Malaysian Attorney-General's Chambers. It will then be transformed into legal language and become a 'Bill'. This Bill must be approved by the Malaysian Cabinet before it enters the second stage, the Parliamentary stage. At the Parliamentary stage, the legislative procedure involves various phases, namely first reading, second reading, committee stage, third reading, Houses stage, Royal Assent, and publication.[53] It should be noted that the Bill has to successfully pass through all these stages before it comes into force as a Malaysian Act of Parliament.

4.3.4. Existing Domestic Law Coordination

Domestic space law coordination is another aspect that a state needs to consider in developing its national space legislation. At this point, the Malaysian national space legislation must be drafted and enacted in accordance with the country's existing domestic laws. Aside from the Malaysian Federal Constitution, which was discussed earlier,[54] certain other operational domestic laws that are relevant to the subject matter should also be taken into consideration. This is vital in order to ensure that the Malaysian national space legislation is coordinated with other relevant Malaysian laws. This will avoid any unnecessary overlapping between the newly enacted laws and the existing laws.

Apart from the Malaysian Federal Constitution, Malaysia already has, for instance, a number of legislative instruments relating to outer space activities. These include the Malaysian

---

[52] The proposal may come from a government department, policy decision of a ministry, recommendation of a Royal Commission and others. See Wan Arfah Hamzah and Ramy Bulan, *An Introduction to the Malaysian Legal System,* (Shah Alam: Penerbir Fajar Bakti Sdn Bhd, 2004), at 45.

[53] At the first reading stage, the Bill will be formally introduced and its short Title read by a Minister. The Bill text is then printed and distributed. At the second reading, the printed version will be debated, followed by a vote. At the committee stage, the Bill will then be considered in detail, and some amendments may take place. At the third reading, the Bill will be reviewed and opened to further debate. Any amendment may be put to a vote. Substantial amendment at this stage is not allowed unless permission is granted. The Bill will then be sent to a House: at this stage it involves two Houses (Senate or *Dewan Negara*, and House of Representative or *Dewan Rakyat*). When the Bill has passed one House, it will then be sent to the other House. If the second House amends the Bill, it must be returned to the first House for its approval. Royal Assent: when the Bill has passed both Houses, it is sent to the King (*Yang di-Pertuan Agong*) for the Royal Assent. The Public Seal will be affixed within 30 days of presentation. Publication: the bill will become a law and comes into force upon publication. See Chapter 5, Part IV of the Malaysian Federal Constitution. See Wan Arfah Hamzah and Ramy Bulan, *supra* note 52, at 47. Read also Wu Min Aun, *The Malaysian Legal System,* 3rd ed., (Petaling Jaya: Pearson Malaysia Sdn Bhd, 2005).

[54] See Chapter 1 of the thesis (1.2.2. The Malaysian Federal Constitution).

Communications and Multimedia Act 1998,[55] the Malaysian Communications and Multimedia Commission Act 1998,[56] the Communications and Multimedia (Licensing) Regulations 2000[57] and others, as mentioned in Chapter 1.[58] Hence, the development of the Malaysian space legislation should be done in compliance with all those existing laws. This means that, when the laws and regulations are already available, such as with respect to matters relating to communications, multimedia and the licensing procedure in Malaysia, the Malaysian space legislation should not deal with such matters. However, it should be drafted in a way that covers and provides the legal certainty and transparency in matters dealing with outer space activities that are not yet covered and regulated by any Malaysian laws and legislation. This would include, for instance, laws in relation to the launching of space objects and their operation, the licence application and its procedure, the registration obligation, the liability and indemnification rules, and so forth.

4.3.5. International Space Law Coordination

The rules of the domestic space law of a state should correspond to the international law of outer space.[59] Hence, to develop Malaysian space legislation, it must be compatible with the rules of the international law of outer space. This claim is made on the premise that, since the nature of outer space activities of a state predominantly involves relations with other states (in other words, international relations), it is important for states to ensure that their domestic space laws are, as far as possible, in agreement with the rules of the international law of outer space. Such circumstances are, in fact, vital to avoid the dilemma of inconsistency between domestic space laws and the international space legal rules. Furthermore, it is enshrined in the United Nations principles and outer space conventions that states must carry out their space explorations and activities in accordance with the international law.[60]

---

[55] For more information read Chapter 1 of the thesis (1.2.3. The Malaysian Communications and Multimedia Act 1998) (Act 588).

[56] For more information read Chapter 1 of the thesis (1.2.4. The Malaysian Communications and Multimedia Commission Act 1998) (Act 589).

[57] For more information read Chapter 1 of the thesis (1.2.5. The Communications and Multimedia (Licensing) Regulations 2000).

[58] For more information read Chapter 1 of the thesis (1.2.6. Other Applicable Laws).

[59] Bordunov, V.D., "Problem of Interaction between International Outer Space and Domestic Law", (1985) 27 *IISL Colloquium on Law of Outer Space* 23.

[60] See Principle 2, Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space, 1963, (hereinafter 'Declaration of Legal Principles 1963'), and Article III, Outer Space Treaty 1967.

It is agreed that, since the United Nations space conventions serve as a foundation of the international space law, it was strongly recommended that the state legislation be developed in compliance with the international obligations.[61] Such international obligations are stipulated in outer space conventions, especially the Outer Space Treaty 1967.[62] The implementation of outer space international obligations should indeed serve as the legal basis of developing national space legislation,[63] including Malaysian space legislation. There are various obligations and rules prescribed by the space conventions that Malaysia needs to consider in the enactment of its space legislation. These include the authorization and continuing supervision, the responsibility and liability rules, the registration obligation, freedom of exploration and use, international peace and security, international cooperation and understanding, and non-appropriation rules.

The authorization and continuing supervision obligation[64] is the first international obligation that must be implemented[65] in the Malaysian space legislation. This is important in order to ensure that the Malaysian Government is able to control the space activities of its nationals. In agreement with the international space law, which imposes a rule that a state should be held responsible and liable for its space activities and those of its nationals,[66] it is significant for Malaysia to implement the authorization and continuing supervision rules in its national space legislation. This is important to ensure that Malaysian nationals' space activities are carried out in conformity not only with the national space rules but also with the international space law. At this juncture, the Malaysian Government can control and monitor its nationals' space activities via the authorization and supervision rules enacted in its space legislation.

---

[61] UNGA, Committee on the Peaceful Uses of Outer Space "Report on the United Nations/Ukraine Workshop on Space Law on the theme "Status, application, and progressive development of international and national space law", *supra* note 22.

[62] Kerrest, Armel, "The Need to Implement the Outer Space Treaty through National Law in the Light of the Current and Foreseeable Space Activity", *IISL/ECSL Symposium on "National Space Legislation –Crafting Legal Engines for the Growth of Space Activities", 22 March 2010, Legal Subcommittee Forty-Ninth Session 2010,* http://www.unoosa.org/oosa/en/COPUOS/Legal/2010/symposium.html, accessed: 22 April 2013.

[63] Gerhard, Michael and Kai-Uwe Schrogl, "Report of the Working Group on National Space Legislation", *Project 2001, Legal Framework for the Commercial Use of Outer Space, International Colloquium, at Cologne, 29-31 May 2001.* Ed. Institute of Air and Space Law, Cologne University and Deutsches Zentrum fur Luft-und Raumfahrt (DLR), (2001), at 7.

[64] Article VI, Outer Space Treaty 1967 and Principle 5, Declaration of Legal Principles 1963.

[65] Gerhard, Michael and Kai-Uwe Schrogl, *supra* note 63.

[66] Article VI and VII, Outer Space Treaty 1967. Read also Principle 5 and 8, Declaration of Legal Principles 1963, and the Liability Convention 1972.

The rules on the state's responsibility and liability[67], particularly for its national space activities at the international level, will, in fact, expose the Malaysian Government to unlimited financial risk. In this situation, such international rules can be modified, as appropriate, at the municipal level to safeguard the interest of the Government of Malaysia. Thus, the protection of the Government of Malaysia from financial risk should be treated as one of the top-priority considerations. It should therefore be considered along with the legal basis[68] in developing the Malaysian space legislation. This can be done as long as it does not contravene the international obligations and laws, for instance, by introducing the appropriate indemnification rules including the compulsory insurance requirement.

Another important obligation for consideration is the registration obligation. The international space law introduces a mandatory system of registering objects launched into space. It further requires the state to establish a national registry for registration of its space objects.[69] This is done to assist the identification of space objects,[70] especially in the event of any accident or damage caused by the space object. Furthermore, it is vital since the international space law prescribes that the registry state shall retain jurisdiction and control over the space object.[71] Thus, such obligation should be taken into account when developing the Malaysian space legislation in order to legalize and then implement it at the national level. By doing so, it will coordinate the rules and obligations of registration of space objects at both national and international levels.

The situation is similar in respect of other rules such as the freedom of exploration and use, international peace and security, international cooperation and understanding, and non-appropriation rules. On this point, the Malaysian Space Act must be drafted and enacted in a way that recognizes the rule of freedom of exploration and use of outer space,[72] strengthens the international peace and security of space activities,[73] promotes and supports international cooperation and understanding among space actors,[74] and emphasizes the non-appropriation

[67] *Id*
[68] Gerhard, Michael and Kai-Uwe Schrogl, *supra* note 63.
[69] See Article II, Convention on Registration of Objects Launched into Outer Space (1974) (Resolution 3235 (XXIX)), adopted on 12 November 1974, opened to signature on 14 January 1975, entered into force on 15 September 1976. 28 UST 695, 1023 UNTS 15, TIAS 8480 (hereinafter, 'the Registration Convention 1975').
[70] See Paragraph 8, Preamble of the Registration Convention 1975.
[71] Article VIII, Outer Space Treaty 1967; see also Principle 7, Declaration of Legal Principles 1963.
[72] Article I, Outer Space Treaty 1967; Principle 2, Declaration of Legal Principles 1963.
[73] Article IV, Outer Space Treaty 1967; Preamble, Declaration of Legal Principles 1963.
[74] Article III, Outer Space Treaty 1967; Principle 6, Declaration of Legal Principles 1963.

principle with respect to outer space, including the moon and other celestial bodies.[75] By incorporating all those rules and obligations in the Malaysian Space Act, such legislation will certainly be coordinated with the international space law. Thus, it will provide a significant contribution to the growth of the national space legislation with the enhancement of the implementation of the international obligations and rules at the domestic level.

4.3.6. Harmonization of Certain Legal Aspects

States should consider harmonizing certain legal aspects of their national space legislations.[76] Such harmonization is worthwhile in the sense that the nature of space activities principally involves relations among various states. Since the conducting of a space activity might involve more than one state, the harmonization of certain aspects of the space legal rules of those different states will bridge the gap and disparity between the rules and procedures involved among the world's space countries. Such a situation will, in fact, avoid the confusion caused by an over-abundant variety of national space laws and procedures among the countries involved. Indeed, such harmonization might enable space actors to feel comfortable and natural even though they are in a foreign state and dealing with foreign laws. This occurs because space actors are familiar with the laws that are similarly functional in their own countries. In fact, such a situation might save time in certain cases. For instance, a space actor can skip certain procedures if satisfied that such procedures have already been executed and fulfilled by the space actor in another appropriate state, as accepted. Such circumstances will certainly encourage foreign states to further enhance their international cooperation and relations with other states that have harmonized their laws. This is also vital to promote the growth of states' national space industries.

At this point, it should be remembered that harmonization can only be executed if it does not jeopardize the interest of the Government of Malaysia, and does not contravene the policies

---

[75] Article II, Outer Space Treaty 1967; Principle 3, Declaration of Legal Principles 1963.

[76] Gerhard, Michael and Kristina Moll, "Perspectives for More National Space Legislation: Introduction by Rapporteurs", *'Project 2001 Plus' – Global and European Challenges for Air and Space Law at the Edge of the 21st Century',* Proceedings of an International Symposium Cologne, 8-10 June 2005, to conclude 'Project 2001 Plus', Schriften zum Luft- und Weltraumrecht/Studies in Air and Space Law, Band 20 / Volume 20, Eds. Hobe, Stephan, Bernhard Schmidt-Tedd and Kai-Uwe Schrogl, (Koln: Heymanns, 2006), at 22; Gerhard, Michael and Kai-Uwe Schrogl, "A Common Shape for National Space Legislation in Europe Summary of Findings and Conclusions of the Project 2001 Plus Workshop", (2005) 47 *IISL Colloquium on Law of Outer Space*, at 82; Gerhard, Michael and Kai-Uwe Schrogl, "Report of the Working Group on National Space Legislation**",** *supra* note 63, at 21.

and laws of Malaysia. There are certain aspects that Malaysia can consider for harmonization[77], such as the duration of the administrative procedure for granting authorization to conduct space activities, acceptance of foreign authorization, and implementation of the right of recourse and its limitation.

In short, regarding the duration of administrative procedures in granting authorization to conduct space activities, the suggestion for harmonization is that it should not exceed an upper limit of six months after the receipt of an application.[78] For foreign authorization, it is worthwhile for Malaysia to consider harmonizing this aspect for simplification of the authorization procedures. This means that a foreign authorization to conduct space activities might also be accepted in Malaysia, rather than Malaysia having to give its own authorization, provided that it complies with the state's legislation. The situation is similar with the implementation of the right of recourse and its limitation, as it is worth harmonizing such a rule to encourage and support the engagement of the space private sector. The right of recourse and its limitation is important in the event of the state being held liable for damage caused by its private actor. The state can have recourse against the private actor, although such recourse is subject to certain limitations, for instance to the insured sum only. This situation will in fact encourage the participation of the private sector. This facility, however, should not apply in cases of damage resulting from the wilful misconduct or negligence of the space actor. All these aspects will be discussed further in Chapter 4 of the thesis.[79]

4.3.7. Sustainability of Space Activities

Another significant aspect that needs to be taken into account in developing Malaysian space legislation is the sustainability of the Malaysian space activities. At this juncture, the sustainability of space activities is important in the sense that the Malaysian Government needs to ensure that its space activities are maintained and that they will grow or expand in

[77] Gerhard, Michael, "National Space Legislation-Perspectives for Regulating Private Space Activities", *Space Law: Currents Problems and Perspective for Future Regulation,* Eds., Benkö, Marietta and Kai-Uwe Schrogl, (Utrecht: Eleven International Publishing, 2005), at 84-87; Gerhard, Michael and Kai-Uwe Schrogl, "A Common Shape for National Space Legislation in Europe Summary of Findings and Conclusions of the Project 2001 Plus Workshop", *id.*; Gerhard, Michael and Kristina Moll, "Perspectives for More National Space Legislation: Introduction by Rapporteurs", *id.*, at 28-41.

[78] Gerhard, Michael and Kai-Uwe Schrogl, "A Common Shape for National Space Legislation in Europe Summary of Findings and Conclusions of the Project 2001 Plus Workshop", *supra* note 76, at 86; Gerhard, Michael and Kristina Moll, "Perspectives for More National Space Legislation: Introduction by Rapporteurs", *supra* note 76, at 28-29.

[79] Read Chapter 4 of the thesis (4.4. Shaping the Malaysian Space Law).

the future through the implementation of the Malaysian Space Act. In other words, to ensure the sustainability of the Malaysian space activities, the Malaysian Space Act should be drafted to support and encourage the continuous growth of the national space activities. This view is based on the fact that continuous development of national space activities is, in fact, dependent on the policies and legal rules of a country. Should a rule be drafted in a way that hinders the progress of the national space activities, this would certainly defeat the development of such activities. Thus, Malaysia, as a space actor, must ensure that its national space legislation is drafted to allow the constant development of its present and future outer space activities.

There are various aspects that Malaysia can consider in developing its space legal rules in order to ensure the sustainability of the country's space activities. These include the involvement of the Malaysian private sector. Apart from the public sector, the Malaysian private sector also has the potential to offer significant contributions to the sustainable development of Malaysian space activities. Therefore, the Malaysian Space Act should incorporate rules that encourage the participation and involvement of the private sector, as well as the public sector. Moreover, to ensure the sustainability of such activities, the space legislation should be enacted to provide facilities for space actors to become further involved in the activities, such as the enactment of the rules of limitation in the right to recourse.[80] This rule is likely to encourage the private sector to participate further in the activities. It is important that, should the state be held liable for damage done by its private sector, it has the right to recourse from its private sector, albeit to a limited amount, such as up to the insured sum only. If the compensation amount claimed is more than the insured sum, the state must then bear the balance of the cost. Such circumstances can indeed be regarded as a significant contribution by the state to the development of space activities involving private space actors. This situation will then certainly lead to the sustainability of the Malaysian space activities.

Other ways of ensuring the sustainability of Malaysian space activities include enacting rules to simplify the long and complicated procedures for granting authorization space activities to the space actors. A long and complicated process of applying authorization may affect the progress of national space activities and the enthusiasm of private space actors. The

[80] Gerhard, Michael and Kristina Moll, "Perspectives for More National Space Legislation: Introduction by Rapporteurs", *supra* note 76, at 37-39; Gerhard, Michael and Kai-Uwe Schrogl, "A Common Shape for National Space Legislation in Europe Summary of Findings and Conclusions of the Project 2001 Plus Workshop", *supra* note 76, at 84-85.

simplification of the authorization may, in fact, attract many private-sector actors to become involved in Malaysian space activities, including foreign participants. However, along with the simplification of the long process of application for authorization, the recognition of foreign authorization[81] would also contribute greatly to the sustainability of the Malaysian space activities.

Apart from the above, Malaysia should also consider enacting rules on providing consultancy services for Malaysian space activities. Such consultancy services would aim to offer advice and guidance on the Malaysian space activities, especially for the private sector newly involved in such activities. It is hoped that such a service would promote the sustainability of the Malaysian space activities.

4.4. SHAPING THE MALAYSIAN SPACE LAW

States are required to observe the United Nations space obligations when conducting their space activities. As is the case in Malaysia, a requirement to observe the space obligations imposed by the United Nations in its space conventions arises when the state performs its outer space activities and also particularly when the state becomes a party to the treaties. For an effective performance of its obligations, Malaysia should abide by such obligations not only at the international level but also at the national level. Implementation of the obligations at the national level is possible only by way of domestication or incorporating such obligations into Malaysian national law. Furthermore, it is critical for Malaysia to be aware of its possible liabilities at the international level, and also for it to be categorized as a launching state. Therefore, in such circumstances, Malaysia must be prepared to adequately protect itself against any possible liability arising from its private space activities. In view of this, the state must be able to control and regulate its private space activities by providing clear guidelines. This could be realized by the establishment of a Malaysian space legal regime. Such a legal regime would incorporate matters such as licensing, registration of space

[81] Gerhard, Michael and Kristina Moll, "Perspectives for More National Space Legislation: Introduction by Rapporteurs", *supra* note 76, at 30-31; Gerhard, Michael and Kai-Uwe Schrogl, "A Common Shape for National Space Legislation in Europe Summary of Findings and Conclusions of the Project 2001 Plus Workshop", *supra* note 76, at 83-84.

objects, liability, safety, and a system for financial responsibility including the indemnification and insurance requirements.[82]

In view of the above, this section deals with the construction of the Malaysian space law. However, at this juncture it should be noted that, apart from the Malaysian space legislation, there is a possibility that other Acts or regulations on details will appear later. Thus, this part will focus only on the shaping of Malaysian outer space legislation in respect of six principal legal matters: (1) the scope of law; (2) authorization clause; (3) supervision clause; (4) registration clause; (5) indemnification clause; and, lastly, (6) other relevant clauses. However, prior to the discussion, it is important to note that the following discussion will be presented again in the form of a simulation of a draft specimen of the Malaysian Outer Space Act in Chapter 5.[83]

4.4.1. The Scope of Law

In the process of drafting legislation, it is important firstly to deal with the scope of law that will be enacted. At this juncture, it is necessary to specify the extent to which the Malaysian space law will apply municipally. Dealing with the scope of the Malaysian space law, this section will principally focus on four subjects: (1) preamble of the Act and its short title; (2) the objectives of enacting the Act; (3) the applications of the Act; and (4) the interpretation section.

In general, the enactment of the Malaysian space legislation (hereinafter the 'Malaysian Outer Space Act') is proposed to protect the Government of Malaysia against any potential liability that might be attached to the country as a consequence of the space activities of its private sector. Moreover, it is suggested that such enactment be designed to ensure that the Government of Malaysia and its nationals are in compliance with the obligations of the United Nations space conventions on the use of outer space. Based on the above circumstances, it is then submitted that the scope of the Malaysian Outer Space Act should be set up in light of Article VI of the Outer Space Treaty 1967. Article VI prescribes, among

[82] UNGA, Committee on the Peaceful Uses of Outer Space "Report on the United Nations/Ukraine Workshop on Space Law on the theme "Status, application, and progressive development of international and national space law", *supra* note 22.
[83] The proposed Malaysian Outer Space Act consists of six parts and fifty sections. For details, refer to the proposed draft of Malaysian Outer Space Act [Year] (Act [No.]), available in Chapter 5 of the thesis (5.2.1. A Feasible Draft of a Malaysian Outer Space Act).

other things, the international responsibility of a state for its national space activities, the state's responsibility to ensure its national space activities are in conformity with the United Nations treaties, the requirement to grant authorization for conducting space activities, and the obligation for continuous supervision of the said activities.[84]

On the point of the scope of the Malaysian Outer Space Act, we first consider the preamble of the Act and its short title. It is suggested that the wording of the preamble of the Malaysian Outer Space Act read as follows: 'An Act to provide for and to regulate the Malaysian space activities'.[85] This suggestion is made on the grounds that the Act is enacted purposely to provide an appropriate system that is competent to regulate and govern Malaysian space activities. However, in relation to the types of activities to be governed by the Act, further clarification will be provided during a discussion of the scope of application of the Act.[86] Thus, in view of the above, it is proposed that the Malaysian space legislation's short title be the "Malaysian Outer Space Act [Year] (Act [No.])".[87]

On the point of the objectives of enactment of the Malaysian Outer Space Act, five major objectives can be highlighted and emphasized.[88] The first objective is to regulate Malaysian space activities to ensure compliance with the international space obligations. This is based on the fact that a state shall be held accountable for its national space activities.[89] It is therefore vital that Malaysia controls and regulates the state's space activities, including the activities of its nationals, to ensure they are in compliance with the space obligations imposed by the international law. Such circumstances could be realized by the enactment of the Malaysian Outer Space Act.

The second objective is to establish a licensing regime for the Malaysian space activities, and also to confer the licensing power and other relevant powers on the appropriate Minister. This objective is significant as the national space activities will require authorization from the

---

[84] See Article VI of the Outer Space Treaty 1967, *supra* notes 10 and 20.
[85] See Preamble of the proposed draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.
[86] Refer Section 4 (Application of Act), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83; refer also *infra* notes 94, 95, and 96.
[87] Section 1 (Short Title), Part I (Preliminary), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.
[88] Section 3 (Objects), Part I (Preliminary), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.
[89] Article VI of the Outer Space Treaty 1967, *supra* notes 10 and 20.

state.[90] Thus, among the effective modes of authorization for Malaysian space activities is the establishing of the licensing regime in the Malaysian Outer Space Act. This is also an efficient way of controlling and monitoring the Malaysian national space activities. Aside from that, the Act will also allocate power to grant licences and other relevant powers to the Minister in charge.

The third objective is to create a liability regime and indemnification rules for the Malaysian space activities. Apart from the previous objectives, the establishment of a liability regime and indemnification rules is imperative to regulate the Malaysian space activities. This is based on the strong possibility of Malaysia being held liable and responsible under the category of launching state, as well as for damage or loss caused by its nationals' space activities as prescribed by the international space law.[91] It is hoped that such regime and indemnification rules will be able to provide Malaysia with sufficient protection against any possible liability arising from space activities. It may also offer better and clearer rulings in dealing with such matters.

The fourth objective is to lay down rules of registration of Malaysian space objects. In such circumstances, the enactment of the Malaysian Outer Space Act is designed to specify rules obliging Malaysian space participants to register any objects they launch into space. It also applies to any space object of other space participants launched from Malaysia according to its geographical limits and territorial waters. Such rules are essential to ensure that space objects are registered in accordance with the international space legal requirements. This will, in fact, support and verify the importance of the registration of the space objects to the space participants at both international and municipal levels.[92]

The fifth objective is to ensure the safety of operational space activities performed under Malaysian jurisdiction. Assurance of safety for operational space activities conducted in the country is another primary purpose of enacting a Malaysian Outer Space Act. At this point,

[90] *Id*.
[91] *Id*. See also Article VII, Outer Space Treaty 1967, *supra* note 11; and the Liability Convention 1972.
[92] See also Article V, Outer Space Treaty 1967 states: *'… When astronauts make such a landing, they shall be safely and promptly returned to the State of registry of their space vehicle …'*. However, Article VIII mentions: *'… 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 … Such objects or component parts found beyond the limits of the State Party to the Treaty on whose registry they are carried shall be returned to that State Party …'*; and also, Registration Convention 1975.

the Act will lay down some relevant clauses for assurance of safety in respect of the space activities conducted under this Act. This is initiated after taking into consideration the spirit of safety introduced by the international space law.[93] The assurance of safety of operation is, in fact, critical as the activities may involve human lives and affect surrounding areas of Earth and outer space. Furthermore, it is well established that the outer space environment is a fragile place that requires constant preservation from any possible destruction.

Returning to the earlier point concerning four subjects that should be emphasized under the scope of the law, next point is in respect of the application of the Malaysian Outer Space Act. In general, it is proposed that the application of the Act be subjected to three criteria: (1) locality; (2) nationality; and (3) type of activities. Based on locality, the Malaysian Outer Space Act will only apply to space activities conducted from or within Malaysia and her territorial waters.[94] This means that any foreign company conducting activities within Malaysia and her territorial waters shall be regulated and governed by the Malaysian Outer Space Act. In terms of nationality, the Malaysian Outer Space Act will also apply to space activities performed by Malaysian nationals, firms and bodies incorporated by or under Malaysian laws, even if the activities are conducted outside Malaysia.[95]

The same situation applies to space activities conducted in or from Malaysian ships or aircraft, even if they are abroad. In such situations, they will be governed by the Malaysian Outer Space Act provided that the activities fall under the categories stipulated by the Act. At this juncture, four categories of activities are proposed.[96] First, 'space activity' refers to any activity carried out in outer space.[97] This means that any kind of activities conducted in outer space, if performed by a Malaysian national, will then be governed by the Malaysian Outer

---

[93] See Article IX, Outer Space Treaty 1967 cites: *'... State Parties ... shall pursue studies of outer space ... and conduct exploration of them so as to avoid their harmful contamination and also adverse changes in the environment of the Earth ... shall adopt appropriate measures for this purpose'*.

[94] See Section 4(1) (Application of Act), Part I (Preliminary), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83. Read also Article 1 (Scope of Application) and its comment in the Proposed Model Law on National Space Legislation (The Sofia Guidelines for a Model Law on National Space Legislation of the International Law Association (ILA), UN Doc. A/AC.105/C.2/2013/CRP.6, 26 March 2013.

[95] See Section 4(2) (Application of Act), Part I (Preliminary), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83. Read also *id*.

[96] See Section 4(3) (Application of Act), Part I (Preliminary), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83. Read also Article 2 (Definitions-Use of terms: 'Space Activity') in the Proposed Model Law on National Space Legislation (The Sofia Guidelines for a Model Law on National Space Legislation of the International Law Association (ILA), UN Doc. A/AC.105/C.2/2013/CRP.6, 26 March 2013.

[97] Modified from Section 1(c), United Kingdom Outer Space Act 1986, 1986 Chapter 38. The full text is available at http://www.bis.gov.uk/assets/ukspaceagency/docs/osa/outer-space-act-1986.pdf, accessed: 6 January 2013. Read also Chapter 3 of the thesis (3.2.3. National Space Legislation: The Outer Space Act 1986).

Space Act following the nationality criterion. Second, the activity refers to launching or procuring the launch of a space object or human being.[98] At this point, any launch or procurement of the launch of a space object (the definition of 'space object' will be provided later) or any human being, if satisfying the locality or nationality criterion, will be governed by the Malaysian Outer Space Act. Third, the activity refers to operating a space object.[99] Any kind of operation relating to the space object will be governed by the Act. Fourth, the activity refers to all other measures to manoeuvre or in any way affects the objects or human beings launched into space.[100] At this point, all other measures to manoeuvre or in any way affect the object or people launched into space, such as operations relating to navigation of the space objects, may fall under the category. It should also be noted that all prescribed activities, whether conducted or attempted in Malaysia or elsewhere, are liable to be governed by the Malaysian Outer Space Act.

The last crucial point concerns the interpretation section. Under this section, the study will suggest some important words that demand interpretation. This is significant in order to afford comprehensible and transparent legal rules for space actors. Thus, there are a number of words requiring definitions for the smooth application of the Malaysian Outer Space Act. They include outer space, launch, space object, payload, launch facility, launch vehicle, re-entry vehicle, suborbital rocket, suborbital trajectory, space damage, and Minister.

Among the words that Malaysia should consider defining is the term 'outer space'. Since the issue of delimitation of outer space is still unresolved at the international level, there is no exact demarcation line agreed for determining where air space ends and outer space begins. Despite various suggested scientific boundaries,[101] for the application of the Malaysian Space

[98] Modified from Section 1(a), United Kingdom Outer Space Act 1986.
[99] See Section 1(b), United Kingdom Outer Space Act 1986.
[100] Modified from Section 1, Sweden Act on Space Activities (1982:963).
[101] For instance, the theoretical line of 100 km above the Earth's sea level known as the *Karman* line, or the suggestion of 80 km above sea level based on the fact that the USA awarded astronaut's wings to those who travel above such altitude, and 118 km above Earth as determined by the scientists at the University of Calgary in 2009. More information is available in Dunk, Frans G. von der, "The Sky is the Limit – But Where Does it End", (2006) 48 *IISL Colloquium on Law of Outer Space* 92. See also Perek, Lubos, "Is Customary Law a Source of Space Law?", IISL and ECSL Space Law Symposium 2011 on A New Look on the Delimitation of Airspace and Outer Space, 20 March 2011, 50th Session of the Legal Subcommittee of the UNCOPUOS, http://www.oosa.unvienna.org/pdf/pres/lsc2011/symp02.pdf , accessed: 19 April 2013. See also Thompson, Andrea, "Edge of Space Found", *Space.com,* 9 April 2009, available at http://www.space.com/6564-edge-space.html, and also, http://en.wikipedia.org/wiki/Outer_space#Boundary, accessed: 20 April 2013; read also comment in Article 2 (Definitions-Use of terms: 'Space Activity'), The Proposed Model Law on National Space Legislation (The Sofia Guidelines for a Model Law on National Space Legislation of the International Law Association (ILA), UN Doc. A/AC.105/C.2/2013/CRP.6, 26 March 2013.

Act this study proposes that 'outer space' shall mean 'an area, inclusive of the Moon and other celestial bodies, which is outside the Earth's atmosphere in which the operation of an object in an orbit around the Earth is possible'.[102] This signifies that, as long as the area involved is outside the Earth's atmosphere and is capable of accommodating an object in an orbit around the Earth, it is considered as outer space under the Malaysian Outer Space Act regardless its altitude from the Earth. This approach is preferred since the exact measurement of the demarcation line may not be accurate due to the fragile nature of the environment through which it may be exposed to changes; moreover, the rapid evolution of technology may revolutionize an earlier demarcation line. Thus, the suggested definition seems more flexible to accommodate the situation.[103]

Another word that should be given an interpretation is 'launch'.[104] For the application of the Malaysian Outer Space Act, it is proposed that 'launch' be defined as placing or attempting to place a space object or human being from Earth in a suborbital trajectory, or in an Earth orbit, or in outer space.[105] Thus, any action or efforts to place a space object or human being from Earth into any of the three areas - (1) outer space, or (2) suborbital trajectory, or (3) Earth orbit - is to be regarded as a launch. With respect to the three areas mentioned in the Act, it should be noted that it is not the aim of the Act to differentiate the areas according to their geographical characteristics since the issue of where outer space begins remains unresolved. Furthermore, these three areas may overlap. However, the classification is made purposely to emphasize the intended location (target location) for each launch mission. For instance, there is a strong possibility that Malaysia will one day launch a suborbital space flight into a suborbital trajectory, or an orbital space flight to orbit the Earth, or any other kind of launch into other areas of outer space. Therefore, it is proposed that such areas be precisely mentioned in the Act. Indeed, the adoption of the general terms 'outer space' along with

---

[102] See Section 6 (Interpretation: 'Outer Space'), Part I (Preliminary), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83. This definition is adapted from Article 1, South Africa Republic Space Affairs Act No. 84 of 1993. In respect of the use of the words 'outside the Earth's atmosphere' it was acquired from Section 20103(1)(A), National Aeronautics and Space Act, Pub.L.No. 111-314, 124 Stat. 3328 (Dec. 18, 2010). See also Pedrazzi, Marco, "Are there Indications for Upper and Lower Limits for Air Space and Outer Space in Air Law, Space Law, and National Legislation?", IISL/ECSL Space Law Symposium 2011 on A New Look on the Delimitation of Airspace and Outer Space, *id.*

[103] Pedrazzi, Marco, *id.*

[104] See Section 6 (Interpretation: 'Launch'), Part I (Preliminary), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.

[105] See Section 6 (Interpretation: 'Launch'), Part I (Preliminary), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83; modified from Section 50902(4) (Definitions: Launch), 51 USC Chapter 509, *supra* note 320 (Chapter 3 of the thesis); Section 70102(4) (Definitions: Launch), 49 USC Chapter 701, *supra* note 321 (Chapter 3 of the thesis).

'suborbital trajectory' and 'Earth orbit' will encompass all locations that may not be classified under both suborbital trajectory and Earth orbit. With regard to the term 'human being' in the launch definition, this has been included for the preparation of Malaysian space activities that might involve sending human beings into outer space, especially in relation to the potential space tourism sector.

The word 'space object'[106] is defined as any object or thing launched or intended to be launched into outer space, or into a suborbital trajectory, or into an Earth orbit, including a launch or re-entry vehicle, orbital or suborbital rocket, and a payload, even if such object travels only part of the way towards or back from outer space.[107] Regarding this point, it appears that any objects or things launched or intended to be launched into any of the three areas - (1) outer space, or (2) suborbital trajectory, or (3) Earth orbit - are considered space objects even if the object travels only part of the way into outer space. Following the definition of 'launch', the definition of 'space object' also includes the three prescribed areas. It also provides some examples of objects categorized as space objects under the Act. They include a launch or re-entry vehicle, an orbital or suborbital rocket and a payload. For the purpose of the Act, 'payload' means any object that a person undertakes to place in outer space by means of a launch or re-entry vehicle, including the components of the vehicles.[108] Thus, any objects, such as a sample of scientific research, may constitute a payload under this Act.

Next, 'launch facility' means a fixed or mobile facility or place from which a space object can be launched, and it includes any other facilities at the facility or place that are necessary to conduct a launch.[109] At this point, 'mobile facility' may refer to any kind of moving object, such as a ship sailing on the sea, or an aeroplane in the air, that is used to launch the object.

[106] See Section 6 (Interpretation: 'Space Object'), Part I (Preliminary), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.
[107] See Section 6 (Interpretation: 'Space Object'), Part I (Preliminary), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83; modified from Section 13(1), United Kingdom Outer Space Act 1986, *supra* note 97; Section 8, Australian Space Activities Act 1998. This Act refers to 'Act No. 123 of 1998 as amended, taking into account amendments up to Act No. 8 of 2010'. It was prepared by the Office of Legislative Drafting, Attorney-General Department, Canberra. The full text is available at http://www.comlaw.gov.au/Details/C2010C00193, accessed: 17 January 2013.
[108] See Section 6 (Interpretation: 'Payload'), Part I (Preliminary), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83; modified from Section 50902(10) (Definitions: Payload), 51 USC Chapter 509, *supra* note 320 (Chapter 3 of the thesis); Section 70102(10) (Definitions: Payload), 49 USC Chapter 701, *supra* note 321 (Chapter 3 of the thesis).
[109] See Section 6 (Interpretation: 'Launch Facility'), Part I (Preliminary), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83; modified from Section 8, Australian Space Activities Act 1998, *supra* note 107.

However, 'launch vehicle' means any vehicle manufactured or adapted to carry payloads or human beings into outer space, or in a suborbital trajectory, or in an Earth orbit, including suborbital and orbital rockets.[110] Other words whose meanings should be defined include the following: 're-entry vehicle', which means a vehicle or reusable vehicle designed to return from outer space to Earth;[111] 'Suborbital rocket', which means a vehicle that is rocket-propelled in whole or in part, intended for flight on a suborbital trajectory;[112] 'Suborbital trajectory', which means the flight path of a launch or re-entry vehicle whose vacuum instantaneous impact point does not leave the surface of the Earth.[113] Meanwhile, 'space damage' means any physical damage including death, bodily injury or other impairment of health and loss of property as a result of the launch, re-entry, or operation of the space object.[114] Lastly, the word 'Minister' shall mean the Minister currently charged with responsibility for Malaysian space activities.

4.4.2. Authorization Clauses

In general, international space law states that space activities shall require authorization when the activities involve non-governmental entities.[115] Thus, in observing such an obligation, it is crucial for the Government of Malaysia to provide authorization for its private space activities. Furthermore, the authorization is the principal way of controlling private space activities and ensuring that they are in compliance with both international and domestic laws. In view of the above, this section attempts to propose some clauses dealing with authorization

---

[110] See Section 6 (Interpretation: 'Launch Vehicle'), Part I (Preliminary), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83; Section 50902(8) (Definitions: Launch Vehicle), 51 USC Chapter 509, *supra* note 320 (Chapter 3 of the thesis); Section 70102(8) (Definitions: Launch Vehicle), 49 USC Chapter 701, *supra* note 321 (Chapter 3 of the thesis).

[111] See Section 6 (Interpretation: 'Re-entry Vehicle'), Part I (Preliminary), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83; modified from Section 50902(16) (Definitions: Re-entry Vehicle), 51 USC Chapter 509, *supra* note 320 (Chapter 3 of the thesis); Section 70102(16) (Definitions: Re-entry Vehicle), 49 USC Chapter 701, *supra* note 321 (Chapter 3 of the thesis).

[112] See Section 6 (Interpretation: 'Suborbital Rocket'), Part I (Preliminary), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83; modified from Section 50902(19) (Definitions: Suborbital Rocket), 51 USC Chapter 509, *supra* note 320 (Chapter 3 of the thesis); Section 70102(19) (Definitions: Suborbital Rocket), 49 USC Chapter 701, *supra* note 321 (Chapter 3 of the thesis).

[113] See Section 6 (Interpretation: Suborbital Trajectory), Part I (Preliminary), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83. Modified from Section 50902(20) (Definitions: Suborbital Trajectory), 51 USC Chapter 509, *supra* note 320 (Chapter 3 of the thesis); Section 70102(20) (Definitions: Suborbital Trajectory), 49 USC Chapter 701, *supra* note 321 (Chapter 3 of the thesis).

[114] See Section 6 (Interpretation: 'Space Damage'), Part I (Preliminary), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83; modified from Article 2, Korean Space Liability Act 2007.

[115] See Article VI, Outer Space Treaty 1967 prescribes: '... *The activities of non-governmental entities in outer space ... shall require authorization ... by the appropriate State Party to the Treaty ...'.*

in the Malaysian Outer Space Act. There are proposals on three major areas:[116] (1) the requirement of authorization for space activities; (2) modes of authorization; and (3) powers of the Minister.

The first is in regard to the requirement of authorization for space activities.[117] It is significant to stipulate in the Malaysian Outer Space Act that space activities shall not be carried out without an authorized licence or other authorized means.[118] This means that any person wishing to conduct space activities as prescribed by the Act must have a licence or other means of authorization granted by the Government of Malaysia. This clause needs to be clear and exact in the sense that it shall signify that, if no authorization is granted, no space activities are allowed.

The second relates to the modes of authorization. At this juncture, it is apparent that there should be authorization before space activities can be conducted. Hence, there are four modes of authorization proposed for the Malaysian Outer Space Act to cater for space activities:[119] (1) licences; (2) overseas launch or return certificate; (3) experimental permit; (4) exemption certificate.

The first mode is licences.[120] Two types of licence are proposed: (a) space site or facility licence; and (b) space launch or re-entry licence. These two categories are both essential as they are two separate matters. Hence, since they are treated as two different things, it is necessary to create different technical safety assessments for both matters. Such assessment is important to ensure the fulfilment of the conditions imposed by the Act before licences are granted to the applicant. This matter will be discussed again under the topic of safety, peace and security clauses.[121] The first type of licence is known as a space site or facility licence.

[116] See Part II (Authorization of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.
[117] See Section 7 (Requirement of authorization for space activities), Chapter 1 (Requirement and Mode of Authorization), and Part II (Authorization of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83. Read also Article 3 (Authorization) and its comment in the Proposed Model Law on National Space Legislation (The Sofia Guidelines for a Model Law on National Space Legislation of the International Law Association (ILA), UN Doc. A/AC.105/C.2/2013/CRP.6, 26 March 2013.
[118] Modified from, Section 3(1), United Kingdom Outer Space Act 1986, *supra* note 97.
[119] See Section 8 (Modes of authorization), Chapter 1 (Requirement and Mode of Authorization), and Part II (Authorization of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.], *supra* note 83.
[120] See Section 8(a), Chapter 1 (Requirement and Mode of Authorization), Part II (Authorization of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83. Modified from, Section 15, Division 2, and Division 3, Australian Space Activities Act 1998, *supra* note 107.
[121] For more information, read Chapter 4 of the thesis (4.4.6. Safety, Peace and Security Clauses).

These licences are available for the operation of a space site or facility located in Malaysia.[122] A space participant is required to apply for such a licence under the Malaysian Outer Space Act for the operation of a space site or facility to conduct space activities. Thus, any person who wishes to operate a space site or facility within Malaysia or her territorial waters must apply for a space site or facility licence. The second type of licence is a space launch or re-entry licence. These licences relate to the operation of the launch or re-entry of the space object itself.[123] It is necessary to apply to the Government of Malaysia for this type of licence for the purpose of operating the launch or re-entry of a space object either from or to Malaysia. Thus, any person wishing to conduct the launch or re-entry of a space object must apply for a space launch or re-entry licence. In such circumstances, it should be noted that, should a person wish to operate a space site as well as conduct the launch and re-entry of an object, he/she must apply for both licences. However, should he/she only wish to launch or recover a space object, he/she would then need just a space launch or re-entry licence.

The second mode of authorization is an overseas launches or return certificate.[124] Although a space licence is required for space activities conducted in Malaysia, the overseas launch or return certificate is necessary for operations conducted outside Malaysia. Such a certificate is required for the launch or re-entry of space objects carried out by Malaysian nationals, firms or bodies incorporated by or under the Malaysian laws outside Malaysia.[125] In such circumstances, any Malaysian national or bodies falling under the mentioned categories who wish to launch or recover space objects abroad must have an overseas launch or return certificate from Malaysia. This certificate is critical in order to control the space activities of Malaysians abroad since the Government of Malaysia could be held responsible and liable for their nationals' activities.[126]

[122] See Section 8(a)(i), Chapter 1 (Requirement and Mode of Authorization), Part II (Authorization of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.
[123] See Section 8(a)(ii), Chapter 1 (Requirement and Mode of Authorization), Part II (Authorization of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.
[124] Modified from Section 12, 14, 35(1), Division 4, and Division 5, Australian Space Activities Act 1998, *supra* note 107.
[125] See Section 8(b), Chapter 1 (Requirement and Mode of Authorization), Part II (Authorization of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.
[126] See Article VI, Outer Space Treaty 1967, *supra* note 10.

The third mode of authorization is an experimental permit.[127] This type of authorization is required for the operation of space activities solely connected to research, the testing of a new design, concept or equipment, and other related purposes.[128] It is essential to note that this study specifically proposes the experimental permit apart from the other modes of authorization since the purpose of the space activities covered by the permit is different from those involved in other modes of authorization. In other words, the experimental permit activities are solely meant for research or experimental purposes, but not for other authorizations. Thus, in such circumstances, the procedure for granting the experimental permit, inclusive of the duration of time involved in the process of application for the permit as well as the fees involved, should be treated differently from the other modes of authorization.

The fourth and final mode is an exemption certificate.[129] The exemption certificate is required for operations involving an acceptance of foreign authorization or where the appropriate arrangement has been made between Malaysia and other states.[130] At this point, in circumstances where the operation of the space activities has been specifically authorized by a foreign state, and in the event of such authorization being accepted by the Government of Malaysia, such activities are allowed under the Malaysian Space Act provided that they are conducted with an exemption certificate. In other words, when the foreign authorization of space activities is accepted, an application for a licence under the Malaysian Outer Space Act is no longer necessary, and it is sufficient to apply for an exemption certificate only. This should also apply in situations where there is proof of an appropriate arrangement having been made between the Malaysian Government and other states.

---

[127] Modified from Section 50906 (Experimental Permits), 51 USC Chapter 509, *supra* note 320 (Chapter 3 of the thesis); Section 70105a (Experimental Permits), 49 USC Chapter 701, *supra* note 321 (Chapter 3 of the thesis).; 14 CFR 413.3(f), and 437, Chapter III, Electronic Code of Federal Regulations. The author refer to the United States Commercial Space Transportation Regulation, 14 CFR Chapter III, Electronic Code of Federal Regulations (Data is updated as of January 30, 2013), updated editorial compilation of the electronic Code of Federal Regulations (e-CFR) material and Federal Register amendments produced by the National Archives and Record Administration's Office of the Federal Registrar (OFR) and the Government Printing Office, http://www.ecfr.gov/cgi-bin/text-idx?SID=2e27f4eb2925c60b03799278aec854be&tpl=/ecfrbrowse/Title14/14tab_02.tpl; and, http://www.faa.gov/about/office_org/headquarters_offices/ast/licenses_permits/media/Part_400_Compilation.pdf, both accessed: 28 January 2013.

[128] See Section 8(c), Chapter 1 (Requirement and Mode of Authorization), Part II (Authorization of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.

[129] Modified from Division 6, Australian Space Activities Act 1998, *supra* note 107; and Section 3(2)(b), United Kingdom Outer Space Act 1986, *supra* note 97.

[130] See Section 8(d), Chapter 1 (Requirement and Mode of Authorization), Part II (Authorization of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.

We now return to the three major aspects proposed under the authorization clauses.[131] Besides the requirement for authorization of space activities,[132] and the various modes of authorization proposed,[133] the next is in regard to the powers of the Minister.[134] There are five main legal rules proposed under the powers of the Minister: (1) power to establish an Authorization Committee; (2) granting of licences and other modes of authorization; (3) authorization fees; (4) duration of authorization procedures; and (5) power to make regulations.

The first power is the power to establish an Authorization Committee. Under this clause, the Minister is given the authority to establish a Committee to assist him/her in the implementation of his/her power to give authorization for conducting space activities as specified under Part II of the Malaysian Outer Space Act.[135] This Committee shall be known as the Authorization Committee. It is proposed that the Authorization Committee consists of members who are expert and eligible to deal with matters relating to the granting of an authorization to an applicant and its appropriateness. Indeed, some of the members should represent the government sector and others must represent the private sector. This is recommended in order to avoid the possible manipulation of powers by the Minister that might occur were he/she to be acting alone.

The second power is the power to grant licences and other modes of authorization. In the Malaysian Outer Space Act, it is proposed that the Minister may, acting on a recommendation by the Authorization Committee, grant a licence or any other authorized means to the applicant for the operation of space activities.[136] Thus, it is essential to remember that this Act proposes that the Minister exercises his/her power only on the recommendation of the

[131] See Part II (Authorization of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.
[132] Section 7, Chapter 1 (Requirement and Mode of Authorization), Part II (Authorization of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.
[133] Section 8, Chapter 1 (Requirement and Mode of Authorization), Part II (Authorization of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.
[134] See Chapter 3 (Powers of Minister), Part II (Authorization of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.], *supra* note 83.
[135] See Section 10, Chapter 3 (Powers of Minister), Part II (Authorization of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.
[136] See Section 11, Chapter 3 (Powers of Minister), Part II (Authorization of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83; read also Article 3 (Authorization) and its comment in the Proposed Model Law on National Space Legislation (The Sofia Guidelines for a Model Law on National Space Legislation of the International Law Association (ILA), UN Doc. A/AC.105/C.2/2013/CRP.6, 26 March 2013.

Authorization Committee. The Minister is not recommended to grant licences or other modes of authorization without first referring to the Committee. It is the task of the Committee to assist and provide relevant advice to the Minister in respect of matters concerning the granting of authorization under the Malaysian Outer Space Act. Thus, in short, the power to grant licences and other modes of authorization prescribed by the Act shall be exercised only on the recommendation of the Committee.

The third power concerns the authorization fees. The Minister may, acting on a recommendation by the Authorization Committee, prescribe the amount of fees, but this shall not exceed an agreed limit, calculated on the basis of the complexity of the operation.[137] With regard to the power of Minister in prescribing the amount of the fees for authorization purposes, it is proposed that the Minister prescribes the fees on the recommendation of the Committee. It is worth mentioning that the amount of the fees prescribed shall vary depending on the types of the authorization modes applied. Thus, it is suggested that the calculation be made according to the degree of complexity of the operation of the space activities. The more complex the operation involved, the higher the fee can be imposed. The term 'complexity of operation' is proposed to mean the level or degree of complexity involved in the operation of space activities in relation to safety and security evaluation, environmental assessment, human lives involved, and other appropriate matters.[138] This means that when the operation has undergone, for instance, a comprehensive safety assessment and security evaluation process, it can be classified as a complex operation as it involves a higher degree of complexity according to this clause. Thus, the size of the fee imposed is likely to be greater.

In contrast, if an operation has already obtained a foreign authorization (meaning that the operation has already passed the assessment and evaluation process in a foreign country before receiving the foreign authorization), and such operation is approved by the Government of Malaysia, there is no need for further assessment. Thus, the operation can

[137] See Section 12, Chapter 3 (Powers of Minister), Part II (Authorization of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83. See also Gerhard, Michael and Kristina Moll, "Perspectives for More National Space Legislation: Introduction by Rapporteurs", *'Project 2001 Plus' – Global and European Challenges for Air and Space Law at the Edge of the 21st Century',* Proceedings of an International Symposium Cologne, 8-10 June 2005, to conclude 'Project 2001 Plus', Schriften zum Luft- und Weltraumrecht/Studies in Air and Space Law, Band 20 / Volume 20, Eds. Hobe, Stephan, Bernhard Schmidt-Tedd and Kai-Uwe Schrogl, (Koln: Heymanns, 2006), at 30.

[138] See Section 6 (Interpretation), Part I (Preliminary), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.

indeed be performed via the application of an exemption certificate only. The fees prescribed in this case shall be lower than usual since the operation will not require any further comprehensive assessment process. However, such a situation is allowed only if the Malaysian Government is satisfied with and accepts the foreign authorization. In addition to the above, in terms of fees for experimental permits, the study proposes that such fees be applied at a special rate. This is based on the fact that such operations involve research or the testing of new technology rather than being conducted for commercial purposes. The allocation of a special rate may encourage new inventions and motivate the research spirit in respect of space-related technology in Malaysia. Furthermore, such operations have a strong tendency to be conducted repeatedly, which might involve a large amount of money for the researcher.

Moreover, although the Act allocates power to the Minister to prescribe the fees, it is significant to stress that the amount of the fees shall not exceed a certain limit. At this juncture, it is essential for the Malaysian Government to stipulate an agreed limit for the amount imposed in order to ensure that the fees are not prescribed beyond such a limit. This situation is proposed in view of the fact that it is vital not to burden the space enthusiasts conducting space activities with fees that are too high for them, as this would certainly discourage and curtail the growth and development of Malaysian space activities.

The fourth power of the Minister prescribed by the Malaysian Outer Space Act is in relation to the duration of the authorization procedure. It is proposed that the Minister shall, acting on the recommendation of the Authorization Committee, decide whether or not to grant the application for the authorization to conduct the space activities. This should be exercised not later than six months after receiving the application.[139] It is undisputed that the length of time taken to afford a decision in relation to granting the application for authorization is important as it might affect the development of the national space activities. In the event of the duration involved being too long for a normal application, such a situation will disrupt the progress of the Malaysian space activities. Therefore, this study proposes that the duration of the authorization process should not exceed six months.[140] This means that the Minister, on the recommendation of the Authorization Committee, shall decide whether to grant the

[139] See Section 13, Chapter 3 (Powers of Minister), Part II (Authorization of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.

[140] Gerhard, Michael and Kristina Moll, "Perspectives for More National Space Legislation: Introduction by Rapporteurs", *supra* note 137, at 28.

application for authorization within a six-month period. This figure is chosen based on the experiences of some states that reported that the technical safety evaluation involved might last from three to six months.[141] However, in certain cases where the activities do not involve much evaluation, it is proposed that the duration of authorization be about two months only.

Apart from those four powers allocated to the Minister, it is important to note that, for the purpose of the enactment of the Malaysian Outer Space Act, the study also proposes the allocation of a general power to the Minister that empowers him to issue any relevant regulations or others as necessary for the application of the Act.[142]

4.4.3. Monitoring and Continuing Supervision Clauses

Once a space activity has been authorized by a state, it then needs to be monitored and supervised accordingly to ensure it complies with the laws. The international law obliges all private authorized space activities to continue supervision from the relevant state in order to ensure that they remain in conformity with the international rules.[143] Thus, in observing such obligation, Malaysia is recommended to formulate some legal rules that are able to monitor and supervise those activities to ensure they are in accordance with the national as well international laws. In view of the above, this section aims at providing rules in relation to monitoring and continuing supervision obligations.[144] The discussion will be divided into three main areas: (1) powers of the Minister; (2) establishment, powers and functions of Supervision and the Monitoring Committee; and (3) duties of licensees.

The first area concerns the powers of the Minister.[145] It is essential to remark that the powers of the Minister, at this juncture, refer to the powers within the scope of the monitoring and continuing supervision obligation. Thus, it should be noted that they are different from the

[141] Gerhard, Michael and Kristina Moll, "Perspectives for More National Space Legislation: Introduction by Rapporteurs", *supra* note 137, at 29.
[142] See Section 5 (Ministerial Power), Part I (Preliminary), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.
[143] See Article VI, Outer Space Convention 1967, *supra* note 20.
[144] See Part III (Supervision and Monitoring of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83; read also Article 5 (Supervision) and its comment in the Proposed Model Law on National Space Legislation (The Sofia Guidelines for a Model Law on National Space Legislation of the International Law Association (ILA), UN Doc. A/AC.105/C.2/2013/CRP.6, 26 March 2013.
[145] See Chapter 1 (Powers of Minister), Part III (Supervision and Monitoring of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.

powers of the Minister discussed earlier under the topic of authorization clauses.[146] There are three types of powers of the Minister proposed in relation to the monitoring and continuous supervision obligations: (1) power to monitor and supervise; (2) power to give direction; (3) power to revoke, vary, or suspend a licence and other modes.

The first power is the power to monitor and supervise.[147] Under this clause, it is proposed that the Minister be granted the power to monitor and continuously supervise the Malaysian space activities registered under the Malaysian Outer Space Act.[148] Such power authorizes the Minister to monitor and constantly control the operations. Indeed, the Minister has the right to supervise the operation accordingly so that it remains in conformity with the national and international laws. By having such a clause in the Malaysian Outer Space Act, Malaysia is able to observe the international obligation of continuing supervision imposed by the international space treaty.[149]

The second power is the power to give direction.[150] In this clause, it is proposed that the Minister may give direction to the licensee in the event of the licensee contravening the licence requirements and conditions under the Malaysian Outer Space Act, or indeed to secure compliance with Malaysia's international space obligation.[151] At first, it is necessary to note that, under the Malaysian Outer Space Act, the word licensee shall mean a person who holds a licence or any other mode of authorization granted under this Act.[152] Hence, 'licensee' shall refer to a holder of licence, overseas launch or return certificate, experimental permit, or exemption certificate. For the purpose of monitoring and controlling the operation, the Minister is given the power under the Malaysian Outer Space Act to give direction to the holder of a licence, certificate, and permit who has been proved to have contravened the

[146] Refer to Chapter 3 (Powers of Minister), Part II (Authorization of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.
[147] Modified from Section 50907 (Monitoring Activities), 51 USC Chapter 509, *supra* note 320 (Chapter 3 of the thesis); Section 70106 (Monitoring Activities), 49 USC Chapter 701, *supra* note 321 (Chapter 3 of the thesis), and Section 5(2)(a), United Kingdom Outer Space Act 1986, *supra* note 97; read also Article 5 (Supervision) and its comment in the Proposed Model Law on National Space Legislation (The Sofia Guidelines for a Model Law on National Space Legislation of the International Law Association (ILA), UN Doc. A/AC.105/C.2/2013/CRP.6, 26 March 2013.
[148] See Section 14, Chapter 1 (Powers of Minister), Part III (Supervision and Monitoring of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.
[149] See Article VI, Outer Space Convention 1967, *supra* note 20.
[150] Modified from Section 8(1)(a)and (b), United Kingdom Outer Space Act 1986, *supra* note 97.
[151] See Section 15, Chapter 1 (Powers of Minister), Part III (Supervision and Monitoring of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.
[152] See Section 6 (Interpretation), Part I (Preliminary), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.

conditions of the licence, certificate or permit. The Minister may also give direction to the licensee if it is established that it is necessary to do so in order to secure compliance with the country's international obligations.

The third power is the power to revoke, vary, or suspend a licence or other modes.[153] To control and monitor the Malaysian space activities, it is also proposed that the Minister be conferred with a power to revoke, vary, or suspend the licence or other modes of authorization of the licensee. Such power is recommended to apply in two situations: (a) when the conditions of the licence and the other modes of authorization have not been complied with by the licensee; or (b) when the revocation, variation, or suspension of the licence or other modes is required in the interest of public health, national security, or to comply with the international obligations of Malaysia.[154] In such circumstances, when the Minister has discovered that the licensee has not observed the licence conditions in his/her operation, the Minister may exercise the power of revocation, suspension, or variation to the licence as he/she may think reasonable. The Minister may exercise the power under this clause when it is needed to protect public health and Malaysian national security, and to ensure compliance with the international obligations.

Returning to the original area of matters proposed under the supervision and monitoring clauses, rather than the powers of the Minister, the second concerns the establishment, powers and functions of the Supervision and Monitoring Committee.[155] In this regard, six legal rules are suggested: (1) establishment of Supervision and Monitoring Committee; (2) assistance by a Committee; (3) composition of a Committee; (4) issuance and submission of identity cards; (5) powers and functions of a Committee; and lastly, (6) compliance with Minister's instructions.

The first is the establishment of Supervision and Monitoring Committee. For the purpose of constant monitoring and supervising of space activities, it is significant to create a special

---

[153] Modified from Section 6(2), United Kingdom Outer Space Act 1986, *supra* note 97; read also Article 6 (Withdrawal, Suspension or Amendment of Authorization) and its comment in the Proposed Model Law on National Space Legislation (The Sofia Guidelines for a Model Law on National Space Legislation of the International Law Association (ILA), UN Doc. A/AC.105/C.2/2013/CRP.6, 26 March 2013.
[154] See Section 16, Chapter 1 (Powers of Minister), Part III (Supervision and Monitoring of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.
[155] See Chapter 2 (Establishment, Powers, and Functions of Supervision and Monitoring Committee), Part III (Supervision and Monitoring of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.

mechanism to assist the Minister in exercising his power. By having such mechanism, it is expected that the task of monitoring, controlling and supervising the activities will be executed more effectively and efficiently. In view of this, the study proposes a clause on the establishment of a Committee.[156] In parallel with its tasks, the Committee shall be known as the Supervision and Monitoring Committee. Hence, in the Malaysian Outer Space Act, a rule is proposed stipulating that the Minister shall establish a Committee to assist him in performing his power of supervision and monitoring of space activities.

The second is assistance from a Committee. After prescribing a clause in respect of the establishment of a Committee, the next clause proposed is in regard to the purpose of establishing the Supervision and Monitoring Committee. At this point, the legal rule recommended is that the Committee shall assist the Minister to perform his power of supervision and monitoring of space activities.[157] In this sense, the main task of the Committee is to assist the Minister in exercising his duty of monitoring and supervising the activities. The implementation of the task should thus be more efficient and well-organized.

The third is the composition of a Committee.[158] At this juncture, it is essential to prescribe the type of Committee that is required. Thus, the study proposes that the Supervision and Monitoring Committee consists of a group of Malaysian technical and legal experts, assisted if necessary by foreign experts as well.[159] They are, in fact, designated on the basis of their technical and legal expertise and their knowledge of the space activities involved. Thus, the Committee to assist the Minister in monitoring and supervising the activities should comprise Malaysian technical and legal experts in regard to the operations involved. The appointment of foreign experts will be permitted only when proved necessary.

---

[156] See Section 17, Chapter 2 (Establishment, Powers, and Functions of Supervision and Monitoring Committee), Part III (Supervision and Monitoring of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.

[157] See Section 18, Chapter 2 (Establishment, Powers, and Functions of Supervision and Monitoring Committee), Part III (Supervision and Monitoring of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.

[158] Modified from Section 2 of Chapter II, Belgium Law on the Activities of Launching, Flight Operations or Guidance of Space Object (Text of the Royal Implementing Decree of 19 March 2008), http://www.belspo.be/belspo/space/doc/beLaw/AR_spatial_en.pdf, accessed: 25 April 2013.

[159] See Section 19, Chapter 2 (Establishment, Powers, and Functions of Supervision and Monitoring Committee), Part III (Supervision and Monitoring of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.

The fourth is the issuance and submission of identity cards.[160] For the purpose of identification of the Committee member, it is submitted that each of them be assigned a special identity card. The purpose of this card is to identify the person as a member of the monitoring and supervision Committee, so that they will be afforded cooperation and easy access to the space site and facility by the licensee. This is, in fact, can also avoid the possibility of power being abused by the other unauthorized officer. Hence, the study proposes a clause in the Malaysian Outer Space Act to specify that the Supervision and Monitoring Committee shall be issued with identity cards that include a recent photograph of the holder.[161] It is also suggested that there be a clause mentioning that the identity card must be returned to the Minister as soon as is practicable after the holder has ceased to be a member of the Committee.[162] This is significant in order to avoid misuse of the card.

The fifth area is the powers and functions of the Committee.[163] It is proposed that the Malaysian Outer Space Act prescribes the specific powers and functions of the Supervision and Monitoring Committee in performing its task of assisting the Minister in monitoring and supervising the space activities. Seven functions are suggested in total. The first main function is to constantly monitor the licensee and ensure his/her compliance with the terms and conditions of the licence and other modes of authorization.[164] The main task of the Committee is to monitor the space operations continuously and to ensure that the licensee always complies with and observes all the terms and conditions stipulated in the licence and other modes. The second function is to constantly supervise the licensee.[165] The Committee has an obligation to continue supervising the licensee in respect of the operation of the space activities. This is essential in order, for instance, to avoid any possible misunderstandings by

[160] Modified from Section 58, Australian Space Activities Act 1998, *supra* note 107.
[161] See Section 20(1), Chapter 2 (Establishment, Powers, and Functions of Supervision and Monitoring Committee), Part III (Supervision and Monitoring of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.
[162] See Section 20(2), Chapter 2 (Establishment, Powers, and Functions of Supervision and Monitoring Committee), Part III (Supervision and Monitoring of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.
[163] Modified from Section 51 and 52, Australian Space Activities Act 1998, *supra* note 107; Section 5(2)(c), United Kingdom Outer Space Act 1986, *supra* note 97; Section 50907 (Monitoring Activities), 51 USC Chapter 509, *supra* note 320 (Chapter 3 of the thesis); Section 70106 (Monitoring Activities), 49 USC Chapter 701, *supra* note 321 (Chapter 3 of the thesis).
[164] See Section 21(a), Chapter 2 (Establishment, Powers, and Functions of Supervision and Monitoring Committee), Part III (Supervision and Monitoring of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.
[165] See Section 21(b), Chapter 2 (Establishment, Powers, and Functions of Supervision and Monitoring Committee), Part III (Supervision and Monitoring of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.

the licensee particularly in relation to the national and international obligations that need to be observed during the activities. This task should, for instance, be applicable to the Committee of legal experts.

The third function of the Committee is to ensure that no person or property is endangered by space operations.[166] Space activities, by their nature, may involve persons and property. Thus, it is crucial for the Committee, especially those members with technical expertise, to ensure such space operations do not expose the public and their property to any kind of danger. If it is proved that the operation will endanger lives and destroy property, the operation must then be stopped. The fourth function is to enter and inspect the site, facility, space object or other related equipment.[167] In order to monitor activities, it is important to give authorization to the Committee to enter and inspect the site, facilities, and other related equipment. The Committee will thus be able to assess whether the licensee is in conformity with the rules.

The fifth function is to require the licensee to provide necessary information or assistance regarding the space operations.[168] In such circumstances, while monitoring the activities, the Committee has the right to ask the licensee to supply or provide any information in relation to the space operation, if necessary. The Committee also has the right to seek any kind of assistance during the performance of the task. The sixth function is to take copies of the documents of the space operation when necessary.[169] To effectively perform this task, the Committee is authorized to take copies of any documents related to the operation. This can be performed only if the Committee feels it is relevant and necessary to assist them in the inspection of the operation. The seventh function is the broad scope of the Committee to do anything that is reasonable and necessary to perform its duty.[170] This clause is broad and open in terms of the powers and functions of the Committee. It is proposed that this clause covers

[166] See Section 21(c), Chapter 2 (Establishment, Powers, and Functions of Supervision and Monitoring Committee), Part III (Supervision and Monitoring of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.
[167] See Section 21(d), Chapter 2 (Establishment, Powers, and Functions of Supervision and Monitoring Committee), Part III (Supervision and Monitoring of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.
[168] See Section 21(e), Chapter 2 (Establishment, Powers, and Functions of Supervision and Monitoring Committee), Part III (Supervision and Monitoring of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.
[169] See Section 21(f), Chapter 2 (Establishment, Powers, and Functions of Supervision and Monitoring Committee), Part III (Supervision and Monitoring of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.
[170] See Section 21(g), Chapter 2 (Establishment, Powers, and Functions of Supervision and Monitoring Committee), Part III (Supervision and Monitoring of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.

all other reasonable necessary actions that need to be executed by the Committee while performing its tasks.

To conclude the points regarding powers and functions of the Committee, the sixth and final legal rule proposed under the establishment, powers and functions of the Committee is the clause on compliance with the Minister's instructions.[171] It should be noted that, in performing its tasks, the Supervision and Monitoring Committee must comply with any instruction given by the Minister.[172]

The third major area proposed under the supervision and monitoring of space activities clauses, as distinct from the powers of the Minister and the establishment of Supervision and Monitoring Committee, is in respect of the duties of the licensee.[173] It should be remarked that it is essential to prescribe duties for the licensee to observe. When the licensee is required under the law to observe his/her duties, it is hoped that the task of the Minister and the Committee in monitoring and supervising the activities will be more effective and successful. Thus, the study proposes four legal rules in relation to duties of the licensee: (1) duty of the licensee to cooperate; (2) duty to permit access to the site and for observation of the operation; (3) duty to obtain advance approval for deviation of space object; and (4) duty to notify the disposal of a payload.

The first is the duty of the licensee to cooperate.[174] In general, it is the duty of the licensee to cooperate with the Committee. In order to successfully implement the tasks of monitoring and controlling the space activities, the Committee needs the cooperation of the licensee. Therefore, it is proposed that there be a clause stipulating that a licensee must cooperate with the Committee for the fulfilment of the functions prescribed under the Malaysian Outer Space Act.[175] The second is the duty to permit access to the site or facility for observation of the

---

[171] Modified from Section 55, Australian Space Activities Act 1998, *supra* note 107.
[172] See Section 22, Chapter 2 (Establishment, Powers, and Functions of Supervision and Monitoring Committee), Part III (Supervision and Monitoring of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.
[173] See Chapter 3 (Duties of Licensee), Part III (Supervision and Monitoring of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.
[174] Section 50907 (Monitoring Activities), 51 USC Chapter 509, *supra* note 320 (Chapter 3 of the thesis); Section 70106 (Monitoring Activities), 49 USC Chapter 701, *supra* note 321 (Chapter 3 of the thesis). .
[175] See Section 23, Chapter 3 (Duties of Licensee), Part III (Supervision and Monitoring of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.

operation.[176] It is the duty of the licensee to provide access to the Committee for the inspection of sites, facilities and equipment, as well as to allow the Committee to observe the operation of the space activities. Therefore, the study suggests a clause specifying a rule that the licensee must allow the Committee to access the site or facilities, and to perform all other functions prescribed by the Act, as well to observe the operation.[177] This clause again supports the Committee in performing its monitoring tasks.

The third is the duty to obtain advance approval for a deviation of a space object.[178] The licensee must obtain approval in advance from the Minister for any intended deviation of a space object from its orbital parameter and must inform the Minister of any unintended deviation.[179] Such a clause would indeed assist the Minister in controlling the space activities in that all deviations of the space object from its orbital parameter, and any unintended deviation must obtain the Minister's approval. This signifies that the Minister is aware of the latest progress of the space activities registered under the Act and is thus able to constantly monitor the activities. The fourth and final duty is to notify the disposal of a payload.[180] It is also suggested that the licensee be required to notify the Minister of any disposal of payloads in outer space on the termination of the operation.[181] The same earlier reason shall also apply to this clause.

4.4.4. Registration Clauses

The registration of objects launched into outer space by a state is essential since the international law prescribes numerous rules in relation to states' registry. These rules include the recognition of the international space law that ownership of a space object belongs to the state of registry, which will thus retain jurisdiction and control over it.[182] In the event of a

[176] Modified from Section 50907 (Monitoring Activities), 51 USC Chapter 509, *supra* note 320 (Chapter 3 of the thesis); Section 70106 (Monitoring Activities), 49 USC Chapter 701, *supra* note 321 (Chapter 3 of the thesis).
[177] See Section 24, Chapter 3 (Duties of Licensee), Part III (Supervision and Monitoring of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.
[178] Modified from Section 5(2)(d), United Kingdom Outer Space Act 1986, *supra* note 97.
[179] See Section 25, Chapter 3 (Duties of Licensee), Part III (Supervision and Monitoring of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.
[180] Modified from Section 5(2)(e) and (g), United Kingdom Outer Space Act 1986, *supra* note 97.
[181] See Section 26, Chapter 3 (Duties of Licensee), Part III (Supervision and Monitoring of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.
[182] Article VIII, Outer Space Treaty 1967 states: '*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 ... Such objects or component parts found beyond the limits of the State Party to the Treaty on*

space object or its components being found outside the territory of the state of registry, such object shall be returned to the state that maintains the registration of the object at the state's request.[183] The same applies where astronauts make an emergency landing outside the intended jurisdiction; they shall be returned safely and promptly to the state of registry of their space vehicle.[184] Based on the aforementioned situations, it is noted that it is important to clearly identify the state of registry of the space object when dealing with the object launched into space. To be evidently identified as a state of registry of a specific space object, such state needs to have an efficient registration system to deal with the related matters. Thus, in view of the above, this section proposes a number of legal clauses in relation to registration of space objects whose launch operations have been authorized by the Malaysian Outer Space Act. As such, the discussion is divided into two main points: (1) a national registry; and (2) a supplementary registry.

Under the national registry, ten legal clauses are proposed:[185] (1) Minister to establish and maintain a national registry; (2) notification of establishment of a registry to the United Nations; (3) registration of space objects; (4) allocation of registration numbers; (5) entry of information on the space objects; (6) time limit to enter information; (7) updating information in the register; (8) power to vary an entry on register; (9) inspection of register; and (10) notification of information to the United Nations.

The first clause is in regard to the Minister establishing and maintaining a national registry.[186] It has been established that the international law imposes an obligation on a state to register any object it launches into outer space by means of entry in an appropriate registry.[187] To implement the obligation to register objects in the appropriate registry, it is proposed that

---

whose registry they are carried shall be returned to that State Party, which shall, upon request, furnish identifying data prior to their return'. See also Registration Convention 1975

[183] *Id*.

[184] Article V, Outer Space Treaty 1967 stipulates: *'State Parties to the Treaty shall regard astronauts as envoys of mankind in outer space and shall render to them all possible assistance in the event of accident, distress, or emergency landing … they shall be safely and promptly returned to the State of registry of their space vehicle'* . See also Rescue Agreement 1968.

[185] See Chapter 1 (National Registry), Part IV (Registration of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.

[186] Modified from Section 7(1), United Kingdom Outer Space Act 1986, *supra* note 97; Section 76(1), Australian Space Activities Act 1998, *supra* note 107; read also Article 10 (Registration) and its comment in the Proposed Model Law on National Space Legislation (The Sofia Guidelines for a Model Law on National Space Legislation of the International Law Association (ILA), UN Doc. A/AC.105/C.2/2013/CRP.6, 26 March 2013.

[187] Article II(1), Registration Convention 1975 mentions: *'When a space object is launched into Earth orbit or beyond, the launching state shall register the space object by means of an entry in an appropriate registry … State shall inform the Secretary-General of the United Nations of the establishment of such a registry'*.

states form national registries to register space objects. Thus, this study proposes a legal rule stipulating that the Minister shall establish and maintain a national registry of space objects.[188] Such a clause will ensure that Malaysia has an official national registry for space objects that is regulated under the Malaysian Outer Space Act.

The second clause is notification of the establishment of a registry to the United Nations. Once a state has established its national registry of space objects, it is further obligated to inform the Secretary-General of the United Nations of such registry.[189] In other words, it is the duty of the state to inform the United Nations about the national registry after its establishment. In this way, the United Nations will have records of such matters. In parallel with the international obligation to notify the establishment of national registries, it is proposed that the Malaysian Outer Space Act contains a clause stipulating that the Minister shall notify the Secretary-General of the United Nations of the establishment of a national registry of a space object.[190] This is important to ensure that the Minister legally fulfils his/her obligation to notify the United Nations about the establishment of the state registry. This practice will in fact assist the United Nations in recognizing the existence of the state registry and will also support them in monitoring the space activities.

The third clause is the registration of space objects. As there is an obligation for a launching state to register objects launched into space,[191] there should be a clause obliging the licensee to register those space objects. By registering the objects, the state will become the state of registry for those objects, and can therefore claim jurisdiction and control over the objects. Such registration is indeed evidence of ownership of a space object. Thus, the state of registry has the right to claim jurisdiction and control over it, especially in the event of it crashing or landing outside the intended territory.[192] Furthermore, the international space law has affirmed that the ownerships of space objects launched into outer space will not be affected by matters such as their presence in outer space or on a celestial body, or by their return to the Earth.[193] This means that, regardless of the object's location, the ownership will remain with

---

[188] See Section 27, Chapter 1 (National Registry), Part IV (Registration of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.
[189] Article II (1), Registration Convention 1974, *supra* note 187.
[190] See Section 28, Chapter 1 (National Registry), Part IV (Registration of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.
[191] Article II (1), Registration Convention 1974, *supra* note 187.
[192] Article VIII, Outer Space Treaty 1967, *supra* note 182.
[193] *Id*.

the state of registry. Hence, in such circumstances it is suggested that a clause be included in the Malaysian Outer Space Act requiring the licensee to register the space object in the national registry before launching it. Under this clause, the licensee would then be legally required to register, in the Malaysian national registry, the space object to be launched into outer space.[194] Such registration must be executed prior to the launch taking place.

The fourth concerns the allocation of a registration number.[195] For the purpose of registration of the space object, in order to ensure the effective performance of the registration, it is suggested that a registration number be allocated to each object launched into space.[196] These numbers will make it easier to identify and trace the objects in outer space, or when they crash into the Earth, for instance. Indeed, the number should reflect the identity of the state of registry of those objects. Thus, it is proposed that the Malaysian Outer Space Act include a legal rule requiring the Minister to allocate a registration number to each space object by which the object shall be identified.[197] With a system for the allocation of specific registration numbers, it is hoped that the procedure for national registration will be more efficient.

The fifth deals with the entry of information on the space object.[198] Although the international law prescribes that the contents of the register and the conditions by which it is maintained shall be determined by the state of registry,[199] it would be more effective to determine from the outset that the content of the register is similar to that maintained by the Secretary-General of the United Nations.[200] Such a situation is considered more effective since the similar contents can be furnished as soon as is practicable to the United Nations after the entry has been executed at the national level.[201] However, the Minister may also

[194] See Section 29, Chapter 1 (National Registry), Part IV (Registration of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.
[195] Modified from Section 77(1), Australian Space Activities Act 1998, *supra* note 107.
[196] There is a requirement under Article IV(1), Registration Convention 1975 stipulating the obligation of the state of registry to furnish information of the space object, such as its registration number, to the Secretary General of the United Nations.
[197] See Section 30, Chapter 1 (National Registry), Part IV (Registration of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.
[198] Modified from Article IV(1), Registration Convention 1975, *supra* note 19; Section 7(2), United Kingdom Outer Space Act 1986, *supra* note 97; Section 76(2), Australian Space Activities Act 1998, *supra* note 107; read also Article 10(4) (Registration) and its comment in the Proposed Model Law on National Space Legislation (The Sofia Guidelines for a Model Law on National Space Legislation of the International Law Association (ILA), UN Doc. A/AC.105/C.2/2013/CRP.6, 26 March 2013.
[199] Article II (3), Registration Convention 1975 states: *'The contents of each registry and the conditions under which it is maintained shall be determined by the State of registry concerned'*.
[200] See Article IV(1) and Article XI, Registration Convention 1975, *supra* note 19; Gerhard, Michael and Kai-Uwe Schrogl, "Report of the Working Group on National Space Legislation", *supra* note 63, at 26.
[201] Article IV (1) and Article XI, Registration Convention 1975 *supra* note 19.

include any other entries in the register as necessary.[202] Thus, to make this point legally effective at the Malaysian national level, it is proposed that the Malaysian Outer Space Act include a clause stipulating that the licensee shall enter the following particulars of the space object:[203] (a) registration number of a space object; (b) location of launch; (c) date and time of launch; (d) space object's general function; (e) the space object's main orbital parameters, including the nodal period, its inclination, apogee and perigee; (f) name of manufacturer; (g) name of operator; (h) name of other launching state (if applicable); (i) main constituent elements on board the space object; (j) current status (functional/non-functional/no longer in orbit); and, (k) any other necessary information. Under this clause, all this listed information shall be provided by the licensee to the national registry at the national level, after which the Malaysian Minister is then obliged to register the space object with the United Nations at the international level.

The sixth clause concerns the time limit for entering information.[204] Fixing a time limit for entering information in the register is a crucial matter as it will assist the Minister in charge to perform his/her duty to further notify the information to the Secretary-General of the United Nations within a reasonable time limit.[205] In other words, by fixing a limit for the period for entering information in the national registry, the licensee is obliged to do so within the stipulated period. This situation will then allow the relevant Minister to perform the task of passing such information to the United Nations as prescribed. For the time limit clause, the study suggests the licensee enters in the registry the information relating to the space object not later than 30 days following its launch.[206] Hence, the entry of the information must be done within 30 days of the launch date. The study believes that 30 days is an appropriate period of time for a licensee to make a reasonable effort to enter the information in the register in accordance with the Malaysian Outer Space Act.

The seventh clause deals with updating information in the register. All information provided by the licensee in relation to the space object launched must be updated by the licensee when

[202] Article II (3), Registration Convention 1975, *supra* note 199.
[203] See Section 31, Chapter 1 (National Registry), Part IV (Registration of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.
[204] Modified from Section 5(2) (b), United Kingdom Outer Space Act 1986, *supra* note 97.
[205] Article IV (1), Registration Convention 1974 prescribes that the relevant information shall be furnished by the state of registry to the United Nations as soon as practicable. See *infra* note 215.
[206] See Section 32, Chapter 1 (National Registry), Part IV (Registration of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.

any changes occur. This clause is important for maintaining the current and latest information about the status of the space object. It will assist the Minister to comply with his/her responsibility to forward the latest information on the object registered under the Malaysian Outer Space Act to the United Nations in accordance with the international law.[207] Such national legal obligation on the licensee to update the information on the current status of the space object will only apply when there is a change to the previous recorded information. If no changes take place, there will be no obligation to update the information previously recorded. This practice will greatly strengthen the provision of up-to-date information to the United Nations, which will surely benefit the space community. In view of this, the study proposes a legal rule requiring the licensee to update the information when any modification occurs.[208]

The eighth clause concerns the power to vary an entry in the register.[209] It is important to allocate power to the Minister to vary an entry in the register, since entries in the register may be varied and modified from time to time in order to ensure its effectiveness. Thus, if the Minister is given such power by the Malaysian Outer Space Act, he/she will have the authority to vary and modify the entries at any time, as it is necessary, for the efficiency and efficacy of the registering system under the Malaysia Outer Space Act. On this basis, the study proposes a clause empowering the Minister to vary an entry in the register when necessary.[210] It is hoped that such a clause will accommodate the future changes and challenges in outer space technology.

The ninth clause is about inspection of the register.[211] This point is considered after taking into consideration the international rule of outer space which provides to the public full and open access to information in respect of space objects registered with the United Nations.[212]

---

[207] Article IV (2), Registration Convention 1975 mentions: *'Each State of registry may, from time to time, provide the Secretary General ... with additional information concerning a space object carried on its registry'*; Article IV (3), says: *'Each State of registry shall notify the Secretary General ..., to the greatest extent feasible and soon as practicable, of space object ... has previously transmitted information ... but no longer are in Earth orbit'*.
[208] See Section 33, Chapter 1 (National Registry), Part IV (Registration of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.
[209] Modified from Section 76(4), Australian Space Activities Act 1998, *supra* note 107.
[210] See Section 34, Chapter 1 (National Registry), Part IV (Registration of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.
[211] Modified from Section 7(3), United Kingdom Outer Space Act 1986, *supra* note 97; Section 79, Australian Space Activities Act 1998, *supra* note 107.
[212] Article III (2), Registration Convention 1975 specifies: *'There shall be full and open access to the information in the Register'*.

Thus, it is proposed that the Malaysian Outer Space Act give the public the right to inspect the data provided by the licensee to the Malaysian national registry in regard to space objects launched into space. The public is entitled to know about the activities conducted in outer space since these activities may affect the quality of their future lives and surrounding environment. In addition, according to the international rule,[213] such activities should be carried out only for the betterment and interest of all mankind. On this matter, it is also suggested that the inspection be carried out only upon payment of a certain fee. Such payment would be made to cover the cost of the administrative procedure involved; this would be a small fee to be prescribed by the Minister in charge. Hence, it is proposed that this clause of the Malaysian Outer Space Act be split into two: (a) The register shall be open to any member of the public for inspection; and (b) the inspection can only be made after payment of fees as prescribed by the Minister.[214]

The tenth and final clause is to do with the notification of information to the United Nations. Once the licensee has entered the information on the space object whose launch has been authorized under the Malaysian Outer Space Act, such information must then be furnished to the Secretary-General of the United Nations. With the implementation of this clause, Malaysia under its national law can legally observe the international obligation of the United Nations space convention which requests the state of registry to furnish the information to the United Nations as soon as practicable.[215] In addition, Malaysia will comply with the requirement to provide additional and updated information to the United Nations from time to time.[216] Thus, this study proposes a clause in the Malaysian Outer Space Act specifying that the Minister shall notify the Secretary-General of the United Nations about the information obtained regarding the space object and the updated information relating to it as soon as is practicable.[217]

---

[213] The Preamble, Outer Space Treaty 1967, and Principle 1, Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space 1967.

[214] See Section 35, Chapter 1 (National Registry), Part IV (Registration of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.

[215] Article IV(1), Registration Convention 1975, prescribes: *'Each states of registry shall furnish to the Secretary-General ... , as soon as practicable, the following information ...: (a) Name of launching state or states; (b) An appropriate designator of the space object or its registration number; (c) Date and territory or location of launch; ...'*.

[216] Article IV (2) and (3), Registration Convention 1975, *supra* note 207.

[217] See Section 36, Chapter 1 (National Registry), Part IV (Registration of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.

Apart from the above-mentioned Malaysian national registry clauses proposed, the second division suggested is in relation to the supplementary registry.[218] The aim of incorporating the supplementary registry clauses into the Malaysian Outer Space Act is to effectively cater for matters in respect of the registration of objects launched into space. On this point, besides having a main national registry, a supplementary registry is also necessary to cover circumstances where the space object launched into space falls under a specific category, which will be discussed in the coming paragraphs. Thus, under the supplementary registry, there are two clauses proposed in the Malaysian Outer Space Act: (1) Minister to establish and maintain a supplementary registry; and (2) circumstances where registration is categorized under the supplementary registry.

The first clause is about the power of the Minister to establish and maintain the supplementary registry. As well as providing the Minister with the power to establish the national registry, it is also necessary to provide him/her with the power to establish a supplementary registry of objects launched into space. This power is prescribed not only to establish but also to maintain such registry, as proposed for the main national registry. Thus, the clause suggested in relation to this matter shall state that the Minister shall establish and maintain a supplementary registry of space objects.[219]

The second clause concerns the circumstances in which registration is categorized under the supplementary registry. The supplementary registry is treated as a supplement to the main national registry. It is proposed that information on certain types of space objects be entered in the supplementary registry instead of the main national registry. These are space objects whose launch has been procured by Malaysia but which appear in the registries of another states, and space objects whose title and control has been transferred to Malaysian operators after their launch, the authorization for which has been granted under the Malaysian Outer Space Act.[220]

[218] See Chapter II (Supplementary Registry), Part IV (Registration of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.
[219] See Section 37, Chapter II (Supplementary Registry), Part IV (Registration of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.
[220] See Section 38, Chapter II (Supplementary Registry), Part IV (Registration of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83; read also Article 9 (Transfer of Space Activity) and its comment in the Proposed Model Law on National Space Legislation (The Sofia Guidelines for a Model Law on National Space Legislation of the International Law Association (ILA), UN Doc. A/AC.105/C.2/2013/CRP.6, 26 March 2013.

The first situation involves space objects whose launch has been procured by Malaysia, but which are registered in the national registries of other states. For this case, although the registration of the object has been made in the national registry of another country, for the purposes of a complete and efficient record system the relevant information of such objects shall then also be entered in the Malaysian supplementary registry. This is to ensure that the Malaysian Government does not overlook an object whose launch it has procured but which is registered in another country's national registry. It is remarked that, by entering the information in the supplementary registry, it is well understood that such an object already appears in the registry of another state. The second situation involves a space object whose title and control has been transferred to a Malaysian operator. At this point, it should be noted that such transfer of title and control only occurs after the launch has taken place and the operation has been authorized by the Malaysian authority. In other words, it is a case of transferring ownership. Thus, for this kind of operation, the information shall be recorded in the Malaysian supplementary registry.

Besides suggesting the rules of registration of space activities whose details are accessible to the public, it is important to note that the study also proposes that such rules of registration not be applicable to Malaysian military outer space activities.[221] This matter will be discussed further in the forthcoming section.[222]

4.4.5. Liability and Indemnification Clauses

It is remarked that the international space law imposes rules that a state shall be internationally responsible for the activities of its nationals in outer space,[223] as well as internationally liable for any damage or loss caused by a space object launched by the state or whose launch has been procured by the state.[224] Such rules have, in fact, exposed states to the financial risk of having to compensate for any liability or loss resulting from their national

[221] See Section 49, Part VI (Other Relevant Clauses), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.
[222] Discussion is available in Chapter 4 of the thesis (4.4.7. Other Relevant Clauses).
[223] Article VI, Outer Space Treaty 1967 stipulates: *'States Parties to the Treaty shall bear international responsibility for national activities in outer space ... whether such activities are carried on by governmental agencies or by non-governmental entities ...'*. See also Liability Convention 1972.
[224] Article VII, Outer Space Treaty 1967 specifies: *'Each State Party to the Treaty that launches or procures the launching of an object into outer space ... , and each State Party from whose territory or facility an object is launched, is internationally liable for damage to another State Party ...'*. See also Liability Convention 1972.

space activities.[225] As a space participant, Malaysia must be aware of the possibility of such liability at the international level, as well its capacity to be regarded as a launching state.[226] In such circumstances, Malaysia is strongly advised to adequately protect itself from any possible liability arising from space activities performed by its private entities.

In view of the above, this section proposes a number of legal rules in respect of indemnification of space liability by the licensee to the Government of Malaysia. It will also stress some requirements for any licensee conducting space activities under the Malaysian Outer Space Act to obtain liability insurance.[227] The discussion is divided into two main points: (1) full indemnification and its exemptions; and (2) the liability insurance and its requirements.

The first point relates to full indemnification and its exemptions.[228] In this matter, six legal clauses are proposed. They are: (1) obligation to indemnify the Government in full against any claims; (2) entitlement for exemption to the obligation to indemnify the Government in full; (3) conditions for entitlement for exemption to the obligation to indemnify in full; (4) safeguarding the interest of the Government of Malaysia against possible financial risk; (5) power of the Government of Malaysia to claim the balance of the indemnification amount; (6) situations where entitlement for exemption of indemnification in full is not applied.

The first clause concerns the obligation to indemnify the Government in full against any claims.[229] It is crucial to note that observing the liability obligation under the international space conventions might expose Malaysia to financial risk.[230] The Government of Malaysia

[225] Article II, Liability Convention 1972 mentions: *'A launching State shall be absolutely liable to pay compensation for damage caused by its space object on the surface of the Earth or to aircraft in flight'*. See also Article VII, Outer Space Treaty 1967, *id*.; Article VI, Outer Space Treaty 1967, *supra* note 223.

[226] Article II, Liability Convention 1972, *id*.; Article I, Liability Convention 1972 prescribes: '*(b) The term "launching" includes attempted launching; (c) The term "Launching State" means: (i) A State which launches or procures the launching of a space object; (ii) A State from whose territory or facility a space object is launched ...'*.

[227] See Part V (Indemnification and Insurance Requirement), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.

[228] See Chapter I (Full Indemnification and Its Exception), Part V (Indemnification and Insurance Requirement), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.

[229] Modified from Section 10(1), United Kingdom Outer Space Act 1986, *supra* note 97; read also Article 11(1) (Liability and Recourse) and its comment in the Proposed Model Law on National Space Legislation (The Sofia Guidelines for a Model Law on National Space Legislation of the International Law Association (ILA), UN Doc. A/AC.105/C.2/2013/CRP.6, 26 March 2013.

[230] Article II, Liability Convention 1972, *supra* note 225; Article I, Liability Convention 1972, *supra* note 226; Article VI, Outer Space Treaty 1967, *supra* note 223; Article VII, Outer Space Treaty 1967, *supra* note 224.

can be held liable for damage or loss caused by its nationals' space activities.[231] In such circumstances, the Government of Malaysia is obliged under the international space law to compensate any liability occurred and to be responsible for any losses caused by the space activities conducted by its nationals. Thus, there is a need to propose some municipal rules that are able to safeguard the interests of the Government of Malaysia when observing such liability obligation at the international level. In view of this, the study proposes a rule that, in the event of the Government being held liable at the international level for a certain amount of compensation to be paid to the claimant, the actual responsible party whose space object caused the damage or loss shall indemnify the Government of Malaysia in the full amount at the national level. Hence, the Malaysian Outer Space Act should prescribe that the licensee shall indemnify the Government of Malaysia in full against any claims brought against the Government of Malaysia, internationally or nationally, in respect of damage or loss arising from activities carried out by the licensee under the Malaysian Outer Space Act.[232] With the imposition of the rule of full indemnification, it is believed that the interests of the Malaysian Government with respect to its financial risk would be adequately protected.

The second clause is concerned with the entitlement to exemption from the obligation to indemnify the Government in full.[233] Despite the obligation of licensees to indemnify the Government of Malaysia in the full amount against any claims brought against it, this study also attempts to encourage space operators or licensees to register their space activities under the Malaysian Outer Space Act. To this end, the study proposes a rule that the licensee is entitled to indemnify the Government of Malaysia not in the full amount but only to the licensee's utmost financial capacity, provided that such amount is not less than the insured amount.[234] This means that the licensee is given a chance to exempt him/herself from making a full payment of indemnification to the Government. However, the amount payable should

---

[231] Article VI, Outer Space Treaty 1967, *supra* note 223; Liability Convention 1972.

[232] See Section 39, Chapter I (Full Indemnification and Its Exception), Part V (Indemnification and Insurance Requirement), draft of Malaysian Space Act [Year] (Act [No.]), *supra* note 83.

[233] In Australia, the Australian Government applies a concept of monetary limit on liability. This concept implies that a responsible party is liable to pay compensation up to the certain insured amount only (as required under the Australian legislation). However, if the amount is in excess of the insured amount, he/she is not liable to pay the balance of the compensation. This balance of compensation amount (which is in excess of the insured amount) is, indeed, a matter of the Australian Government's responsibility to provide the payment. See Section 48(3), and 69(3), Australian Space Activities Act 1998. More information is available in Chapter 3 of the thesis (3.3.3(e) Australia: Liability and Indemnification); read also Article 11(2) (Liability and Recourse) and its comment in the Proposed Model Law on National Space Legislation (The Sofia Guidelines for a Model Law on National Space Legislation of the International Law Association (ILA), UN Doc. A/AC.105/C.2/2013/CRP.6, 26 March 2013.

[234] See Section 40, Chapter I (Full Indemnification and Its Exception), Part V (Indemnification and Insurance Requirement), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.

be according to the licensee's utmost capable financial capacity and not lower than the insured amount. In other words, it must refer to whichever is the higher amount.[235] This entitlement is actually available to the licensee only when the conditions prescribed by the Act are fulfilled. This will be further elaborated in the next paragraph.

The third clause deals with the conditions for entitlement to exemption from indemnification in full. As the study proposes the entitlement to exemption from indemnification in full, it also suggests a number of conditions to be fulfilled before the licensee is entitled to exemption from full payment. All these conditions must be proved successfully. They are as follows:[236] (a) the licensee must sufficiently prove to the Government of Malaysia that he/she is genuinely incapable of indemnifying the Government in full; (b) the Government of Malaysia has to be satisfied itself to the fullest extent that the licensee is financially incapable of indemnifying in full; and, (c) the entitlement will not jeopardize the interest of the Government of Malaysia in particular, and Malaysia as a whole, especially in relation to its financial capacity. Thus, for the first condition the onus is on the licensee to provide evidence that he/she is incapable of paying full indemnification to the Government. Then, such evidence will be used to fulfil the second condition, which is for the Malaysian Government to be satisfied to the fullest extent that the licensee is incapable of making full settlement of the amount. Finally, when the Government is satisfied with the first two conditions, it should assess whether, by granting such entitlement to exemption to the licensee, it may or may not jeopardize any interest of the Government of Malaysia in particular, and Malaysia in general. If the licensee satisfies all these conditions, he/she will then be granted the entitlement to exemption from indemnification in full. These rules are proposed on the ground that they will encourage the development and progress of private space activities in Malaysia, apart from the Government's space activities. It is hoped that such rules will support and balance the

---

[235] For instance: the full amount of compensation that the Malaysian Government should bear is RM (Ringgit Malaysia) 120 000. However, the licensee's insured sum is RM100 000 only**.** Based on evidence, the highest payment he is capable of paying according to his financial capacity is RM110 000. The licensee shall then indemnify the Government of Malaysian in the amount of RM110 000 (amount of his financial capability), instead of RM100 000 (the insured amount). The reason is that RM110 000 (amount of his financial capability) is even higher than the RM100 000 (the insured amount). So, for the balance of another RM10 000, it is up to the Malaysian Government to bear the cost. On the other hand, if the licensee can only pay RM 90 000 based on his financial capacity, he shall then indemnify the Government of Malaysia in the amount of RM100 000 (the insured amount), and not RM90 000 (the amount of his financial capacity). The reason is that RM100 000 (the insured amount) is even higher than RM90 000 (amount of his financial capability). Therefore, for the balance of RM20 000, it is up to the Government of Malaysia to bear the cost.

[236] See Section 41, Chapter I (Full Indemnification and Its Exception), Part V (Indemnification and Insurance Requirement), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.

growth of public and private space activities in the country, thereby contributing to the expansion of the Malaysian economy into space technology and activities.

The fourth clause is about further safeguarding the interests of the Government of Malaysia against the possible financial risk. It should be noted that, although the study proposes the entitlement of the licensee to be exempted from paying the full indemnification amount, it believes that it is also necessary to further safeguard the interests of the Malaysian Government against any possible financial risks after providing such exemption facility to the licensee. As such, in order to further safeguard the interest of the Government of Malaysia against any possible financial risk, it is proposed that the entitlement to exemption from full indemnification shall apply only once for the whole period of operation under the licence or other modes authorized by the Malaysian Outer Space Act to the licensee.[237] This means that the licensee is not allowed to request exemption from full payment more than once for the whole period of operation of space activities under the licence or other modes granted by the Malaysian Outer Space Act. It is believed that such a rule would protect the Malaysian Government from the possibility of facing financial risks resulting from possible multiple requests made by the same licensee to be exempted from making full indemnification payments as required under the Malaysian Outer Space Act.

The fifth clause concerns the power of the Government of Malaysia to claim the balance of the indemnification amount. Apart from providing the licensee with the facility for exemption from payment of the indemnification amount in full, the study must also consider other future potential financial risks that may be faced by the Government of Malaysia. This is highlighted on the ground that Malaysia is not a large developed country with a firm economic capacity that will guarantee its enduring stability. Thus, the study suggests a clause prescribing a right of the Government of Malaysia to claim or recover the balance of the indemnification amount that the licensee was previously exempted from paying under this Act. It should be remarked that this right should only apply in the event of the Malaysian Government strongly believing that it is necessary to do so in the interests of the Government and the country as a whole. The Government of Malaysia should also be entitled to recover the amount if the Government identifies that the respected licensee has the financial capacity

[237] See Section 42, Chapter I (Full Indemnification and Its Exception), Part V (Indemnification and Insurance Requirement), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.

to pay the balance of the indemnification amount to the Government.[238] By proving one of the conditions, the Government of Malaysia would be entitled to recover the balance of the amount of indemnification. This clause is, indeed, suggested on the basis that the Government of Malaysia and the private sector should adopt a spirit of serving each other for the sake of the further development of the country's space activities. This can be achieved through the study's initial proposal that the Government shall assist the private sector in relation to payment of indemnification. In other words, the Malaysian Government should assist the private sector to pay the remaining indemnification amount if the prescribed conditions are fulfilled. On the other hand, the private sector must be willing to pay back this amount to the Government when it has the financial capacity to do so. To achieve a balance between safeguarding the interests of the private sector and those of the Government of Malaysia, the study proposes that the Government have the right to fully recover such amount when it believes it is necessary to do so in the interests of country, such as during an economic crisis.

The sixth and final clause deals with situations where the entitlement to exemption from indemnification in full is not applied. It is proposed that, in certain situations, the entitlement to exemption from paying the indemnification amount in full shall not be granted to the licensee. Such circumstances include those in which the damage or loss results from the wilful misconduct or negligence of the licensee. The same applies if it is proved that the damage or loss occurs because of non-compliance with the requirements of the authorization, or any other relevant laws, by the licensee.[239] This means that, if it is proved that those factors have contributed to the cause of the damage or loss, the licensee is not then entitled to request exemption from the full indemnification payment offered under the Malaysian Outer Space Act.

Let us return to the points proposed under the liability and indemnification clauses. While the first is in respect of the full indemnification and its exemptions, the second relates to liability insurance and its requirements.[240] Under this point, the study proposes three rules: (1)

[238] See Section 43, Chapter I (Full Indemnification and Its Exception), Part V (Indemnification and Insurance Requirement), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.
[239] See Section 44, Chapter I (Full Indemnification and Its Exception), Part V (Indemnification and Insurance Requirement), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.
[240] See Chapter 2 (Liability Insurance and Its Requirements), Part V (Indemnification and Insurance Requirement), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83; read also Article 12 (Insurance) and its comment in the Proposed Model Law on National Space Legislation (The Sofia Guidelines

requirement to obtain liability insurance; (2) circumstances in which liability insurance is required; and (3) requirement to obtain the maximum insurance coverage.

The first point is the requirement to obtain liability insurance. To protect the interests of the Malaysian Government against any possible financial risks arising from the liability of space operations conducted by the licensee, it is highly recommended that the Malaysian Outer Space Act imposes a requirement for the licensee to insure him/herself against any possible liability. Thus, the Malaysian Outer Space Act should require the licensee to insure him/herself against any liability incurred after obtaining authorization under the Malaysian Outer Space Act.[241] This clause would legally bind the licensee to obtain insurance in order to insure him/herself against any possible liability that might be incurred during the operations. Such requirement would, indeed, guarantee the capacity of the licensee to indemnify the Government of Malaysia in the event of any damage or loss occurring on the international stage.

The second point is in respect of the circumstances in which liability insurance is required.[242] The study proposes some specific circumstances in which the licensee is required to obtain the insurance. The licensee must insure him/herself against any liability incurred with respect to four situations: (a) damage or loss of property or death or bodily injury suffered by a third party; (b) damage or loss of property or death or bodily injury suffered by the Government of Malaysia and its agents; (c) liability of the Government of Malaysia that might be incurred under the international law; (d) any other circumstances that the Government of Malaysia deems necessary.[243] The first situation deals with circumstances in which the licensee's space operation causes damage or loss to a third party. The second situation concerns damage or loss to the Government of Malaysia or its agents. These two liabilities may indeed take place domestically. The third situation refers to any liability of the Government of Malaysia that might be incurred internationally. This point refers to circumstances in which the Government of Malaysia shall be internationally responsible and liable on behalf of the

---

for a Model Law on National Space Legislation of the International Law Association (ILA), UN Doc. A/AC.105/C.2/2013/CRP.6, 26 March 2013.

[241] See Section 45, Chapter 2 (Liability Insurance and Its Requirements), Part V (Indemnification and Insurance Requirement), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.

[242] Modified from Section 5(2)(f), United Kingdom Outer Space Act 1986, *supra* note 97; Section 48(1), Australian Space Activities Act 1998, *supra* note 107.

[243] See Section 46, Chapter 2 (Liability Insurance and Its Requirements), Part V (Indemnification and Insurance Requirement), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.

licensee's space activities in accordance with the international space law. The last rule refers to any situation in which the Government believes it necessary for the licensee to insure him/herself against any liability that might be incurred. Thus, with those legal rules, all possible damage or loss that might be caused to a third party, or the Malaysian Government and its agents, both nationally and internationally, will be fully covered and protected.

The third and final point is the requirement to obtain maximum insurance coverage.[244] It is the aim of the study to adequately protect the interest of the Government of Malaysia against any possible international liability arising from private space activities. Thus, in order to ensure that the Government is able to recover the amount it has to compensate with regard to international liability of private space activities, this study proposes a rule requiring the licensee to insure him/herself for the greatest amount of loss or damage that might reasonably be expected to result from such activities. It is also proposed that the Malaysian Outer Space Act include a legal rule obliging the licensee to ensure that the insured amount is the maximum liability insurance coverage available at the time of application.[245] This clause makes the licensee legally responsible for insuring him/herself with the maximum insurance coverage. The licensee would then have the capacity to compensate the victim in case of loss, thus indemnifying the Government of Malaysia in situations where the Government has to take responsibility for the licensee's action and liability under the international space law. Thus, the interests of the victims, as well as the Malaysian Government and its agents, would be fully protected.

4.4.6. Safety, Peace and Security Clauses

Safety, peace and security clauses are among the clauses requiring special attention. It is important to incorporate these clauses into the national law as they will ensure the safe operation of space activities, not only locally but also internationally. Indeed, such clauses will prevent the possibility of a national space actor using outer space for unhealthy activities, such as testing a nuclear weapon, which is against the international law. Moreover, the clauses will ensure the preservation of the state's national security when its private entities conduct activities outside the country. Although, at the international level, the international

---

[244] Modified from Section 48(3), Australian Space Activities Act 1998, *supra* note 107.

[245] See Section 47, Chapter 2 (Liability Insurance and Its Requirements), Part V (Indemnification and Insurance Requirement), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.

law authorizes everyone to freely explore and use outer space without discrimination, these clauses will inject the spirit of safety and peace into the international rules.[246] This is essential in order to ensure the permanent preservation of the fragile environment of outer space. Indeed, it will preserve both, outer space and the Earth.

In view of the above, the study proposes a number of clauses that incorporate the spirit of safety, peace and security as the basis of the conditions for granting authorization to applicants.[247] When the Government of Malaysia is satisfied that the applicant has fulfilled the conditions, the licence will be granted. There are ten clauses of conditions proposed in the Malaysian Outer Space Act, the majority of which deal with the spirit of safety, peace and security.

The first condition proposed concerns the granting of authorization, as the Minister and the authorization Committee must be satisfied that the applicant is a competent person to operate the site, facility and/or space object.[248] In this point, to ensure that the operation is safe and will be conducted according to the legal rules, the Government of Malaysia and the authorization Committee must be fully satisfied, before granting him/her a licence, that the applicant is a competent person to conduct the space activities. If the applicant is proved to be a competent person legally and financially, such as being sufficiently sound and knowledgeable about space operations and activities, and having the financial capacity to conduct such activities, such proof will contribute significantly to the safe operation of the space activity. A sound and competent person will make appropriate efforts to ensure that the

[246] Article III, Outer Space Treaty 1967 stipulates: *'States Parties ... shall carry on activities in the exploration and use of outer space ... in the interest of maintaining international peace and security ...'.* Article IV, Outer Space Treaty 1967 prescribes: *'... The Moon and other celestial bodies shall be used by all States Parties to the Treaty exclusively for peaceful purposes ...'*; Article I, Outer Space Treaty 1967 states: *'... Outer space, including the Moon and other celestial bodies, shall be free for exploration and use by all States without discrimination of any kind ...'.* However, Article IX, Outer Space Treaty 1967 prescribes: *'... States Parties ... conduct exploration of them so as to avoid their harmful contamination and also adverse changes in the environment ...';* Preamble, Outer Space Treaty 1967 states: '… *Recognizing the common interest of all mankind in the progress of the exploration and use of outer space for peaceful purposes ...*'; Preamble, Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space 1962, among others, mentions: *'... Desiring to contribute to broad international cooperation in the scientific as well as in the legal aspects of exploration and use of outer space for peaceful purposes ...'.*

[247] See Chapter 2 (Conditions for Granting Authorization), Part II (Authorization of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83; read also Article 4 (Conditions for Authorization) and its comment in the Proposed Model Law on National Space Legislation (The Sofia Guidelines for a Model Law on National Space Legislation of the International Law Association (ILA), UN Doc. A/AC.105/C.2/2013/CRP.6, 26 March 2013.

[248] Modified from Section 18(a), Australian Space Activities Act 1998, *supra* note 107. See Section 9(a), Chapter 2 (Conditions for Granting Authorization), Part II (Authorization of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.

operation is conducted in a safe environment and in accordance with the legal rules. Thus, the licence will be granted on this condition.

The second condition is that, in order to grant authorization, the Minister and the appointed Committee must be satisfied that the necessary environmental approval under the Malaysian law (if necessary) has been obtained. Moreover, an adequate environmental plan should also have been made for the construction and operation of the site, facility or space object.[249] Thus, before the licence or other authorization modes can be granted to the applicant, the Malaysian Outer Space Act requires the applicant to obtain the necessary environmental approval from the relevant authority should he/she be requested to do so. In addition, he/she must provide an adequate environmental plan for the construction of the space site.[250] All those things are essential to prove that the operation being conducted will not affect the environmental quality of the surrounding areas or endanger the life of the community. This clause will contribute to the safe operation of the space activities and maintain the quality of the environment.

The third condition is that the applicant must conduct his/her operations in such a way as to prevent the contamination of outer space or adverse changes in the environment of the Earth.[251] This clause again reflects the spirit of safety, as the Act obliges the applicant to prove to the authority that he/she will conduct his/her operation in a manner that will prevent any contamination of outer space or cause adverse changes to the Earth's environment. If the applicant can successfully prove to the Minister and the Committee that he/she will abide by the condition, the licence is then granted to the applicant. However, should they be unable to provide such proof, no licence will be granted. This clause is essential for the preservation and maintenance of the Earth's environment, as well as for the protection of outer space from

[249] Modified from Section 18(b), Australian Space Activities Act 1998, *supra* note 107; read also Article 7 (Protection of the Environment) and its comment in the Proposed Model Law on National Space Legislation (The Sofia Guidelines for a Model Law on National Space Legislation of the International Law Association (ILA), UN Doc. A/AC.105/C.2/2013/CRP.6, 26 March 2013.

[250] See Section 9(c), Chapter 2 (Conditions for Granting Authorization), Part II (Authorization of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.

[251] Modified from Section 5(2) (e), United Kingdom Outer Space Act 1986, *supra* note 97. See Section 9(d), Chapter 2 (Conditions for Granting Authorization), Part II (Authorization of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83; read also Article 7 (Protection of the Environment) and its comment in the Proposed Model Law on National Space Legislation (The Sofia Guidelines for a Model Law on National Space Legislation of the International Law Association (ILA), UN Doc. A/AC.105/C.2/2013/CRP.6, 26 March 2013.

contamination. Thus, these two areas can be used safely and their benefits utilized continuously.

The fourth condition is intended to ensure that the activities conducted will not jeopardize public health, and the safety of persons or property.[252] This clause clearly deals with the spirit of safety. The study proposes the rule in order to ensure the activities that will be carried out by the applicant will not affect the health of the public or cause damage to property. In the event of the activities being conducted having the tendency to endanger the health, life or property of the public, the Minister shall not authorize the applicant to conduct the activities. The clause should be clear and precise since it involves issues of public health and the safety of life and property. It should be remembered that, when it comes to public safety and property, the law must not tolerate any infringement and it must be firm in dealing with the matter.

The fifth condition is that the applicant will conduct his/her operation in such a way as to avoid interference with the activities of others in the peaceful exploration and use of outer space.[253] For this clause, the applicant must ensure that his/her activities are conducted and performed in a peaceful manner. That is to say, he/she must ensure that the activities do not interfere with the space activities of others. The exploration and use of outer space shall be performed in a peaceful and tolerant manner as prescribed by the international law.[254] Indeed, such a clause supports the international obligation to perform activities in peace. However, should the Minister and Committee be notified that such activities have been conducted in a non-peaceful way; the Minister will have the right to terminate the licence under this Act.

The sixth condition is that the space object or the object concerned does not contain a nuclear weapon or a weapon of mass destruction of any kind.[255] This proposed clause also reflects the spirit of safety and peace. To receive a licence, the applicant has to prove to the Minister and

---

[252] Modified from Section 4(2) (a), United Kingdom Outer Space Act 1986, *supra* note 97. See Section 9(e), Chapter 2 (Conditions for Granting Authorization), Part II (Authorization of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.
[253] Modified from Section 5(2)(e), United Kingdom Outer Space Act 1986, *supra* note 97. See Section 9(f), Chapter 2 (Conditions for Granting Authorization), Part II (Authorization of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.
[254] See *supra* note 246.
[255] Modified from Section 26, Australian Space Activities Act 1998, *supra* note 107. See Section 9(g), Chapter 2 (Conditions for Granting Authorization), Part II (Authorization of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.

the Committee that the space object in question does not contain any nuclear weapon or any other weapon of mass destruction. This is crucial in order that the Minister can be satisfied that the space operation will be conducted in accordance with the international obligations.[256] By having a clause prohibiting the carrying of dangerous weapons, Malaysia can ensure that the licensee authorized under this Act will utilize outer space exclusively for peaceful purposes and in accordance with the international law.

The seventh condition is that the activities conducted will not impair the national security of Malaysia.[257] This clause reflects the spirit of security. For this point, it is important that the Minister and the Committee, prior to granting the licence to the applicant, ensure that the space operation performed by the applicant will not impair the national security of the country. This means that, while conducting the activities, the applicant must preserve the national security, as they may jeopardize the safety of the country. With this clause as a condition of granting a licence, Malaysia's national security will be guaranteed and well protected.

The eighth condition is that the activities conducted must be consistent with the international obligations of the country.[258] This clause is proposed in order to ensure that the applicant conducts his/her operation in compliance with the international obligation of the country. This is essential since the operation will be performed at the international level as well as the national level. When the activities take place internationally, they should observe the international obligation prescribed by the international law. In the event of the licensee failing to observe the law, the Malaysian authority has the legal right to terminate the authorization of the activities. This clause, in fact, refers to the international obligation of Malaysia in general. However, it may also include the obligation to use outer space in a safe and peaceful manner.

---

[256] Article IV, Outer Space Treaty 1967 prescribes: *' State Parties ... undertake not to place in orbit around the Earth any objects carrying nuclear weapons or any other kinds of weapons of mass destruction, install such weapons on celestial bodies, or station such weapons in outer space in any other manner…'*.

[257] Modified from Section 18 and 26, Australian Space Activities Act 1998, *supra* note 107; Section 4(2)(a), United Kingdom Outer Space Act 1986, *supra* note 97; see also Section 9(i), Chapter 2 (Conditions for Granting Authorization), Part II (Authorization of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.

[258] Modified from Section 4(2) (a), United Kingdom Outer Space Act 1986, *supra* note 97; see also Section 9(h), Chapter 2 (Conditions for Granting Authorization), Part II (Authorization of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.

Another condition is that the insurance requirement under this Act must be satisfied.[259] This clause deals with security against financial risks that might possibly accrue to the Malaysian Government as a result of the applicant's space activities. If the applicant intends to apply the authorization under the Malaysian Outer Space Act, he/she needs to insure his/her operation as provided by the Malaysian Outer Space Act. The insurance coverage will secure the Malaysian Government's position in the event of damage or loss resulting from the activities of the licensee. Therefore, if no liability insurance is obtained, the application for authorization should be rejected.

4.4.7. Other Relevant Clauses

Apart from the five major clauses discussed previously, the other relevant clause proposed under this section is in respect of offences and penalties.[260] This study believes that it is necessary to impose rules prescribing the offences under the Malaysian Outer Space Act, as well as their penalties, either specifically or in general. Imposing the clauses on offences and their penalties will remind the licensee to fully observe the conditions imposed under the licence or other modes, as well as to comply with the rules prescribed by the Malaysian Outer Space Act and other related laws and legal instruments. Hence, this study proposes two major clauses in relation to offences and penalties.

For the first clause, it is proposed to stipulate that every omission or failure to comply with, and any act committed or attempted contrary to this Act or its subsidiary legislation or any written instrument made under this Act, or in breach of the conditions subject to which any licence or other modes of authorization have been granted, shall be an offence against this Act or its subsidiary legislation.[261] Based on the proposed clause, three main points can be highlighted in terms of proving the commission of an offence under this Act. It is remarked that certain elements must be proved before the licensee is legally liable for committing an offence under the Malaysian Outer Space Act. Those elements are omission, or neglect to

---

[259] See Section 9(b), Chapter 2 (Conditions for Granting Authorization), Part II (Authorization of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.
[260] See Part VI (Other Relevant Clauses), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83; read also Article 14 (Sanctions) and its comment in the Proposed Model Law on National Space Legislation (The Sofia Guidelines for a Model Law on National Space Legislation of the International Law Association (ILA), UN Doc. A/AC.105/C.2/2013/CRP.6, 26 March 2013.
[261] See Section 48(1), Part VI (Other Relevant Clauses), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.

comply with, or any action done or attempted that is contrary to the law. However, it is sufficient to prove just one of these elements to establish an offence under the Malaysian Outer Space Act, provided that it is done contrary to or against the law. Thus, the first point is in relation to the omission. When the licensee omits to take an action that he/she is supposed to take as prescribed by the Act, such as omitting to obtain third-party liability insurance coverage for his/her operation, he/she will then be considered an offender under this Act. The situation is similar when he/she neglects to comply with something that should have been done in accordance with the law. Apart from establishing the omission or failure to comply with the law, the authorities can also establish that an offence has been committed when actions are taken or attempted by the licensee that are verifiably in contravention of the law, such as carrying a nuclear weapon on the space flight. This action can be categorized as an offence under this Act.

The second point to note concerns the words 'contrary to this Act or its subsidiary legislation or any written instrument made under this Act'.[262] This implies that, as well as being contrary to the Malaysian Outer Space Act, it is also an offence when the licensee performs an omission or action that contradicts the subsidiary legislation, as well as any written instrument made under the Malaysian Outer Space Act. Thus, by performing an action or an omission that is against the rules provided in the subsidiary legislation or any legal instrument made under the Act, the licensee can then be classified as an offender under the Malaysian Outer Space Act. The third point is that, apart from stipulating the contravention of the legal rules prescribed by the Act, the clause also specifically stresses that, should the licensee be in breach of any conditions by which he/she was granted a licence or other modes of authorization, he/she can be regarded as having committed an offence under the Malaysian Outer Space Act.

The second suggested clause concerns the penalty rules in general. It is proposed that the Malaysian Outer Space Act mention that, 'for such offence where the penalty is not otherwise specifically provided for, the offender shall be liable to a fine not exceeding […] or to imprisonment for a term not exceeding […] or both'.[263] Thus, this clause is quite general as it proposes dealing with an offence committed by the licensee when the penalty is not

---

[262] See *id*.
[263] See Section 48(2), Part VI (Other Relevant Clauses), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.

specifically prescribed under the Act. If no specific penalty is prescribed by the Act or by any other relevant legal instrument, this clause shall be applied to the offender under this Act. However, if the Malaysian Outer Space Act or any other related law has specified a specific penalty for the offence, this clause shall be ignored. With respect to this point, the study proposes three types of penalty that can be imposed on the offender when he/she is proven liable under this Act. The first penalty is a fine. On this point, the Malaysian Government shall prescribe the amount of the fine to be imposed on the offender under this Act. It is suggested that such amount be a reasonable amount based on the nature of the space activities. The second penalty is imprisonment for a term not exceeding a specific period. Again, the Government must specify the longest reasonable period for which the offender can be imprisoned if he/she commits an offence under this Act. Lastly, it is proposed that the court be given the power to impose both penalties at the same time if the court thinks it reasonable and necessary to do so. This means that, besides being required to pay a certain amount of money for his/her conviction, the offender will also be sentenced to imprisonment for a certain period. However, it is up to the judge to use his/her discretionary power to decide which penalty to impose on the offender depending on the seriousness of the offence committed, as long as it is in accordance with the law.

The next relevant clause proposed is in respect of Malaysian military activities. The study believes that the Malaysian Outer Space Act should be designed to safeguard the Malaysian military outer space activities that involve national security. Thus, it is proposed that the Malaysian Outer Space Act include a clause whereby the Minister may give an exemption for Malaysian military outer space activities with regard to the registration obligations prescribed by the Malaysian Outer Space Act.[264] However, it should be noted that this exemption applies only to military outer space activities that involve Malaysia's national security.[265] To illustrate further, when Malaysia launches a military satellite into outer space, for instance, the military shall be exempted under the Malaysian Outer Space Act from disclosing information about the object to the public, as supposedly happens with other space objects. This will only be allowed when it is believed that such disclosure would interfere with the country's national security. However, should it be proved that this is not the case; such

[264] The registration obligation is prescribed under Part IV (Registration of Space Activities), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.
[265] See Section 49, Part VI (Other Relevant Clauses), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.

exemption shall not be applicable. Therefore, the normal registration procedures for space activities should be observed.

Apart from the above, another significant clause proposed under this section concerns the rule applicable when there is inconsistency or conflict of laws. It is proposed that the Malaysian Outer Space Act incorporate a rule to clarify situations of inconsistency and conflict between laws. The rule prescribes that, in the event of any inconsistency or conflict between the Malaysian Outer Space Act and any other law, the provision of the Malaysian Outer Space Act shall prevail, to the extent of the inconsistency or conflict, over any other laws.[266]

4.5. CONCLUDING REMARKS

To sum up, there are several points to be noted in this chapter in relation to the proposed legal framework for Malaysian space law. Firstly, the study has justified the construction of a Malaysian space law as an indispensable action that should be performed for numerous reasons. In short, the reasons for the necessity of establishing a Malaysian space law include the following: Malaysian space participants will be afforded legal certainty and transparency; the country will have a reliable supervisory legal framework; it will be possible to modify, change, and transfer the concept of international responsibility as well as the liability obligation under the international law; the Government of Malaysia will be able to control and monitor the activities; the international legal rules can be implemented more efficiently and effectively; it will promote the growth of the space commercialization of the country; and many other reasons that were discussed earlier.

Secondly, the study has explored various aspects that the Malaysian Government should take into consideration while constructing the Malaysian space law. It is hoped that, by giving special attention to those aspects during the drafting process of the Malaysian space law, the study can contribute significantly to producing an excellent outcome for Malaysian national space legislation. In this matter, the study has proposed at least seven aspects that are worthy of consideration. In brief, they are as follows: the Malaysian national policy compliance; the Malaysian national interest; the Malaysian national legal system compliance; the existing

[266] See Section 50, Part VI (Other Relevant Clauses), draft of Malaysian Outer Space Act [Year] (Act [No.]), *supra* note 83.

domestic law coordination; the international space law coordination; harmonization of certain legal aspects; and sustainability of the Malaysian space activities.

Having recognized the importance of constructing the Malaysian space law and the aspects that should be taken into consideration while drafting the law, the third point deals with the efforts to shape and draft the Malaysian space law. Such law is then proposed, carrying the title of the Malaysian Outer Space Act. In this matter, the study has proposed seven significant points to discuss in relation to the major clauses that must be incorporated into the Malaysian Outer Space Act. These clauses are as follows: clauses in relation to the scope of the law; authorization; monitoring and supervision; and registration. Others clauses are in respect of liability and indemnification, safety, peace and security, and other clauses that the study believed necessary.

Although this study provides a draft law in respect of seven major clauses, it should be noted that, apart from this general outer space Act, it may be necessary to introduce further laws from time to time to equip the rules to deal with matters arising from the Malaysian outer space activities. Thus, continuous effort in the improvement and refinement of the law is necessary in order to adapt to the changes in outer space technology and the growth of such activities. It is hoped that the outcome of this study, especially the seven major clauses, will assist and open the way for the Malaysian Government to proceed with the realization of the Malaysian space legislation.

5 A FEASIBLE DRAFT ACT OF A MALAYSIAN OUTER SPACE LAW

5.1. INTRODUCTION

The burgeoning of various activities in outer space[1] necessitates the emergence of national space laws, especially in countries involved and participating in space activities. This is evident from the discussion provided throughout the study.[2] Having the international space rules alone is, in fact, inadequate to govern and monitor the flourishing of space activities, particularly considering the tremendous efforts accomplished by the private sector in the exploration and use of outer space. More efforts and ideas should be arranged and formulated to alert the world community to the importance of enacting domestic space laws to rule and guide the activities nationally. There is no doubt that national space laws can assist the international space conventions in monitoring space activities, nationally and globally. Indeed, they will benefit each other in ensuring that space actors adhere to and observe the application and performance of the legal principles and rules governing the exploration and use of outer space.[3]

Thus, to meet the above target, this study has attempted to draft feasible national space legislation for Malaysia. The legislation is drafted in such a way that it takes into account certain major aspects that must be considered while drafting such legislation.[4] Indeed, this is done in the expectation that the study will produce the best possible Malaysian national space legislation. Moreover, the study has scrutinized several important points or themes that the Malaysian space legislation should incorporate.[5] In fact, these points have been discussed in the previous chapter,[6] and have then been modified and adjusted to suit the Malaysian legal, economic, and technological environment. Thus, on the basis of these major themes, this

[1] Read Chapter 1 of the thesis (1.4. Applications and Activities) and Chapter 2 (2.2. World Space Activities).
[2] Read Chapter 4 of the thesis (4.2. Reasons for Necessity), Chapter 5 (5.2.2.The Legal Impacts on Malaysia), and (5.2.3.The Legal Impacts on the ASEAN and the World Space Activities).
[3] A few examples of such legal principles and rules include the following: the exploration and use of outer space should be carried on for the benefit and in the interest of all mankind; outer space and celestial bodies are free for exploration and use by all states on the basis of equality and in accordance with international law; and outer space and celestial bodies are not subject to national appropriation by claim of sovereignty. Further discussion is available in Chapter 2 of the thesis (2.3.4. Malaysia and the Five Outer Space Principles).
[4] Such discussion is available in Chapter 4 of the thesis (4.3. Some Major Aspects of Drafting Malaysian Space Legislation).
[5] The discussion is available in Chapter 4 of the thesis (4.4. Shaping the Malaysian Space Law).
[6] *Id.*

chapter then proposes a feasible draft of the Malaysian Outer Space Act as the main outcome of the study. It is hoped that this draft of a Malaysian Outer Space Act will become a significant guideline for the realization of the actual Malaysian Outer Space Act.

5.2. THE MALAYSIAN OUTER SPACE ACT

This section specifically deals with the drafting of the Malaysian Outer Space Act. The draft is indeed the main product of the study. The proposed draft Act follows the style of Malaysian legislation: statement of purpose, reference to the Sovereign (King), preliminary part, short title, interpretative section, and so on. In brief, the draft consists of six parts: Part I (Preliminary); Part II (Authorization of Space Activities); Part III (Supervision and Monitoring of Space Activities); Part IV (Registration of Space Activities); Part V (Indemnification and Insurance Requirement); Part VI (Other Relevant Clauses).[7] It is expected that the present construction of the draft will assist and contribute to the development of the actual Malaysian Outer Space Act. After proposing the draft, the study discusses the legal impacts of enacting the Outer Space Act on Malaysia. Lastly, the discussion highlights the legal impacts of the Act on the ASEAN and world space activities.

5.2.1. A Feasible Draft of a Malaysian Outer Space Act

This section presents the outcome of the study, a feasible draft of a Malaysian Outer Space Act. For an effective reading and a comprehensive understanding, it is paramount to note that this section should be read together with or cross-referenced with Chapter 4[8] of the thesis.

[7] *Id*.
[8] Read also Chapter 4 of the thesis (4.4. Shaping the Malaysian Space Law).

"DRAFT"

MALAYSIAN OUTER SPACE ACT [YEAR]

(Act [No])

PART I

PRELIMINARY

Section

PART II

AUTHORIZATION OF SPACE ACTIVITIES

Chapter 1

Requirement and Mode of Authorization

Chapter 2

Conditions for Granting Authorization

Chapter 3

Powers of Minister

PART III

SUPERVISION AND MONITORING OF SPACE ACTIVITIES

Chapter 1

Powers of Minister

Chapter 2

Establishment, Powers and Functions of Supervision and Monitoring Committee

PART V

INDEMNIFICATION AND INSURANCE REQUIREMENT

Chapter 1

Full Indemnification and Its Exception

Chapter 2

Liability Insurance and Its Requirements

PART VI

OTHER RELEVANT CLAUSES

MALAYSIAN OUTER SPACE ACT [YEAR]

(Act [No])

AN ACT to provide for and to regulate the Malaysian space activities.

BE IT ENACTED by the Seri Paduka Baginda Yang di-Pertuan Agong with the advice and consent of the Dewan Negara and Dewan Rakyat in Parliament assembled and by the authority of the same as follows:

PART I
PRELIMINARY

1. Short title.

This Act may be cited as the Malaysian Outer Space Act [year].

2. Commencement.

This Act comes into operation on a date to be appointed by the Minister by notification in the Gazette.

3. Objects.

The objects of this Act are -

(a) to regulate the Malaysian space activities in order to ensure compliance with the international space obligations;

(b) to establish a licensing regime for the Malaysian space activities, as well as to confer the licensing power and other relevant powers on the appropriate Minister;

(c) to establish a liability regime and indemnification rules for the Malaysian space activities;

(d) to lay down rules of registration of Malaysian space objects;

(e) to ensure safety of operational space activities performed under the Malaysian jurisdiction.

4. Application of Act.

(1) This Act applies to space activities carried out either from or within Malaysia and her territorial waters or from Malaysian ships or aircraft.

(2) This Act applies to space activities carried out by Malaysian nationals, firms and bodies incorporated by or under the Malaysian laws outside Malaysia.

(3) Subject to subsection (1) or (2), this Act applies to the following space activities whether conducted or attempted in Malaysia or elsewhere:

(a) any activity carried out in outer space;

(b) launching or procuring the launch of a space object or human being;

(c) operating a space object;

(d) all other measures to manoeuvre or in any other way affect the objects or human beings launched into space.

5. Ministerial power.

For the purposes of this Act, the Minister may have power to issue regulations or others as necessary for the application of the Act.

6. Interpretation.

In this Act, unless the context otherwise requires:

"Authorization Committee" means Committee established under Part II.

"Complexity of operation" means level or degree of complexity involved in the operation of space activities in respect of safety and security evaluation, environmental assessment, human life involvement, and other matters that are appropriate.

"Launch facility" means a fixed or mobile facility or place from which a space object can be launched, and includes any other facilities at the facility or place that are necessary to conduct a launch.

"Launch vehicle" means any vehicle manufactured or adapted to carry payloads or human beings into outer space, or in suborbital trajectory, or in an Earth orbit, inclusive of suborbital and orbital rockets.

"Launch" means place or attempt to place the space object or human being from Earth in a suborbital trajectory, or in an Earth orbit, or in outer space.

"Licence and/or other authorized modes" means licences and/or other modes of authorization as prescribed under section 8 that are obtained and registered under this Act.

"Licensee" means a person who holds a licence or any other modes granted under this Act.

"Minister" means the Minister currently charged with responsibility for Malaysian space activities.

"Outer space" means an area, inclusive of the moon and other celestial bodies, that is outside the Earth's atmosphere in which the operation of an object in an orbit around the Earth is possible.

"Payload" means any object that a person undertakes to place in outer space by means of a launch or re-entry vehicle, including the components of the vehicles.

"Re-entry vehicle" means a vehicle or reusable vehicle designed to return from outer space to Earth.

"Space damage" means any physical damage including death, bodily injury or other impairment of health, and loss of property as a result of launch, re-entry, or operation of the space object.

"Space object" means any object or thing launched or intended to be launched into outer space, or into a suborbital trajectory, or into an Earth orbit, including a launch or re-entry vehicle, orbital or suborbital rocket, and a payload, even if such object goes only some of the way towards or back from outer space.

"Suborbital rocket" means a vehicle, rocket-propelled in whole or in part, intended for flight on a suborbital trajectory.

"Suborbital trajectory" means the flight path of a launch or re-entry vehicle whose vacuum instantaneous impact point does not leave the surface of the Earth.

"Supervision and Monitoring Committee" means the Committee established under Part III.

PART II
AUTHORIZATION OF SPACE ACTIVITIES

Chapter 1
Requirement and Mode of Authorization

7. Requirement of authorization for space activities.

For the purposes of Section 4, space activities shall not be carried out unless with an authorized licence or other authorized modes as prescribed under Section 8.

8. Modes of authorization.

This Act offers four (4) modes of authorization:

(a) Space Licences:

(i) space site or facility licence – required for operation of site or facility of space activities in Malaysia.

(ii) space launch or re-entry licence – required for operation of launch or re-entry of space object from and to Malaysia.

(b) Overseas Launch or Return Certificate – required for operation of launch or re-entry space object conducted by Malaysian nationals, firms or bodies incorporated by or under Malaysian laws outside Malaysia.

(c) Experimental Permit – required for operation of space activities solely connected to research or testing new design or concept or equipment or other experimental purposes.

(d) Exemption Certificate – required for operation involving an acceptance of foreign authorization or where appropriate arrangement has been made between Malaysia and other states.

Chapter 2
Conditions for Granting Authorization

9. Conditions for granting licences or other modes of authorization.

For the purpose of Sections 7 and 8, the Minister may, acting on the recommendation of the Authorization Committee, grant to an applicant a licence or other authorized modes if the Minister and the Committee are satisfied that:

(a) the applicant is competent to operate the site, or facility, and/or space object;

(b) the insurance requirement under this Act has been satisfied;

(c) all necessary environmental approvals under Malaysian law (if any) have been obtained, and an adequate environmental plan has been made for the construction and operation of the site, or facility, or the space object;

(d) the applicant will conduct his/her operation in such a way as to prevent the contamination of outer space or adverse changes to the environment of the Earth;

(e) the activities conducted will not jeopardize the public health, or the safety of person or property;

(f) the applicant will conduct his/her operation in such a way as to avoid interference with the activities of others in the peaceful exploration and use of outer space;

(g) the space object or objects concerned do not contain a nuclear weapon or a weapon of mass destruction of any other kind;

(h) the activities conducted are consistent with the international obligations of Malaysia;

(i) the activities conducted will not impair the national security of Malaysia.

Chapter 3

Powers of Minister

10. Power to establish an Authorization Committee.

For the purpose of Section 11, the Minister shall establish an Authorization Committee to assist him/her in exercising his/her power under Part II.

11. Granting of licences and other modes of authorization.

Subject to Chapter 2 of Part II, the Minister may, acting on the recommendation of the Authorization Committee, grant a licence or other authorized modes in accordance with the provision of this Act.

12. Authorization fees.

The Minister may, acting on the recommendation of the Authorization Committee, prescribe the amount of fees, but they shall not exceed an agreed limit, calculated on the basis of complexity of the operation.

13. Duration of authorization procedure.

The Minister shall, acting on the recommendation of the Authorization Committee, make a decision on the application not later than 6 months after receiving said application.

PART III
SUPERVISION AND MONITORING OF SPACE ACTIVITIES

Chapter 1
Powers of Minister

14. Power to monitor and supervise.

For the purposes of this Act, the Minister shall monitor and continuously supervise the space activities registered under this Act.

15. Power to give direction.

The Minister may give direction to the licensee in the event of the licensee contravening the licences or other authorized modes' requirements and conditions under this Act, or to secure compliance with the international obligations of Malaysia.

16. Power to revoke, vary, or suspend licences and other authorized modes.

The Minister may revoke, vary, or suspend the licences or other authorized modes in the event that:

(a) the conditions of licences and other authorized modes under this Act have not been complied with by the licensee; or

(b) the revocation, variation, or suspension of the licences or other authorized modes is required in the interest of public health, national security, or to comply with the international obligations of Malaysia.

Chapter 2

Establishment, Powers, and Functions of Supervision and Monitoring Committee

17. Establishment of Supervision and Monitoring Committee.

For the purposes of Section 14, the Minister shall establish a Committee to assist him/her in exercising his/her power under Part III, and it shall be known as the Supervision and Monitoring Committee.

18. Assistance by a Committee.

For the purposes of Section 14, the Supervision and Monitoring Committee shall assist the Minister in the exercising of his power under Part III.

19. Composition of a Committee.

For the purposes of Part III, the Supervision and Monitoring Committee shall comprise a group of Malaysian technical and legal experts and a foreign technical expert (if necessary) designated on the basis of their technical and/or legal expertise and knowledge of the space activities involved.

20. Issuance and submission of identity cards.

(1) For the purposes of Section 18, the Supervision and Monitoring Committee shall be issued with identity cards that include a recent photograph of the holder.

(2) The identity card must be returned to the Minister as soon as is practicable after the holder has ceased to be a member of the Committee.

21. Powers and Functions of a Committee.

Powers and Functions of the Supervision and Monitoring Committee are:

(a) to constantly monitor and ensure compliance of licensee with terms and conditions of licences and other modes of authorization;

(b) to constantly supervise the licensee;

(c) to ensure that no person or property is endangered by the operations conducted;

(d) to hold authority to enter and inspect the site, facility, space object, or other equipment;

(e) to hold authority to require the licensee to provide necessary information or assistance in terms of the operation;

(f) to hold authority to take copies of documents in relation to operations when necessary;

(g) to do anything that is reasonably necessary in order to perform its duty.

22. Compliance with Minister's instructions.

Pursuant to Section 18 and in performing the functions and exercising the power under Section 21, the Committee must comply with any instruction given by the Minister.

Chapter 3

Duties of Licensee

23. Cooperation of Licensee.

Licensee must cooperate with the Committee for the fulfilment of the functions and powers of the Committee under Section 21.

24. Permission to access sites and observe operations.

Licensee must allow the Committee to access the site or facility, and to perform its powers and functions under Section 21, as well to observe the operation.

25. Advance approval for a deviation of a space object.

Licensee must obtain approval in advance from the Minister of any intended deviation of a space object from its orbital parameter and to inform the Minister of any unintended deviation.

26. Notification of disposal of a payload.

Licensee must notify the Minister of any disposal of payload in outer space on the termination of the operation.

PART IV
REGISTRATION OF SPACE ACTIVITIES

Chapter 1
National Registry

27. Minister to establish and maintain a national registry.

The Minister shall establish and maintain a national registry of space objects.

28. Notification of establishment of a national registry to the United Nations.

For the purposes of Section 27, the Minister shall notify the Secretary-General of the United Nations of the establishment of a national registry of space objects.

29. Registration of space objects.

The licensee shall register the space object in the national registry before the launch of the object.

30. Allocation of registration numbers.

For the purposes of Sections 29 and 38, the Minister shall allocate a registration number to each space object by which the object shall be identified.

31. Entry of information on space objects.

For the purposes of Chapter I and Chapter II, the licensee shall enter in the national registry the following particulars of the space object:

(a) registration number of a space object;

(b) location of launch;

(c) date and time of launch;

(d) space object’s general function;

(e) the space object’s main orbital parameters, including the nodal period, its inclination, apogee and the perigee;

(f) name of manufacturer;

(g) name of operator;

(h) name of other launching state (if applicable);

(i) main constituent elements on board the space object;

(j) current status (functional/non-functional/no longer in orbit);

(k) any other information that is necessary.

32. Time limit to enter information.

For the purposes of Section 31, the licensee shall enter the information not later than 30 days following the launch of the space object.

33. Updating information in the register.

For the purposes of Section 31, the licensee shall update the information when any modification has occurred.

34. Power to vary an entry on register.

For the purposes of Section 31, the Minister may vary an entry on the register when necessary.

35. Inspection of register.

For the purposes of Section 31:

(a) The register shall be open to any member of the public for inspection.

(b) The inspection can only be made after payment of fees as prescribed by the Minister.

36. Notification of information to the United Nations.

The Minister shall notify the Secretary-General of the United Nations of the information obtained under Section 31 and the updates on the space objects as soon as is practicable.

Chapter II

Supplementary Registry

37. Minister to establish and maintain a supplementary registry.

Notwithstanding Section 27, the Minister shall also establish and maintain a supplementary registry of space objects.

38. Circumstances in which registration is categorized under supplementary registry.

The circumstances in which information shall be entered in the supplementary registry are as follows:

(a) a space object for which Malaysia has procured the launch but which appears on the registry of another state;

(b) a space object whose title and control has been transferred to a Malaysian operator after its launch and the authorization granted under this Act.

PART V
INDEMNIFICATION AND INSURANCE REQUIREMENT

Chapter 1
Full Indemnification and Its Exception

39. Obligation to indemnify the Government in full against any claims.

The licensee shall indemnify the Government of Malaysia in full against any claims brought against the Government of Malaysia, internationally or locally, in respect of damage or loss arising out of activities carried on by the licensee under this Act.

40. Entitlement for exemption to indemnify the Government in full.

Subject to Section 41, the licensee is entitled to indemnify the Government of Malaysia not in full amount, but only to the licensee's utmost capable financial capacity, provided that such amount is not lower than the insured sum.

41. Conditions for entitlement of exemption to indemnify in full.

The entitlement under Section 40 shall only apply when all of the following have been successfully proven:

(a) the licensee must sufficiently prove to the Government of Malaysia that the licensee is genuinely incapable of indemnifying the Government in full; and

(b) the Government of Malaysia has satisfied itself to the fullest extent of the financial incapability of the licensee to indemnify in full; and

(c) the entitlement will not jeopardize the interest of the Government of Malaysia in particular and Malaysia as a whole, especially in relation to its financial capacity.

42. Further safeguarding the interest of the Government against possible financial risk.

For the purposes of Section 40, in order to safeguard the interest of the Government of Malaysia against any possible financial risk, the entitlement under Section 40 will apply only once for the whole period of operation of the licensee under the licence or other modes authorized by the Act.

43. Power of the Government to claim the balance of the indemnification amount.

Notwithstanding Section 40, the Government of Malaysia has the right to recover the balance of the indemnification amount from the licensee to which it was previously entitled under Section 40 in the event that:

(a) the Government of Malaysia strongly believes that it is necessary to do so in the interest of the Government and country; and/or

(b) the licensee has the financial capacity to pay the balance of the indemnification amount.

44. Situation where entitlement for exemption to indemnify in full shall not apply.

Section 40 shall not apply to the licensee when the damage or loss has resulted from the wilful misconduct, negligence, or non-compliance with the requirement of the licence and other modes of authorization of the licensee, or any rules under this Act, or other relevant laws.

Chapter 2

Liability Insurance and Its Requirements

45. Requirement to obtain liability insurance.

The licensee shall insure him/herself against any liability incurred, after obtaining an authorization under this Act.

46. Circumstances in which liability insurance is required.

For the purposes of Section 45, the licensee shall insure him/herself against any liability incurred in respect of:

(a) damage or loss of property or death or bodily injury suffered by a third party;

(b) damage or loss of property or death or bodily injury suffered by the Government of Malaysia and its agents;

(c) liability of the Government of Malaysia that might be incurred under international law;

(d) any other circumstances the Government of Malaysia may think necessary.

47. Requirement to obtain maximum insurance coverage.

For the purposes of Section 45 and Section 46:

(a) the licensee shall insure him/herself for the greatest amount of loss or damage of property and bodily injury that is reasonably expected to result from the authorized activity under this Act.

(b) the licensee has the obligation to ensure the insured amount is the maximum liability insurance coverage available at the time of application.

PART VI
OTHER RELEVANT CLAUSES

48. Offences and penalties.

(1) Every omission or failure to comply with, or any act committed or attempted that is contrary to this Act or its subsidiary legislation or any written instrument made under this Act, or in breach of the conditions subject to which any licence or other modes of authorization have been granted shall be an offence against this Act or its subsidiary legislation.

(2) For such offence where the penalty is not otherwise specifically provided for, the offender shall, be liable to a fine not exceeding […] or to imprisonment for a term not exceeding […] or both.

49. Military outer space activities.

For the purposes of Malaysian military outer space activities, the Minister may give an exemption to Part IV if required in the interests of national security.

50. This Act prevails over other Acts.

In the event of any inconsistency or conflict between this Act and any other relevant written law, the provisions of this Act shall prevail to the extent of the inconsistency or conflict.

5.2.2. The Legal Impacts on Malaysia

Once a country has successfully enacted legislation, there will be legal impacts on that country. Thus, when the enactment of the Malaysian Outer Space Act has been successfully realized, there will be various legal impacts on the country. In view of this, this section attempts to identify a number of possible legal impacts on Malaysia following the enactment of the Malaysian Outer Space Act. These legal impacts will be assessed from various viewpoints. In this section, the study assesses the legal impacts on Malaysia based on three major approaches. They are: (1) the legal impacts on the Government of Malaysia itself; (2) the legal impacts on the space actors registered under the Malaysian Outer Space Act; and lastly, (3) the legal impacts on the Malaysian public and society.

The first approach is in relation to the legal impacts on the Government of Malaysia. At this juncture, five legal impacts are identified. The first is the legal protection of the Malaysian Government against financial risk. It is noted that the most significant legal impact on the Government of Malaysia following the enactment of the Malaysian Outer Space Act will be the securing of the Government's financial risk. It will be secured in the sense that the Malaysian Government's international liability in regard to its national space activities at the international level will be legally protected. This will be achieved by way of the indemnification rule imposed at the national level via the Malaysian Outer Space Act. In other words, although the Government of Malaysia must be responsible internationally for the liability arising from the space operations of its nationals, the liability amount of compensation can be recovered nationally under the Malaysian Outer Space Act. Such circumstances are derived the fact that the Government has the legal right to claim and recover the indemnification amount from the real owner of the space object that causes damage or loss. As prescribed by the Malaysian Outer Space Act, it is the obligation of the licensee to indemnify the Government in full against any claim brought against the Government of Malaysia with respect to damage or loss arising out of the activities carried out by the licensee.[9] Hence, with the indemnification rule incorporated in the Malaysian Outer Space Act, supported by the liability insurance clauses, the Government of Malaysia will be well protected against any financial risk that may arise under the international law.

The second is the legal assurance of compliance with the international outer space obligations. The second legal impact on the Government of Malaysia following the implementation of the Malaysian Outer Space Act will be the fact that the Government can legally ensure complete compliance with the international outer space obligations imposed by the United Nations space conventions. As noted, there are certain obligations that a state must observe when dealing with outer space activities under its capacity as a state. These include the obligation to take responsibility for the activities of its nationals, the obligation to monitor and supervise such activities accordingly, the obligation to register the object launched into space with the United Nations, the obligation to ensure the activities are carried out in a peaceful manner, the obligation to ensure the activities are carried out for the benefit of mankind, and many others. By incorporating those obligations in the Malaysian Outer Space Act, the Government can ensure that space actors will comply with the rules of international law especially with regard to the international outer space obligations when they are domesticated in the Act. In other words, the performance of the international outer space obligations is legally guaranteed in such a way that the Malaysian Government has the legal capacity under the Malaysian Outer Space Act to monitor and control such situations through its licensing and other modes of authorization prescribed by the Act.[10] Therefore, the enactment of the Act has provided legal assurance with respect to complete observation of the international space obligations at both national and international levels.

The third legal impact on the Government of Malaysia after the enactment of the Malaysian Outer Space Act is the fact that the Government will have a well-organized space legal system. Prior to the enactment of the Act, there has been no specific legal system governing Malaysian space activity, especially in relation to the performance of the United Nations international space obligations. However, when the enactment is passed, the Government can be proud of a system which will provide systematic guidance for the Government and space

[9] See Section 39 (Obligation to indemnify the Government in full against any claims), Part V (Indemnification and Insurance Requirement), as proposed in the draft of Malaysian Outer Space Act [Year] (Act [No.]), available in Chapter 5 of the thesis (5.2.1. A Feasible Draft of a Malaysian Outer Space Act).
[10] See Part II (Authorization of Space Activities) and Part III (Supervision and Monitoring of Space Activities), as proposed in the draft of Malaysian Outer Space Act [Year] (Act [No.]), available in Chapter 5 of the thesis (5.2.1. A Feasible Draft of a Malaysian Outer Space Act).

actors to rely on when dealing with outer space activities. This is evidenced, for instance, by the fact that the Malaysian Outer Space Act will introduce a specific Committee to deal with the authorization matters,[11] and also a special Committee in charge of the supervision and monitoring tasks of the space activities.[12] Indeed, all these Committees will be established to assist the relevant Minister in dealing with the country's outer space matters. They will in fact be selected based on their experience and expertise corresponding to the tasks assigned. Thus, such circumstances will show that the country has a well-organized and systematic legal system.

The fourth legal impact on the Government of Malaysia following the implementation of the Malaysian Outer Space Act will be the fact that the national security of the country will be legally well preserved. This claim is based on the fact that the enactment of the Malaysian Outer Space Act will ensure that the space activities of space actors registered under the Act will not impair the country's national security.[13] Should any activity impair national security, the Government will have the legal right to terminate the licence. This situation is significant for Malaysia since the nature of the space activities might expose the country, for instance, to the risk of leakage of private information on the country's internal security affairs. The same applies to other private domestic affairs that involve internal security, which shall be preserved at all times.

The fifth legal impact on the Government of Malaysia following the enactment of the Malaysian Outer Space Act will be the legal protection under this Act of the property of the Government of Malaysia and any loss suffered by the Government and its agents while performing their duty (as prescribed by the Act).[14] For instance, it has been noted that the Malaysian Outer Space Act will establish a special Committee to deal with the supervision and monitoring of the space activities. Such Committee has a duty to visit the space site or

[11] See Section 10 (Power to establish an Authorization Committee), as proposed in the draft of Malaysian Outer Space Act [Year] (Act [No.]), available in Chapter 5 of the thesis (5.2.1. A Feasible Draft of a Malaysian Outer Space Act).
[12] See Section 17 (Establishment of a Supervision and Monitoring Committee), as proposed in the draft of Malaysian Outer Space Act [Year] (Act [No.]), available in Chapter 5 of the thesis (5.2.1. A Feasible Draft of a Malaysian Outer Space Act).
[13] See Section 9(i) (Conditions for granting licences or other modes of authorization), as proposed in the draft of Malaysian Outer Space Act [Year] (Act [No.]), available in Chapter 5 (5.2.1. A Feasible Draft of a Malaysian Outer Space Act).
[14] See Section 46 (Circumstances in which liability insurance is required), as proposed in the draft of Malaysian Outer Space Act [Year] (Act [No.]), available in Chapter 5 (5.2.1. A Feasible Draft of a Malaysian Outer Space Act).

facility in order to conduct an inspection if necessary. Thus, in the event of any loss or injury occurring during the visit or, in other words, during the performance of its task, the Committee will then be legally protected under the Act against any loss or injury suffered. The same applies to the property of the Malaysian Government. In the event of the property of the Government suffering damage or loss resulting from the space operation conducted under the Act, such damage or loss will be legally secured under the Malaysian Outer Space Act. This situation is secured by the imposition of rules on the space actor for obtaining the related liability insurance for indemnification of the loss suffered.

Returning to the three approaches in respect of the legal impacts on Malaysia, the second approach is in regard to the legal impact on the space actors who register their operations under the Malaysian Outer Space Act. At this juncture, as proposed in the Malaysian Outer Space Act,[15] 'space actor' does not refer only to the Malaysian national who conducts such activities in Malaysia; 'space actor' may also refer to the Malaysian national who conducts space activities outside Malaysia and to the foreigner who conducts space activities within Malaysia. Under this point, four legal impacts are highlighted.

Firstly, it supplies the space actor with a solid legal guidance for his/her involvement in the space activities. The first legal impact on the space actor following the enactment of the Malaysian Outer Space Act is the fact that the Act offers the space actor a solid guideline with respect to his/her involvement in space activities. This signifies that, when the Malaysian Outer Space Act is enacted, the space actor will have a reliable guideline to follow in performing space operations either in Malaysia or elsewhere. This remark is made with reference to the point that the space actor under the Malaysian Outer Space Act can be either a Malaysian or a foreign national who conducts space activities in Malaysia or a Malaysian who performs the operations outside Malaysia. Thus, when the Malaysian Outer Space Act provides the space actor with legal rules in respect of, for instance, authorization of the activities, registration of the space object, indemnifications of the liability and many others,[16] such space actor can indeed rely on this Act as his/her guidance for the entire operation of their space activities.

[15] See Section 4 (Application of Act), as proposed in the draft of Malaysian Outer Space Act [Year] (Act [No.]), available in Chapter 5 (5.2.1. A Feasible Draft of a Malaysian Outer Space Act).
[16] Refer to Part II (Authorization of Space Activities); Part III (Supervision and Monitoring of Space Activities); Part IV (Registration of Space Activities); Part V (Indemnification and Insurance Requirement); and VI (Other Relevant Clauses), as proposed in the draft of Malaysian Outer Space Act [Year] (Act [No.]), available in Chapter 5 (5.2.1. A Feasible Draft of a Malaysian Outer Space Act).

The second legal impact on the space actor following the execution of the Malaysian Outer Space Act is that the Act will provide a clear and transparent set of space legal rules for the space actor. On this point, the space actor will be provided with clear rules in respect of his/her legal obligation to conduct the space activities under the Malaysian law. Such rules include, for instance, the obligation to apply for an authorization before conducting the space activities.[17] In such circumstances, the Malaysian Outer Space Act, for instance, provides clear categories of authorization that must be applied by the space actor and that must correspond to the space activities involved.[18] Other rules include the requirement to register the object launched into space by providing certain clear and specific information to the Malaysian national registry.[19] There is also a requirement to obtain liability insurance with respect to specific situations,[20] and many others. The Act also provides clear parameters on permissible and forbidden space activities.[21]

The third legal impact on the space actor after the implementation of the Malaysian Outer Space Act is that the Act will legally promote the growth and expansion of Malaysian private space activities. Such assertion is made based on the fact that the Malaysian Outer Space Act provides ample space for such activities to expand further. This can be realized through the flexible indemnification rule introduced by the Malaysian Outer Space Act.[22] Under this rule, the space actor can request an exemption from making full payment of the indemnification amount to the Government of Malaysia in the event of the space actor satisfying certain prescribed conditions.[23] Such a proposed approach taken by the Malaysian Outer Space Act will indeed reflect the effort of the Malaysian Government to encourage and promote the growth of the space activities of private space actors in Malaysia.

---

[17] See Section 7 (Requirement of authorization for space activities), as proposed in the draft of Malaysian Outer Space Act [Year] (Act [No.]), available in Chapter 5 (5.2.1. A Feasible Draft of a Malaysian Outer Space Act).
[18] Refer to Section 8 (Modes of Authorization), as proposed in the draft of Malaysian Outer Space Act [Year] (Act [No.]), available in Chapter 5 (5.2.1. A Feasible Draft of a Malaysian Outer Space Act).
[19] See Sections 29 (Registration of space objects) and 31 (Entry of information on space objects), as proposed in the draft of Malaysian Outer Space Act [Year] (Act [No.]), available in Chapter 5 (5.2.1. A Feasible Draft of a Malaysian Outer Space Act).
[20] See Section 45 (Requirement to obtain liability insurance), as proposed in the draft of Malaysian Outer Space Act [Year] (Act [No.]), available in Chapter 5 (5.2.1. A Feasible Draft of a Malaysian Outer Space Act). .
[21] See Section 9 (Conditions for granting licences or other modes of authorization), as proposed in the draft of Malaysian Outer Space Act [Year] (Act [No.]), available in Chapter 5 (5.2.1. A Feasible Draft of a Malaysian Outer Space Act).
[22] See Sections 40 (Entitlement for exemption to indemnify the Government in full), and 41 (Conditions for entitlement of exemption to indemnify in full), as proposed in the draft of Malaysian Outer Space Act [Year] (Act [No.]), available in Chapter 5 (5.2.1. A Feasible Draft of a Malaysian Outer Space Act).
[23] *Id*.

The fourth legal impact on the space actor after the execution of the Malaysian Outer Space Act is that it will ensure that the activities of the space actor are legally in accordance with the law prescribed. This claim is based on the fact that, after the application for a licence or other modes of authorization has been granted, the operation conducted by the space actor will then be continuously monitored and supervised by a special Committee formed under the Malaysian Outer Space Act.[24] Since the Committee will function to ensure that the activities of the space actor are always in accordance with the law, in the event that the space activity appears to be against the law such Committee will then be obliged to supervise the space actor accordingly. Furthermore, the members of the Committee are designated based on their legal and technical expertise regarding the space activities involved. In such a situation, it is remarked that the operation will therefore be secured and protected from any unlawful activities and its performance will in accordance with the law.

After discussing the first approach, which is in respect of the legal impacts on the Government of Malaysia, and the second approach in regard to the space actors, we turn to the third approach, which is about the legal impact on the Malaysian public and society at large. Thus, the first legal impact on the Malaysian public and society following the enactment of the Malaysian Outer Space Act is the fact that the Act will provide legal assurance of the safety of the lives and property of the public.[25] With the enactment of the Act, the safety of the lives of the public and their property will be assured under the Malaysian Outer Space Act. They are assured in that the Malaysia Government will have the power to revoke and suspend the licence or any other modes of authorization granted to the space actor.[26] This can be done if it is satisfied that the space actor is conducting his/her operation in a way that threatens or affects the safety of the lives of the public and their property.[27]

---

[24] See Chapter 2 of Part III (Establishment, Functions, and Powers of Supervision and Monitoring Committee), as proposed in the draft of Malaysian Outer Space Act [Year] (Act [No.]), available in Chapter 5 (5.2.1. A Feasible Draft of a Malaysian Outer Space Act).
[25] See Sections 9 (Conditions for granting licences or other modes of authorization) and 16 (Power to revoke, vary or suspend licences and other authorized modes), as proposed in the draft of Malaysian Outer Space Act [Year] (Act [No.]), available in Chapter 5 (5.2.1. A Feasible Draft of a Malaysian Outer Space Act).
[26] See Section 16 (Power to revoke, vary or suspend licences and other authorized modes), as proposed in the draft of Malaysian Outer Space Act [Year] (Act [No.]), available in Chapter 5 (5.2.1. A Feasible Draft of a Malaysian Outer Space Act).
[27] See *supra* note 25.

The second legal impact on the Malaysian public and society following the execution of the Malaysian Outer Space Act is about the legal assurance of public health and the Earth's environmental safety. Apart from providing the legal assurance of the safety of the lives and property of the public, the Act also ensures the safety of the health of the public and the Earth's environment.[28] Like the earlier situation, the Government of Malaysia has the legal right to terminate or suspend the licence or other modes of authorization previously granted to the space actor when the Government discovers that the space actor has conducted his/her activities in a way that will affect the health of the public and threaten the Earth's environmental safety.[29]

The third legal impact on the Malaysian public and society following the implementation of the Malaysian Outer Space Act is that the Act will provide legal protection against any harm, damage or loss of the public's lives and property. At this juncture, it is observed that, while assuring the safety of the lives, property and health of the public, the Act also provides certain legal protections in cases where the damage or loss may possibly occur. Under the Malaysian Outer Space Act, the harm or loss will be protected in the sense that, when the damage or loss occurs to the property of the public, or in situations where the injury or loss of life occurs to them as a result of the space activities conducted under the Act, the space actor conducting the activities must compensate the victim as prescribed by the Act. This is done through the requirement imposed by the Act for the space actor to obtain third-party liability insurance.[30]

The fourth legal impact of the execution of the Malaysian Outer Space Act on the Malaysian public and society is that the Act provides legal assurance of the public's right to obtain information about the space activities. Following the implementation of the Malaysian Outer Space Act, all the space objects launched into outer space under operations governed by the Malaysian Outer Space Act must be properly registered in the Malaysian national registry.[31] The registration is performed by providing all the necessary information about the space

---

[28] See Section 9(c), (d) and (e), as proposed in the draft of Malaysian Outer Space Act [Year] (Act [No.]), available in Chapter 5 (5.2.1. A Feasible Draft of a Malaysian Outer Space Act).
[29] See *supra* note 26.
[30] See Sections 45 (Requirement to obtain liability insurance), and 46 (Circumstances whereby the liability insurance required), as proposed in the draft of Malaysian Outer Space Act [Year] (Act [No.]), available in Chapter 5 (5.2.1. A Feasible Draft of a Malaysian Outer Space Act).
[31] See Section 29 (Registration of space objects), as proposed in the draft of Malaysian Outer Space Act [Year] (Act [No.]), available in Chapter 5 (5.2.1. A Feasible Draft of a Malaysian Outer Space Act).

activities conducted.[32] Thus, the information provided by the space actor is open for access by the public.[33] In other words, the public has the legal right under the Act to inspect or obtain the information regarding the space activities from the Malaysian national registry. In terms of procedure, the public will have legal access to the information upon payment of certain administration fees to the registry.[34] Thus, it is concluded that the legal right of the public to access the space actor's information is then assured.

5.2.3. The Legal Impact on the ASEAN and World Space Activities

The enactment of the Malaysian Outer Space Act will have various legal impacts not only on Malaysia but also on the ASEAN countries and on world space activities. Following the discussion of the legal impacts on Malaysia in the earlier part, this section attempts to identify the legal impacts on the ASEAN countries and on world space activities. The discussion is thus divided into two main categories: (1) the legal impacts on the ASEAN; and (2) the legal impacts on world space activities.

Firstly, the study will assess the legal impacts of the enactment of the Malaysian Outer Space Act on the ASEAN. As noted, there are ten ASEAN member states: Malaysia, Singapore, Thailand, Brunei, Indonesia, Burma, Philippines, Vietnam, Cambodia and Laos. Since Malaysia is one of the ASEAN member states, the discussion will then focus on the legal impacts following the enactment of the Malaysian Outer Space Act on all the member states. There are three legal impacts to note as follows: (1) Malaysia's emergence as the first ASEAN member state to enact specific outer space legislation; (2) a legal challenge to other ASEAN member states to develop their own national outer space legislation; and (3) promoting cooperation on space activities among the ASEAN countries.

The first impact among the members of ASEAN following the enactment of the Malaysian Outer Space Act is that Malaysia will emerge as the first ASEAN member state to enact specific space legislation to govern the country's space activities, especially in relation to the performance of the United Nations space obligations. It is observed that there is no specific

[32] See Section 31 (Entry of information on space objects), as proposed in the draft of Malaysian Outer Space Act [Year] (Act [No.]), available in Chapter 5 (5.2.1. A Feasible Draft of a Malaysian Outer Space Act).
[33] Section 35 (Inspection of register), as proposed in the draft of Malaysian Outer Space Act [Year] (Act [No.]), available in Chapter 5 (5.2.1. A Feasible Draft of a Malaysian Outer Space Act).
[34] *Id*

outer space legislation available for any ASEAN countries to regulate space activities in fulfilling the United Nations space treaties' legal obligations. In the event of Malaysia successfully enacting its Malaysian Outer Space Act, the country will be the first ASEAN country to have legislation of this kind. Hence, this major effort will lead the way for other ASEAN member states to seriously consider enacting space legislation in their own countries. It is believed that enactment of such legislation will indeed boost the economies of the ASEAN member states, especially in relation to their space sectors. This claim is based on the fact that a state with reliable space legislation will encourage outside investors to invest their money in the country's related industry.

The second impact is the legal challenge to the ASEAN member states to develop their own national outer space legislation. The successful enactment of the Malaysian Outer Space Act will appear as a legal challenge for the ASEAN member states to develop their own national outer space legislation. This is a legal challenge to the members of ASEAN to make appropriate efforts to develop their own outer space legislations. Even though Malaysia is viewed as a small state with limited capacity and resources to conduct space activities, the country will have managed to enact its own national outer space legislation to govern these activities. This phenomenon will encourage the development of outer space legislation among the other ASEAN member states as well. Moreover, states such as Indonesia, Thailand and Singapore have already launched space objects into outer space. They should also seriously consider developing space legislation at the national level and making it a top priority on their agendas.

The third legal impact on the ASEAN member states, following the enactment of the Malaysian Outer Space Act, is that the Act will promote and encourage the cooperation of space activities among the members of ASEAN. This claim is made on the basis that, when Malaysia has successfully enacted its Malaysian Outer Space Act, the other members of ASEAN will tend to conduct their space activities with Malaysia. Such circumstances could occur because when a country has a good, reliable law to govern space activities it will then attract many space actors from other countries to become involved in the space activities of the country. This phenomenon could possibly occur especially in respect of Malaysia's neighbouring countries. At this juncture, the members of ASEAN could cooperate with one another in conducting space activities and their operations will be sheltered under the Malaysian Outer Space Act. Thus, under the Malaysian Outer Space Act, they can ensure that their activities do not contravene the international space law and its obligations. From this point of view, the relationship between the members of ASEAN can also be strengthened.

Returning to the two categories of legal impacts discussed under this section, apart from the legal impacts on the ASEAN, the other legal impacts are on world space activities. In fact, there will be various legal impacts on world space activities following the enactment of the Malaysian Outer Space Act. In this section, the study remarks on five legal impacts. They are: (1) supporting the international space law to rule space activities effectively; (2) legal assurance that the information on the object launched into space will be furnished to the United Nations; (3) supporting the United Nations in promoting the peaceful use of outer space; (4) contributing to the world and outer space environmental protections; and (5) promoting the sustainable development of world space activities.

The first legal impact on world space activities after the successful enactment of the Malaysian Outer Space Act is that it will assist and support the international space law to ensure that space activities are conducted in accordance with the law. It is essential to note that having a space law only at the international level is not sufficient to govern outer space activities and ensure they are performed in accordance with the law. Thus, national outer space legislation is also necessary and it should come into existence to assist the international space law in performing its task. The enactment of the Malaysian Outer Space Act will legally support the international space law to rule and regulate space activities efficiently. The Act can legally support the international space law in the sense that the international space obligations or rules that space actors must observe at the international level will be domesticated in the Malaysian Outer Space Act. From this point of view, the Act can legally ensure that space actors registered under the Act will comply with the rules and obligations of the space activities either nationally or internationally. In the event of space activities being carried out against the rules and obligations, the Act has the legal right to punish the space actor or terminate the authorization of the space activities given to the space actor at the national level.[35] Thus, in such circumstances, the international outer space activities will be effectively controlled nationally and internationally.

---

[35] See Section 16 (Power to revoke, vary or suspend licences and other authorized modes), as proposed in the draft of Malaysian Outer Space Act [Year] (Act [No.]), available in Chapter 5 (5.2.1. A Feasible Draft of a Malaysian Outer Space Act).

The second legal impact on world space activities, following the enactment of the Malaysian Outer Space Act, is that the Act will legally ensure that the information on objects launched into outer space under the Malaysian Outer Space Act will be furnished to the United Nations.[36] In controlling and monitoring outer space activities at the international level, the international law prescribes the state of registry to furnish certain information with respect to the object launched into space.[37] This is essential for the purpose of identifying the state of registry of the space object in the event of the object being lost, damaged or making an emergency landing outside the intended territory.[38] Thus, by incorporating rules in the Malaysian Outer Space Act that the space actor must register and furnish the information regarding the space object launched into outer space,[39] the Act will then be able to legally ensure that the information on the object is furnished to the national registry in the first instance. Then, the Act is able to further ensure that the same information is passed to the Secretary-General of the United Nations[40]for the fulfilment of the international obligation to furnish the information at the international level to the United Nations. Moreover, the Act prescribes that the entry of information should be done within a specific time limit, which is not later than 30 days after the launch took place.[41] Such circumstances will indeed greatly assist the United Nations to identify the state of registry of the object when it is necessary to do so. This will in fact contribute to the proper administration of world space activities.

The third legal impact on world space activities, following the enactment of the Malaysian Outer Space Act, is that the Act will legally support the United Nations to promote the peaceful use of outer space. It is well established that the United Nations in its outer space conventions urges the space actor to utilize outer space for peaceful purposes only.[42] Thus, following its enactment, the Malaysian Outer Space Act will support this principle as it has incorporated the rule requiring space activities to be conducted in a peaceful manner. For

[36] See Section 36 (Notification of Information to the United Nations), as proposed in the draft of Malaysian Outer Space Act [Year] (Act [No.]), available in Chapter 5 (5.2.1. A Feasible Draft of a Malaysian Outer Space Act).
[37] See Article III, Registration Convention 1975.
[38] Article V, Outer Space Treaty 1967.
[39] Refer Sections 29 (Registration of space objects) and 31 (Entry of information on space objects), as proposed in the draft of Malaysian Outer Space Act [Year] (Act [No.]), available in Chapter 5 (5.2.1. A Feasible Draft of a Malaysian Outer Space Act).
[40] See Section 36 (Notification of Information to the United Nations), as proposed in the draft of Malaysian Outer Space Act [Year] (Act [No.]), available in Chapter 5 (5.2.1. A Feasible Draft of a Malaysian Outer Space Act).
[41] See Section 32 (Time limit to enter information), as proposed in the draft of Malaysian Outer Space Act [Year] (Act [No.]), available in Chapter 5 (5.2.1. A Feasible Draft of a Malaysian Outer Space Act).
[42] See, for instance, the preamble of Outer Space Treaty 1967. See also Articles IV and IX, Outer Space Treaty 1967.

instance, the Act establishes rules such as those requiring the space actor to conduct operations in peaceful exploration and prohibiting him/her from carrying nuclear weapons in the space object.[43] The incorporation of such rules in the Malaysian Outer Space Act will ensure that space activities registered under the Malaysian Outer Space Act are performed in a peaceful manner. This will indeed demonstrate that the Malaysian Outer Space Act legally supports and promotes the peaceful use of world space activities as prescribed by the United Nations space conventions.

The fourth legal impact concerns the contribution to the world and outer space environmental protections. It is remarked that, while performing space activities, the space actor must preserve the environment of the Earth and outer space as prescribed by the international space law.[44] Thus, the incorporation of rules in the Malaysian Outer Space Act requiring the space actor to conduct his/her operation in a way that prevents the contamination of outer space or adverse changes in the environment of the Earth will then support and assist the international space law. This is essential to ensure that the world and outer space environments are preserved.[45] Therefore, it is submitted that the enactment of the Malaysian Outer Space Act will definitely contribute to world space activities, particularly in relation to environmental preservation.

The fifth legal impact is concerned with promoting the sustainable development of world space activities. It is noted that outer space is a new area of exploration after the Earth, sea and airspace. Many countries are taking the opportunity to compete with one another in utilizing the area for both profitable and non-profitable purposes. As this area has great potential to be explored continuously for various reasons by human beings, the growth of space activities should be sustained. The enactment of the Malaysian Outer Space Act will promote the sustainable development of world space activities in the sense that it will contribute to the development of the activities by affording national space legal rules, guiding space actors who are interested in participating in space activities. This means that when space actors have reliable space legislation to guide them in performing space activities, their

[43] See Section 9(f) and also (g), as proposed in the draft of Malaysian Outer Space Act [Year] (Act [No.]), available in Chapter 5 (5.2.1. A Feasible Draft of a Malaysian Outer Space Act).
[44] See Article IX, Outer Space Treaty 1967.
[45] See Section 9(d), as proposed in the draft of Malaysian Outer Space Act [Year] (Act [No.]), available in Chapter 5 (5.2.1. A Feasible Draft of a Malaysian Outer Space Act).

participation and involvement in such activities will be encouraged. Such circumstances will then inevitably promote the sustainable development of world space activities.

5.3. CONCLUDING REMARKS

In this chapter, the study mainly focuses on the main outcome of the research, which is a feasible draft of a Malaysian outer space law. The proposed draft Act follows the style of Malaysian legislation: statement of purpose, reference to the Sovereign (King), preliminary part, short title and so on. In the draft Act, the proposed title is 'Malaysian Outer Space Act [year]'. It is hoped that the construction of the draft will assist, contribute to and become a significant guideline in the realization of the actual Malaysian Outer Space Act.

There are six significant parts proposed in the draft Act: Part I - Preliminary; Part II - Authorization of Space Activities; Part III - Supervision and Monitoring of Space Activities; Part IV - Registration of Space Activities; Part V - Indemnification and Insurance Requirement; Part VI - Other Relevant Clauses. The chapter then concluded with the findings of several predictable future legal impacts that were discussed from three approaches: Malaysia, ASEAN, and world space activities.

After examining all legal impacts highlighted in this chapter, it is remarked that any efforts and attempts to realize the Malaysian Outer Space Act should be intensified and fortified. Hence, the outcome of the study - the draft specimen of the Malaysian Outer Space Act - is definitely one example of those efforts.

6 GENERAL CONCLUSIONS

The need for an effective law governing outer space activities is not restricted to the international level. It is also paramount at the state level, particularly for states involved in space activities. Since an increasing number of states have become involved in such activities, the issue of developing national outer space legislations is becoming crucial and is gaining more attention. This has been witnessed particularly with the burgeoning of commercialization of space activities and the huge involvement of public and private sectors. Therefore, the emergence of national outer space legislations can indeed be viewed as an effective mechanism in assisting the United Nations outer space conventions to regulate the world's space activities accordingly. However, this aim will only be achievable if the legislation is prepared and enacted in such a way that it harmonizes and supports the United Nations outer space conventions.

It is observed that constructing and enacting national outer space legislation is not an easy task. It requires the involvement of many parties, such as drafters of legal documents, policy-makers, economic experts, and public and private sectors. Countries must also consider many other things besides facing various obstacles. Indeed, good national outer space legislations must be prepared and drafted by taking into consideration all aspects of the country's governmental policy, legal system, economic growth, and social needs. Considering those factors, it is not surprising that many states involved in space activities are unable to develop their national outer space legislation, even though they are aware of the urgency of developing such legislation. This situation has indeed been experienced by Malaysia as a newly emerged outer space actor.

This research analyses the future perspective of the Malaysian outer space law. In responding to the issue, the study has dealt with a number of research questions, which then resulted in several findings. The development of Malaysian space activities has been discovered to be truly encouraging and inspiring. This sector has very bright prospects nationally and internationally. Indeed, it has great potential for further exploration and expansion, especially with the commitment and involvement of both public and private sectors. As a matter of fact, the public sector has shown great interest in this field for many years and is leading this sector. However, the emergence of the Malaysian private space sector has recently helped to boost the growth of Malaysian space activities. In addition, it is clear that the country has contributed to and participated in such activities by becoming a member of various space-related bodies internationally and regionally.[1] This contribution and commitment has indeed verified her great interest, willingness and enthusiasm in regard to becoming active and further engaged in outer space activities.

Nevertheless, in regard to space-related laws, Malaysia has only a few laws to deal with such activities. These laws are merely in relation to space applications such as telecommunications and multimedia activities. Despite the existence of such laws, it is acknowledged that Malaysia still lacks convincing space legislation to govern the activities, particularly in respect of fulfilling the country's obligations as prescribed by the United Nations outer space conventions. This has in fact resulted in an imbalance between the growth of Malaysian space activities and their legal rules. Hence, the study has established that the present Malaysian laws will indeed be insufficient to cope with the development and growth of the Malaysian space activities in the coming years.[2]

Apart from the above factors, consideration has also been given to the status of Malaysia as a state party to the five United Nations outer space conventions. Malaysia has signed only two treaties: the Outer Space Treaty 1967 and the Rescue Agreement 1968. However, she has not yet ratified them. She has also declined to become a party to the other three treaties: the Liability Convention 1972, the Registration Convention 1975, and the Moon Agreement 1979.[3] Nevertheless, Malaysia has actually shown interest in becoming a party to the treaties. However, due to the absence of Malaysian outer space legislation,[4] the country seems hesitant and reluctant to proceed with ratification, which has resulted in delaying the matter. Malaysia has doubts about ratifying or becoming a party to the treaties because she is concerned about being trapped and bound by the obligations or rules prescribed by the United Nations outer space conventions mainly in relation to the liability and responsibility matters. However, the research has revealed that Malaysia, in her current position as a non-party or signatory state, can still be bound by the United Nations outer space treaties' rules and

[1] More information is available in Chapter 2 of the thesis (2.4. Malaysia as a Member of International and Regional Organizations).
[2] Detailed discussion is available in Chapter 1 of the thesis (Malaysian Space Experiences and Activities: Past, Present and Future).
[3] For more information, read Chapter 2 of the thesis (2.3.3. Malaysia and the Five Outer Space Conventions).
[4] The existence of the Malaysian outer space legislation can indeed legally protect the Government against obligations especially the liability imposed by the United Nations space conventions.

obligations. This might in fact be the case in circumstances where the space treaties' rules and obligations are part of the international custom under Article 38 of the Vienna Convention on the Law of the Treaty.[5] In addition, by virtue of Article 18 of the same Treaty,[6] Malaysia actually has a further obligation to refrain from any acts that contravene the objective and purpose of the treaties she has signed, even though she has not yet ratified the treaties. Thus, it is submitted that Malaysia, in her current position as a signatory and non-party state, has already been bound indirectly by certain obligations and rules of the space treaties or conventions. For this reason, it is strongly recommended that Malaysia expedite the enactment of the Malaysian national space legislation in order to protect her interests.

Considering Malaysia's dilemmas between her international credibility and responsibility (as a newly emerged space actor) to become a party to the United Nations space conventions and also her concerns about the legal impacts of becoming a party to the treaties, as well as the possibility of binding effects of the outer space treaties' rules and obligations as prescribed by Articles 38 and 18 of the Vienna Convention on the Law of the Treaty, the study has firmly concluded that Malaysia must develop and construct her national space legislation as a matter of urgency. Therefore, in support of this development, a study of the legal frameworks of national outer space legislations of several countries has been conducted.[7] The legislations involved are the Outer Space Act 1986 of the United Kingdom, the Space Activities Act 1998 of Australia and several other relevant national space legislations and regulations of the United States of America. These legislations have actually been chosen based on reasons deliberated in the thesis. At least seven major subject matters or issues are highlighted in discussing the legal frameworks of these national space legislations and regulations. These subject matters are: (1) nature and scope of the law; (2) authorization; (3) liability and indemnification; (4) registration; (5) monitoring and supervision; (6) safety, peace and security elements; and (7) other relevant provisions. The research has demonstrated that, even though, in general, these legislations deal with these similar key issues, in certain circumstances different states apply different rules in respect of such issues. Thus, in offering the best outcome for the Malaysian outer space legislation, it has been suggested that

[5] See Article 38 of the Vienna Convention on the Law of Treaties 1969, adopted on 22 May 1969, opened to signature on 23 May 1969, entered into force on 27 January 1980. 1155 UNTS 331, in Chapter 2 of the thesis, *supra* notes 177.
[6] See Article 18 of the Vienna Convention on the Law of Treaties 1969, adopted on 22 May 1969, opened to signature on 23 May 1969, entered into force on 27 January 1980. 1155 UNTS 331, in Chapter 2 of the thesis, *supra* notes 176.
[7] Refer to Chapter 3 of the thesis (The Study of Legal Frameworks of Some National Space Legislations).

Malaysia learn from and consider the various national outer space rules applied by these countries. Such rules, however, should if necessary be considered with appropriate modifications and changes to suit Malaysia's circumstances and interests.

Apart from the above-mentioned countries with national space legislation, certain other countries without space legislation have also been taken into consideration. These countries are India, Thailand, Singapore and Brunei. They have been selected based on criteria explained in the thesis.[8] From the study, it has been verified that, inter alia, the states with national space legislation have a certain legal capacity to implement the United Nations outer space treaties' obligations effectively at both state and international levels, compared to states without such legislation. The states with legislation also have definite and positive approaches to developing their space activities further. This circumstance indeed leads to a balanced evolution of space legal rules and space activities for their countries.

The states that have successfully materialized their outer space legislation seemed more confident and willing to become a party to at least the first four of the United Nations outer space treaties (i.e., the Outer Space Treaty 1967, the Rescue Agreement 1968, the Liability Convention 1972, and the Registration Convention 1975). Various modes of authorization had been introduced by the states in giving consent to outer space actors to conduct their space activities. The ability of states with outer space legislation to legally impose the United Nations outer space treaties' obligations (such as the registration obligation, and monitoring and supervision of the activities) is in fact indisputable. The ability of such states to efficiently deal with the liability and indemnification issues imposed by the international space law has also been evidenced.

The enactment of the Malaysian outer space legislation has been identified as essential for various reasons.[9] In view of the growth of space activities in Malaysia, such enactment is considered paramount in order to regulate the activities. A successful enactment will surely afford the space actor with the legal certainty and transparency of the outer space legal rules at the national level. The legislation will also become a reliable supervisory legal framework for the space actors and participants who conduct activities within the prescribed jurisdiction. In regard to the implementation of the international outer space law, the enactment will verify

[8] For details, read Chapter 3 of the thesis (3.5. India) and (3.6. The Neighbouring Countries).
[9] Discussion is available in Chapter 4 of the thesis (4.2. Reasons for Necessity).

that the international legal rules can be implemented effectively at the national level as well as the international level. The concept of international liability and responsibility prescribed by the international outer space law, which has always been a source of concern for Malaysia, can also be dealt with efficiently and appropriately at the state level. Indeed, this situation will also result in the ability of the Government of Malaysia to control and monitor the activities. Moreover, the enactment of the legislation will also encourage and promote the growth of Malaysian space commercialization, especially by the private sector.

To ensure the best outcome for the Malaysian outer space legislation, several major aspects have been taken into consideration.[10] Firstly, the Malaysian outer space legislation must be drafted in accordance with the Malaysian national policies. It should also be drafted in a way that it will support Malaysian nationals' interest, such as supporting the Malaysian private sector, which has demonstrated great interest in engaging in outer space activities nationally and internationally. The legislation should also comply with the Malaysian national legal system, such as in regard to its legislative process. It is also worth considering coordination with the international outer space law. Since the nature of outer space activities has predominantly involved international relations, the legislation must be drafted as far as possible in agreement with the rules of the international law of outer space. Harmonization of certain legal aspects of national outer space legal rules among states should also be considered; as such activities involve relations between various states. This will bridge the gap of disparity between the rules and procedures involved among the world's space countries. The legislation should also be drafted with the aim of sustaining Malaysian outer space activities in order to ensure that the activities are maintained and continue to grow in the future.

The Malaysian outer space legislation has been drafted with a focus on seven major issues.[11] They are: (1) nature and scope of the law; (2) authorization; (3) liability and indemnification; (4) registration; (5) monitoring and supervision; (6) safety, peace and security elements; and (7) other relevant provisions. The proposed title of the legislation is the 'Malaysian Outer Space Act [year]'. In the nature and scope of the law, the study has highlighted the objectives of enacting the legislation, which include regulating the Malaysian outer space activities for

[10] For more information, refer to Chapter 4 of the thesis (4.3. Some Major Aspects of Drafting Malaysian Space Legislation).
[11] The details are available in Chapter 4 of the thesis (4.4. Shaping the Malaysian Space Law).

compliance with the international outer space obligations. The application of the Act has been proposed based on three criteria: locality, nationality, and type of activities. It is suggested that certain words, such as outer space, launch and space object, be given definitions and further clarification in the Act. In regard to authorization, various modes have been proposed to suit the outer space activities. The study has also discussed some rules on the requirement to obtain authorization and has specified various conditions for granting authorization under the Act. The issues of liability and indemnification have been introduced mainly to safeguard the Malaysian Government's interest against any liability that might be imposed under the international space law. Apart from introducing a full indemnification rule, the study has proposed a rule of partial indemnification in the hope that it will inspire the involvement of the private space sector in the activities. The requirement for registration has been created to guarantee and facilitate the Malaysian Government in observing and fulfilling her registration obligations under the international outer space law. Among the efforts proposed are the establishment of an official Malaysian National Space Registry and a supplementary registry. In terms of monitoring and supervision, the study has suggested various methods and procedures to supervise and monitor the outer space activities to ensure they are in compliance with the spirit of the international space law. Among the suggested modes is the establishment of the Supervision and Monitoring Committee with its list of duties, powers and functions. In regard to the issues of safety, peace and security, the research has strongly proposed that the provisions of the Act be instilled with those values as necessary. Lastly, in respect of other relevant provisions, the study has dealt with matters that are not covered under the earlier issues but that should nevertheless be included in the Act. The proposed matters are those such as the position of Malaysian military outer space activities in regard to the registration rule, and offences and penalties clauses for the offender.

The research has finally proposed a draft specimen of the Malaysian Outer Space Act.[12] The proposed draft Act follows the style of Malaysian legislation: statement of purpose, reference to the Sovereign (King) and Parliament, preliminary part, short title, interpretative section, and so on. Six major parts have been proposed in the draft Act. They are: Part 1 - Preliminary; Part II - Authorization of space activities; Part III - Supervision and monitoring of space activities; Part IV - Registration of Space Activities; Part V - Indemnification and Insurance Requirement; and Part VI - Other Relevant Clauses. These parts have been further

[12] The draft specimen of the Malaysian Outer Space Act is available in Chapter 5 of the thesis (5.2.1. The Feasible Draft of the Malaysian Outer Space Act).

divided into several clauses and sub-clauses as necessary. Fifty sections have been proposed altogether. It is hoped that the construction of this draft Act will assist, guide and contribute to the development of the actual Malaysian outer space legislation. It should also be noted that, apart from the successful enactment of the Malaysian Outer Space Act, other new laws may be required from time to time to deal with the new developments and changes in the related technology and activities.

Should the enactment of the Malaysian Outer Space Act become a reality, there will be numerous legal impacts from various perspectives.[13] In regard to the Government of Malaysia, the Act will provide legal protection in terms of the Government's financial risk. It will also provide the country with a well-organized outer space national legal system. As for the ASEAN member states, the successful establishment of the Act will represent a legal challenge to the other member states to consider developing their national outer space legislations. In respect of world space activities, the Act will ensure, among other things, the furnishing of the United Nations with information on the outer space objects. It will also assist such international bodies to promote the peaceful uses of outer space.

Finally, it is submitted that the enactment of the Malaysian national outer space legislation is undoubtedly important to Malaysia. It is highly recommended that Malaysia urgently realize the Malaysian Outer Space Act. It is hoped that the construction of the draft of the Malaysian Outer Space Act will help pave the way to the realization of the actual Malaysian Outer Space Act, and will positively influence the Malaysian law makers. The earlier the Act is materialized; the sooner the Malaysian Government's interests will be secured. Indeed, it is predicted that the successful implementation of the Act will support and complement the functions of the United Nations outer space conventions. Thus, it is not too much to say that the birth of the Act could support, enhance and strengthen the effectiveness of the implementation of the United Nations outer space law conventions.

[13] For more information, read Chapter 5 of the thesis (5.2.2. The Legal Impacts on Malaysia) and (5.2.3. The Legal Impacts on the ASEAN and the World Space Activities).

Summary in English

NATIONAL SPACE LEGISLATION: FUTURE PERSPECTIVES FOR MALAYSIAN SPACE LAW

The rationale

Outer space activities have attracted the attention of many states. The activities have evolved from exclusive activities of rich countries to ordinary activities of interested countries. Indeed, it is predicted that certain activities that were previously beyond human imagination will become commonplace and ordinary attractive daily activities, especially after the successful operation of the commercial suborbital space plane by the private sector. As one of the states concerned, Malaysia demonstrated her interest when she successfully utilized the freedom of uses and exploration of outer space with various space applications and activities. Such activities, in fact, have bright prospect of expanding further in the future. However, despite this involvement and participation, Malaysia has no specific domestic outer space legislation to govern the activities in accordance with the United Nations outer space legal rules.

The objectives and research questions

This research studies the future perspective of the Malaysian outer space law. It has focused on three major objectives:

1. To demonstrate the past, present and future development of Malaysian outer space-related activities inclusive of the status of Malaysia with respect to the United Nations space conventions and her membership of international and regional space-related organizations.
2. To study the legal frameworks of selected national outer space legislations, the outcomes of which will be utilized in assisting Malaysia to develop her national outer space legislation.
3. To propose a feasible draft specimen of a Malaysian Outer Space Act with some major clauses, to discuss some significant aspects to develop the legislation, and to explain the

necessity for such legislation, and its impacts on Malaysia, ASEAN and world space activities.

In order to achieve these objectives, the research has investigated and analysed the following questions:

1. What are the developments in Malaysian outer space-related activities?
   What is the status of Malaysia with respect to the United Nations outer space laws as well as her membership of the international and regional space-related organizations?
2. What are the legal frameworks of the selected national outer space legislations?
   What can Malaysia learn from the study of those legal frameworks in assisting her to develop national space legislation?
3. Is it necessary for Malaysia to enact a Malaysian outer space law?
   What are the major aspects to consider in drafting Malaysian outer space legislation?
   What would a feasible proposed draft specimen of a Malaysian Outer Space Act consist of?
   What are the legal impacts of the birth of the Malaysian Outer Space Act on Malaysia, ASEAN and world space activities?

The research outline

To accomplish the objectives and respond to the research questions, the study has been carefully arranged into six chapters. *Chapter 1: Malaysian Space Experiences and Activities: Past, Present and Future* demonstrates Malaysia's involvement and participation in outer space-related activities. *Chapter 2: Malaysia, International Space Activities and Laws* presents the status of Malaysia in relation to United Nations outer space conventions and her membership of international and regional space-related organizations. *Chapter 3: The Study of Legal Frameworks of Some National Space Legislations* examines the legal frameworks of selected national space legislations. *Chapter 4: The Proposed Legal Framework for Malaysian Space Law* not only discusses the legal framework for Malaysian outer space legislation but also explains the necessity of enacting the Malaysian outer space law and some major aspects to consider in drafting the law. *Chapter 5: A Feasible Draft of a Malaysian Space Law* proposes a draft specimen of a Malaysian Outer Space Act and also highlights the legal impacts of the Act on Malaysia, ASEAN and world space activities. *Chapter 6: General Conclusions* reports the research findings for each chapter and concludes with a final submission, arguing that the Malaysian Outer Space Act is undoubtedly important to Malaysia and will assist the United Nations outer space conventions in regulating the space activities.

The research outcome

The research findings are demonstrated based on three major aspects that reflect the three major objectives of the study.

Firstly, the development of Malaysian space-related activities has proved to be encouraging and inspiring. The sector has bright future prospects, especially with regard to space activities and the country's contribution to and participation in various space-related bodies internationally and regionally. The emergence of the Malaysian private sector has been seen as a key factor in boosting the growth of Malaysian space activities. Despite this promising scenario, it has been discovered that Malaysia is only a signatory state – without ratification - to the Outer Space Treaty 1967 and the Rescue Agreement 1968, and a non-party state to the Liability Convention 1972, the Registration Convention 1975, and the Moon Agreement 1979. It was found that Malaysia is reluctant to ratify or become a party to the treaties on the ground that this will result in compulsory adherence to the treaties' rules and obligations, particularly in relation to liability and responsibility matters. The fact that the country has no national outer space legislation to protect and secure the Malaysian Government's interest has resulted in it delaying the ratification of the treaties.

However, the research findings have established that Malaysia might indeed still be bound by the treaties' rules and obligations in circumstances where the rules and obligations are part of the international custom under Article 38 of the Vienna Convention on the Law of the Treaty. Furthermore, by virtue of Article 18 of the same Treaty, Malaysia has a further obligation to refrain from any acts that contravene the objective and purpose of any treaties she has signed. Thus, the research has submitted that Malaysia in fact – from this point of view – has indirectly been bound by certain rules and obligations of the outer space treaties. In such circumstances, the research has proposed a requirement to construct the Malaysian outer space legislation in order to protect the country's interest. To achieve this aim, the research has learned and studied several national outer space legislations of other countries, the outcomes of which have been utilized in constructing the draft of the Malaysian outer space legislation.

Secondly, seven major legal issues have been identified from the study of the legal frameworks of selected national outer space legislations. The research has studied the national outer space legislations of three countries: the Outer Space Act 1986 of the United Kingdom, the Space Activities Act 1998 of Australia and several relevant national space legislations and regulations of the United States. It was learned that there are at least seven major subject matters or key issues to consider in developing national outer space legislation: (1) nature and scope of the law; (2) authorization; (3) liability and indemnification; (4) registration; (5) monitoring and supervision; (6) safety, peace and security elements; and (7) other relevant provisions. The research has observed that, although these legislations have similar key issues, in some circumstances different states have different rules to apply. Thus, in producing the best outcome for Malaysian outer space legislation, the research has suggested that Malaysia learn and consider the various rules applied by these countries. However, certain modifications and changes are required – whenever applicable – in order to suit Malaysia's circumstances and interests. This kind of approach can in fact be applied by other countries that lack national space legislation but wish to construct a law.

Thirdly, a draft specimen of a Malaysian Outer Space Act has been successfully constructed as a result of studying the legal frameworks of other national outer space legislations. The draft Act has been presented, arranged and worded carefully. The proposed draft Act is the author's. It follows the style of Malaysian legislation: statement of purpose, reference to the Sovereign (King) and Parliament, preliminary part, short title and so on. The draft Act proposes the incorporation of six major parts: Part 1 (Preliminary); Part II (Authorization of Space Activities); Part III (Supervision and Monitoring Activities); Part IV (Registration of Space Activities); Part V (Indemnification and Insurance Requirements); and Part VI (Other Relevant Clauses). These Parts have then been further divided into several clauses and sub-clauses as necessary, resulting in fifty sections altogether.

To ensure the best outcome of the draft Act, the study has proposed several major aspects that should be taken into consideration. The draft has been constructed mainly to comply with the Malaysian national policy and its legal system. It has also been drafted to support Malaysian nationals' interest, especially to ensure their continuous engagement in space activities. In addition, it has been prepared to coordinate not only the existing Malaysian domestic law but also the international outer space law. In order for it to perform feasibly, it is recommended that it be harmonized with other countries in respect of certain legal matters.

The construction of the draft specimen of a Malaysian Outer Space Act has been identified as essential as it will assist and pave the way to the realization of the actual Malaysian Outer Space Act. The study has also confirmed the necessity of enacting the Malaysian Outer Space Act, especially for providing national regulations to the prescribed space actors. Additionally, the Act has provided the space actor not only with legal certainty and transparency of the space legal rules nationally, but also a reliable supervisory legal framework for those who conduct activities within its prescribed jurisdiction. From the international outer space law perspective, the Act has assured the Malaysian Government and the international community of the space actors' complete observation of the United Nations international outer space legal rules and obligations. Most importantly, the concept of international responsibility and liability that has always been a source of concern for Malaysia has been dealt appropriately at the state level.

The research outcomes also reveal numerous legal impacts from various perspectives, should the enactment of the Malaysian Outer Space Act become a reality. From the Malaysian Government point of view, the most important point is that the Act will provide legal protection in regard to the Malaysian Government's financial risk. For the ASEAN member states, it will provide a legal challenge to other members to consider developing their own national outer space legislations. In respect of world space activities, the Act will afford legal assurance, particularly in furnishing the United Nations with information on the space objects and assisting the international bodies in promoting the peaceful uses of outer space.

Finally, the research findings have reconfirmed that the enactment of the Malaysian national outer space legislation is undoubtedly important to Malaysia. Thus, realization of the Malaysian Outer Space Act is a most highly recommended action for Malaysia. In such circumstances, the construction of the draft Act should offer great assistance in paving the way to the realization of the Act. It is hoped that it will positively influence Malaysian law makers. Apart from safeguarding the Malaysian Government's and space actors' interests in particular, the Act's emergence will support and complement the functions of the United

Nations outer space conventions generally. Its appearance is expected to enliven and strengthen the arena of international outer space law.

Samenvatting (Dutch Summary)

NATIONALE RUIMTEWETGEVING: TOEKOMSTPERSPECTIEVEN VOOR MALEISISCH RUIMTERECHT

Uiteenzetting

Activiteiten in de kosmische ruimte staan de laatste tijd in de belangstelling van een groot aantal staten. De activiteiten lopen uiteen van bijzondere activiteiten door rijke landen tot gewone activiteiten door geïnteresseerde landen. Het valt te voorspellen dat sommige activiteiten die voorheen het menselijke voorstellingsvermogen te boven gingen, over enige tijd gemeengoed zullen worden, zeker na de succesvolle voltooiing van de commerciële suborbitale ruimtevluchten door de particuliere sector. Maleisië heeft, als één van de betrokken landen, zijn belangstelling getoond toen het succesvol gebruik maakte van de vrijheid van gebruik en verkenning van de ruimte met verschillende ruimtetoepassingen en -activiteiten. Dergelijke activiteiten hebben in wezen goede vooruitzichten om in de toekomst uitgebreid te worden. Ondanks deze aanwezigheid en betrokkenheid heeft Maleisië echter geen specifiek nationaal ruimterecht om deze activiteiten te regelen in overeenstemming met de ruimtewetgeving van de Verenigde Naties.

Doelstellingen en onderzoeksvragen

Dit onderzoek bestudeert de toekomstperspectieven van het Maleisische ruimterecht. De nadruk ligt hierbij op drie hoofdonderwerpen:

1. Het laten zien van de ontwikkelingen in verleden, heden en toekomst van Maleisische activiteiten gerelateerd aan de kosmische ruimte, inclusief de positie van Maleisië ten opzichte van de ruimteverdragen van de Verenigde Naties, en het lidmaatschap van internationale en regionale ruimte-gerelateerde organisaties.
2. Het bestuderen van de juridische kaders van geselecteerde nationale ruimtewetgeving. De resultaten hiervan zullen gebruikt worden om de Maleisische regering te adviseren bij de ontwikkeling van de nationale ruimtewetgeving.

3. Het voorstellen van een uitvoerbaar concept voor een Maleisische ruimtewet met een aantal belangrijke bepalingen, het bespreken van een aantal belangrijke aspecten om de wetgeving te ontwikkelen en een uitleg van de noodzaak van een dergelijke wetgeving, en de gevolgen hiervan voor Maleisië, ASEAN (*Association of Southeast Asian Nations*, Associatie van Zuidoost-Aziatische Naties) en mondiale ruimteactiviteiten.

Om deze doelstellingen te verwezenlijken zijn onderstaande vragen onderzocht en geanalyseerd:

1. Wat zijn de ontwikkelingen in Maleisië op het gebied van ruimte-gerelateerde activiteiten?
   Wat is de houding van Maleisië ten opzichte van de ruimtewetgeving van de Verenigde Naties, alsmede het lidmaatschap van internationale en regionale ruimte-gerelateerde organisaties?
2. Wat zijn de juridische kaders van de geselecteerde ruimtewetgevingen?
   Wat kan Maleisië leren van de studie van deze juridische kaders zodat deze behulpzaam kunnen zijn bij de ontwikkeling van zijn nationale ruimtewetgeving?
3. Is het noodzakelijk voor Maleisië om een nationale ruimtewetgeving in te voeren?
   Wat zijn de belangrijkste factoren die overwogen moeten worden bij het ontwerpen van een concept-ruimtewet?
   Waar zou een haalbaar voorstel voor een Maleisische ruimtewet uit moeten bestaan?
   Wat zijn de juridische gevolgen van de instelling van een Maleisische ruimtewet voor Maleisië, ASEAN en mondiale ruimteactiviteiten?

De onderzoeksopzet

Om de gestelde doelen te bereiken en de onderzoeksvragen te beantwoorden, is het onderzoek ingedeeld in zes hoofdstukken. *Hoofdstuk 1: Maleisische ruimte-ervaringen en activiteiten: verleden, heden en toekomst* laat de betrokkenheid en participatie van Maleisië in ruimte-gerelateerde activiteiten zien. *Hoofdstuk 2: Maleisië, internationale ruimteactiviteiten en ruimtewetgeving* laat de houding van Maleisië ten opzichte van de ruimteverdragen van de Verenigde Naties zien en zijn lidmaatschap van internationale en regionale ruimte-georiënteerde organisaties. *Hoofdstuk 3: De studie van juridisch kaders van een aantal nationale ruimtewetgevingen* onderzoekt de juridische kaders van een aantal geselecteerde nationale ruimtewetgevingen. *Hoofdstuk 4: Voorstel voor een juridisch kader voor het Maleisische ruimterecht* behandelt niet allleen het juridische kader voor Maleisische ruimtewetgeving maar verklaart ook de noodzaak van het invoeren van Maleisische ruimtewetgeving, evenals een aantal belangrijke aspecten die in het oog gehouden moeten worden bij het ontwerpen van de wet. *Hoofdstuk 5: Een mogelijk ontwerp voor een Maleisische ruimtewet* geeft een voorstel voor een conceptontwerp voor een Maleisische ruimtewet en belicht ook de juridische gevolgen van de wet voor Maleisië, ASEAN en mondiale ruimteactiviteiten. *Hoofdstuk 6: Algemene conclusies* geeft de onderzoeksresultaten van elk hoofdstuk weer en eindigt met een slotconclusie, waarin beargumenteerd wordt dat een Maleisische ruimtewet zonder twijfel van groot belang is voor Maleisië en bij kan dragen aan de ruimteverdragen van de Verenigde Naties om ruimteactiviteiten te reglementeren.

De onderzoeksresultaten

De onderzoeksresultaten worden getoond op basis van drie belangrijke aspecten die de drie hoofddoelstellingen van het onderzoek weergeven.

Ten eerste is gebleken dat de ontwikkeling van Maleisische ruimte-gerelateerde activiteiten stimulerend en inspirerend is. De sector heeft goede vooruitzichten, in het bijzonder met betrekking tot ruimteactiviteiten en de bijdrage en deelname van het land aan diverse ruimte-gerelateerde internationale en regionale organen. De opkomst van de Maleisische particuliere sector wordt gezien als een cruciale factor in de opkomst van Maleisische ruimteactiviteiten. Ondanks dit veelbelovende scenario is duidelijk geworden dat Maleisië slechts een ondertekenend land was – zonder ratificatie – van het Ruimteverdrag van 1967 en het *Rescue Agreement* (de Overeenkomst inzake de redding van ruimtevaarders, de terugkeer van ruimtevaarders en de teruggave van in de kosmische ruimte gebrachte voorwerpen) uit 1968 en een *non-party* staat in de *Liability Convention* in 1972, de *Registration Convention* in 1975 en de Maanovereenkomst in 1979. Voorts is in het onderzoek naar voren gekomen dat Maleisië zich terughoudend opstelt bij bekrachtiging van of deelname aan de verdragen op grond van het feit dat dit zou resulteren in verplichte aanhankelijkheid aan de regels en verplichtingen van de verdragen, in het bijzonder in relatie tot wettelijke verplichtingen en verantwoordelijkheden. Het feit dat Maleisië geen nationale ruimtewetgeving heeft om de belangen van de Maleisische regering te beschermen en te waarborgen, heeft er toe geleid dat Malesië de ondertekening van de verdragen uitgesteld heeft.

Desondanks is in het onderzoek duidelijk geworden dat Maleisië wellicht toch gebonden is aan de regels en verplichtingen van de verdragen in omstandigheden waarin de regels en verplichtingen deel uitmaken van de internationale gewoonte (met kracht van recht) onder Artikel 38 van de *Vienna Convention on the Law of the Treaty* (Verdrag van Wenen inzake het verdragenrecht). Verder heeft Maleisië, krachtens artikel 18 van hetzelfde verdrag, een nadere de verplichting om zich te onthouden van daden die strijdig zijn met de opzet en doelstelling van alle verdragen die het land ondertekend heeft. Aldus heeft het onderzoek uitgewezen dat Maleisië in feite – vanuit dit standpunt – indirect gebonden is aan bepaalde regels en verplichten van de ruimteverdragen. Onder deze omstandigheden worden in het onderzoek enige eisen voorgesteld om een Maleisische ruimtewetgeving te construeren zodat de belangen van het land gewaarborgd worden. Om dit doel te bereiken zijn de nationale ruimtewetgevingen van een aantal andere landen bestudeerd en geanalyseerd, waarvan de resultaten zijn gebruikt om een concept op te stellen voor een Maleisische ruimtewetgeving.

Ten tweede zijn er zeven belangrijke juridische aspecten geïdentificeerd in het onderzoek van de juridische kaders van de nationale ruimtewetgeving van de geselecteerde landen. In het onderzoek werd de nationale ruimtewetgeving van drie landen geanalyseerd: de *Outer Space Act 1986* van Groot-Brittannië, de *Space Activities Act 1998* van Australië en verschillende relevante nationale ruimtewetten en –reglementen van de Verenigde Staten. Uit deze studie is geconcludeerd dat er zeven belangrijke onderwerpen of hoofdthema's betrokken dienen te worden bij de ontwikkeling van nationale ruimtewetgeving: (1) aard en omvang van de wet; (2) autorisatie; (3) aansprakelijkheid en vrijwaring; (4) registratie; (5) controle en toezicht; (6) elementen van veiligheid, vrede en waarborging; (7) andere relevante bepalingen. Uit het onderzoek is naar voren gekomen dat, hoewel deze wetgevingen dezelfde hoofdthema's hebben, verschillende landen in sommige omstandigheden verschillende regels hanteren. Om het beste resultaat voor de Maleisische ruimtewetgeving te bereiken, wordt in het onderzoek de suggestie gegeven dat Maleisië de verschillende regelgeving die door deze landen wordt toegepast, zou kunnen bestuderen. Er zijn echter wel diverse wijzigingen en aanpassingen vereist om de wetgeving passend te maken voor de Maleisische omstandigheden en belangen. Deze benadering kan ook worden toegepast door landen die nationale ruimtewetgeving missen maar dit wel zouden willen ontwerpen.

Ten derde is er een concept wetsontwerp voor een Maleisische ruimtewet ontworpen als resultaat van de analyse van juridische kaders van andere nationale ruimtewetten. De conceptwet is zorgvuldig gepresenteerd, opgesteld en verwoord. Het is een door de auteur van dit proefschrift voorgestelde conceptwet, conform de opzet van de Maleisische wetgeving: een verklaring van het doel; een verwijzing naar de Monarch (Koning) en het parlement, een inleidende deel, korte titel enzovoort. Er wordt voorgesteld om zes belangrijke onderdelen op te nemen in de conceptwet: Deel 1 (Inleiding); Deel II (Autorisatie van activiteiten in de ruimte); Deel III: (Supervisie en controle), Deel IV (Registratie van activiteiten in de ruimte); Deel V (Vereisten voor schadeloosstelling en verzekering); en Deel VI (Andere relevante bepalingen). Deze delen zijn voorts onderverdeeld in verscheidene benodigde clausules en sub-clausules, resulterend in totaal vijftig artikelen.

Om het beste resultaat van de conceptwet te garanderen, worden er in het onderzoek verschillende belangrijke aspecten aan de orde gesteld die in overweging genomen dienen te worden. Het concept is voornamelijk opgesteld om te voldoen aan het nationale beleid van Maleisië en zijn juridische systeem. Het is tevens ontworpen om de nationale belangen van Maleisië te ondersteunen, in het bijzonder om zijn voortdurende betrokkenheid in ruimteactiviteiten te verzekeren. Bovendien is de afstemming van de bestaande nationale Maleisische wetgeving met de internationale ruimtewetgeving voorbereid. Om de uitvoerbaarheid te bevorderen, wordt aanbevolen om de wet in overeenstemming te brengen met andere landen met betrekking tot bepaalde juridische zaken.

Het ontwerp van een conceptvoorstel voor een Maleisische ruimtewet is als essentieel naar voren gekomen omdat het kan bijdragen aan en de weg kan effenen voor de realisatie van een echte Maleisische kosmische ruimtewetgeving. In het onderzoek is ook de noodzaak om een Maleisische ruimtewet in te voeren bevestigd, in het bijzonder om te voorzien in nationale reglementen voor de ruimteparticipanten. Bovendien voorziet de wet de ruimteparticipanten niet alleen van juridische zekerheid en transparantie van de nationale juridische ruimtereglementen, maar voorziet ook in een betrouwbaar en controleerbaar juridisch kader voor degenen die activiteiten uitvoeren binnen de voorgeschreven jurisdictie. Vanuit het perspectief van het internationale kosmische ruimterecht, heeft de wet de Maleisische regering en de internationale gemeenschap verzekerd van de volledige naleving door ruimteparticipanten van de internationale kosmische ruimtewetten van de Verenigde Naties. Het belangrijkste is dat het concept van internationale verantwoordelijkheid en aansprakelijkheid, dat altijd een bron van zorg is geweest voor Maleisië, nu op staatniveau aandacht heeft gekregen.

De onderzoeksresultaten onthullen ook, vanuit diverse perspectieven, verscheidene juridische gevolgen als de vaststelling van de Maleisische ruimtewet werkelijkheid zou worden. Vanuit het gezichtspunt van de Maleisische regering is het belangrijkste punt dat de wet juridische bescherming zal bieden voor het financiële risico dat van de Maleisische regering loopt. Voor de andere lidstaten van ASEAN zal het een juridische uitdaging vormen om te overwegen om hun eigen nationale ruimtewetgeving te ontwikkelen. Met betrekking tot mondiale ruimteactiviteiten zal de wet zorgen voor wettelijke verzekering, in het bijzonder in het voorzien van informatie aan de Verenigde Naties over ruimteobjecten en in het bijstaan van internationale organisaties bij het bevorderen van een vreedzaam gebruik van de ruimte.

Ten slotte hebben de onderzoeksresultaten opnieuw bevestigd dat het invoeren van een nationale ruimtewetgeving zonder twijfel van belang is voor Maleisië. Daarom wordt de verwezenlijking van de kosmische ruimtewet van Maleisië ten sterkste aanbevolen als actiepunt voor Maleisië. In deze omstandigheden kan het conceptvoorbeeld van een wet een grote bijdrage leveren aan het effenen van de weg voor de realisatie van de wet. Het is te hopen dat het een positieve invloed heeft op de Maleisische wetsontwerpers. Naast het waarborgen van de belangen van de Maleisische regering en deelnemers in de ruimte in het bijzonder, zal de realisatie van de wet de functies van de Ruimteconventies van de Verenigde Naties in het algemeen ondersteunen en aanvullen. De realisatie van de wet zal naar verwachting de arena van het internationale kosmische ruimterecht stimuleren en versterken.

APPENDIX A

Table No.3.1: Some Differences and Similarities of 7 Selected States

STATES	LEGAL SYSTEM	MAIN SPACE BODY	SPACE OBJECT LAUNCHED (NUMBER)	OUTER SPACE CONVENTIONS (MEMBERSHIP)	SPACE LEGISLATION [FOR IMPLEMENTATION OF THE UN SPACE TREATIES OBLIGATIONS]					
					DOMESTIC LEGISLATION	OBLIGATIONS AS IMPOSED BY THE UN SPACE TREATIES				
						AUTHORISATION	REGISTRATION	CONSTANT MONITORING & SUPERVISION	LIABILITY & INDEMNIFICATION	SAFETY, PEACE & SECURITY MEASUREMENT
1. The United Kingdom	Common Law	UK Space Agency	43 objects * Most objects registered with the UN	Member to 4 treaties [OST, RA, LC, RC] *Non-member : Moon Agreement	UK Outer Space Act 1986	Observed through licensing system	Observed through: 1. UK Registry of Space Object. 2. Supplementary Registry of Space Object	Observed through power the UK Secretary of State	* Passing all the risk of international liability to the licensee without limit [No limitation of liability] * Imposed an Indemnification Rule * Requirement of liability insurance	Observed through: e.g. technical safety assessment.
2. Australia [*Speciality: the first legislation to define 'outer space']	Common Law	*Space Licensing and Safety Office (SLASO) *Space Policy Unit	13 objects *All objects registered with the UN	Member to all 5 treaties [OST, RA, LC, RC, MA]	*Australia Space Activities Act 1998 *Australia Space Activities Regulation 2001	Observed through various modes: 1. Licence 2. Permit 3. Certificate 4. Authorisation	Observed through: 1. Australian National Registry of Space Object	Observed through creation of specific post: e.g. Launch Safety Officer (LSO)	* Monetary Limitation on liability * 2 clear divisions of liability: a. strict liability b. fault liability	Observed through: e.g. investigation regime

STATES	LEGAL SYSTEM	MAIN SPACE BODY	SPACE OBJECT LAUNCHED (NUMBER)	OUTER SPACE CONVENTIONS (MEMBERSHIP)	SPACE LEGISLATION [FOR IMPLEMENTATION OF THE UN SPACE TREATIES OBLIGATIONS]					
					DOMESTIC LEGISLATION	OBLIGATIONS AS IMPOSED BY THE UN SPACE TREATIES				
						AUTHORISATION	REGISTRATION	CONSTANT MONITORING & SUPERVISION	LIABILITY & INDEMNIFICATION	SAFETY, PEACE & SECURITY MEASUREMENT
		*Space Industry Innovation Council							*Fixing the liability period	
3.The USA	Common Law	*National Aeronautics and Space Administration (NASA) *Office of Commercial Space Transporta-tion (Federal Aviation Ad-ministration)	2077 objects * Some of them were registered with the UN, but some not	Member to 4 treaties [OST, RA, LC, RC] *Non-member : Moon Agreement	*Rules not contain in single legislation – evolves as need arose *Most referred: 1.Commercial Space Launch Activities 2.Commercial Space Transportation Regulation	Observed through modes: 1. Licence 2.Experimental Permit	Observed, but with certain exceptions: 1. objects owned by foreign entity	Observed by designating a specific officer	* Monetary Limitation on liability *Determination of maximum probable loss *Reciprocal waiver of claim	Observed, especially when involved human spaceflight

STATES	LEGAL SYSTEM	MAIN SPACE BODY	SPACE OBJECT LAUNCHED (NUMBER)	OUTER SPACE CONVENTIONS (MEMBERSHIP)	SPACE LEGISLATION [FOR IMPLEMENTATION OF THE UN SPACE TREATIES OBLIGATIONS]					
					DOMESTIC LEGISLATION	OBLIGATIONS AS IMPOSED BY THE UN SPACE TREATIES				
						AUTHORISATION	REGISTRATION	CONSTANT MONITORING & SUPERVISION	LIABILITY & INDEMNIFICATION	SAFETY, PEACE & SECURITY MEASUREMENT
4. India	Common Law	India Space Research Organisa-tion (ISRO)	53 objects * Most objects registered with the UN	Member to 4 treaties [OST, RA, LC, RC] *Non-member: Moon Agreement	N/A	Applied to certain space activities only – through licensing system [under Guideline and Procedure only]	Observed at international level, but not effectively applied at national level	Not efficiently performed	N/A	N/A
5. Thailand	Civil law but with certain influen-ced of common law	*Geo-Informatics and Space Technology Developme nt Agency (GISTDA)	7 objects *Most objects not registered with the UN	Member to 2 treaties [OST, RA] *Non-member: LC, RC, MA	N/A	N/A	Not observed	Not effectively performed	N/A	N/A

STATES	LEGAL SYSTEM	MAIN SPACE BODY	SPACE OBJECT LAUNCHED (NUMBER)	OUTER SPACE CONVENTIONS (MEMBERSHIP)	SPACE LEGISLATION [FOR IMPLEMENTATION OF THE UN SPACE TREATIES OBLIGATIONS]						
					DOMESTIC LEGISLATION	OBLIGATIONS AS IMPOSED BY THE UN SPACE TREATIES					
						AUTHORISATION	REGISTRATION	CONSTANT MONITORING & SUPERVISION	LIABILITY & INDEMNIFICATION	SAFETY, PEACE & SECURITY MEASUREMENT	
		*Space Affairs Bureau									
6. Singapore	Common Law	No specific space agency MICA IDA SSTA	3 objects * No object registered with the UN	Member to 3 treaties [OST, RA, LC] *Non-member: RC, MA	N/A	N/A	Not observed	Not effectively performed	N/A	N/A	
7. Brunei	Common Law	No specific space agency Brunei Mi-nistry of Communi-cation	No Object	Non-member	N/A	N/A	N/A	N/A	N/A	N/A	

Keywords: (OST) – Outer Space Treaty 1967; (RA) – Rescue Agreement 1968; (LC) – Liability Convention 1972; (RC) – Registration Convention 1975; (MA) – Moon Agreement 1979; (N/A) – Non-applicable

APPENDIX B

Selected Bibliography

1. INTERNATIONAL LEGAL MATERIALS

(a) TREATIES AND CHARTER

Outer Space Treaty 1967: Treaty on Principles Governing the Activities of States in the Exploration and Use of the Outer Space, Including the Moon and Other Celestial Bodies (1967) (Resolution 2222 (XXI)), adopted on 19 December 1966, opened to signature on 27 January 1967, entered into force on 10 October 1967. (1967) 610 UNTS 205, 18 UST 2410, TIAS 6347; (1967) 6 ILM 386; (1967) 61 AJIL 644.

Liability Convention 1972: Convention on International Liability for Damage Caused by Space Objects (1972) (Resolution 2777 (XXVI)), adopted on 29 November 1971, opened to signature on 29 March 1972, entered into force on 1 September 1972. 24 UST 2389, 961 UNTS 187, TIAS 7762.

Registration Convention 1975: Convention on Registration of Objects Launched into Outer Space (1974) (Resolution 3235 (XXIX)), adopted on 12 November 1974, opened to signature on 14 January 1975, entered into force on 15 September 1976. 28 UST 695, 1023 UNTS 15, TIAS 8480.

Rescue Agreement 1968: Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space (1968) (Resolution 2345 (XXII)), adopted on 19 December 1967, opened to signature on 22 April 1968, entered into force on 3 December 1968. 19 UST 7570, 672 UNTS 119, TIAS 6599.

Moon Agreement 1979: Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (1979) (Resolution 34/68), adopted on 5 December 1979, opened to signature on 18 December 1979, entered into force on 11 July 1984. 18 ILM 1434, 1363 UNTS 3.

Geneva Convention on the Continental Shelf 1958: Convention on the Continental Shelf, done at Geneva, on 29 April 1958, entered into force on 10 June 1964. 499 UNTS 311.

Test Ban Treaty: Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and under Water 1963, opened to signature on 5 August 1963, entered into force on 10 October 1963. 480 UNTS 43.

United Nations Charter: Charter of the United Nations, San Francisco, done 26 June 1945, entered into force on 24 October 1945. 24 UST 2225, TIAS No. 7739, TS 993.

United Nations Convention on the Law of the Sea 1982: United Nations Convention on the Law of the Sea (UNCLOS), done at Montego Bay, Jamaica on 10 December 1982, entered into force on 16 November 1994. 1833 UNTS 3.

Vienna Convention on Diplomatic Relations 1961: Vienna Convention on Diplomatic Relations, done at Vienna on 18 April 1961, entered into force on 24 April 1964. 500 UNTS 95.

Vienna Convention on the Law of Treaties: Vienna Convention on the Law of Treaties 1969, adopted on 22 May 1969, opened for signature on 23 May 1969, entered into force on 27 January 1980. 1155 UNTS 331.

(b) RESOLUTIONS

UNGA Res. 1348 (XIII), "Question of the Peaceful Use of Outer Space", adopted on 13 December 1958.

UNGA Res. 1472 (XIV), "International Co-operation in the Peaceful uses of Outer Space", adopted on 12 December 1959.

UNGA Res. 1721 (XVI), "International Co-operation in the Peaceful uses of Outer Space", adopted on 20 December 1961.

UNGA Res. 1884 (XVIII), "Question of General and Complete Disarmament", adopted on 17 October 1963.

UNGA Res. 1962 (XVIII), "Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space", adopted on 13 December 1963.

UNGA Res. 2222 (XXI), "Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies", adopted on 19 December 1966.

UNGA Res. 2345 (XXII), "Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space", adopted on 19 December 1967.

UNGA Res. 2453 (XXIII), "International Co-operation in the Peaceful uses of Outer Space", adopted on 20 December 1968.

UNGA Res. 2600 (XXIV), "International Co-operation in the Peaceful uses of Outer Space", adopted on 16 December 1969.

UNGA Res. 2733 C (XXV), “International Co-operation in the Peaceful uses of Outer Space”, adopted on 16 December 1970.

UNGA Res. 2777 (XXVI), “Convention on International Liability for Damage Caused by Space Object”, adopted on 29 November 1971.

UNGA Res. 2779 (XXVI), “Preparation of an International Treaty Concerning the Moon”, adopted on 29 November 1971.

UNGA Res. 2916 (XXVII), “Preparation of an International Convention on Principles Governing the Use by States of Artificial Earth Satellite for Direct Television Broadcasting”, adopted on 9 November 1972.

UNGA Res. 31/8, “International Co-operation in the Peaceful Uses of Outer Space”, adopted on 8 November 1976.

UNGA Res. 3234 (XXIX), “International Co-operation in the Peaceful Uses of Outer Space”, adopted on 12 November 1974.

UNGA Res. 3235 (XXIX), “Convention on the Registration of Objects Launched into Outer Space”, adopted on 12 November 1974.

UNGA Res. 33/16, “International Co-operation in the Peaceful Uses of Outer Space”, adopted on 10 November 1978.

UNGA Res. 3388 (XXX), “International Co-operation in the Peaceful Uses of Outer Space”, adopted on 18 November 1975.

UNGA Res. 34/66, “International Co-operation in the Peaceful Uses of Outer Space”, adopted on 5 December 1979.

UNGA Res. 34/68, “Agreement Governing the Activities of States on the Moon and Other Celestial Bodies”, adopted on 5 December 1979.

UNGA Res. 37/92, “Principles Governing the Use by States of Artificial Earth Satellites for International Direct Television Broadcasting”, adopted on 10 December 1982.

UNGA Res. 41/65, “Principles Relating to Remote Sensing of the Earth from Space”, adopted on 11 December 1986.

UNGA Res. 47/68, “Principles Relevant to the Use of Nuclear Power Sources in Outer Space”, adopted on 14 December 1992.

UNGA Res. 49/33, “Enlargement of the Committee on the Peaceful Uses of Outer Space”, adopted on 9 December 1994.

UNGA Res. 51/122, “Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of All State, Taking Into Particular Account the Needs of Developing Countries”, adopted on 13 December 1996.

UNGA Res. 56/51, "International Cooperation in the Peaceful Uses of Outer Space", adopted on 10 December 2001.

(c) PRINCIPLES AND DECLARATIONS

Declaration of Legal Principles 1963: Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space, adopted on 13 December 1963.

Declaration on Outer Space Benefits 1996: Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of All States, Taking into Particular Account the Needs of Developing Countries, 1996.

Principles on Direct Broadcasting by Satellite (DBS) 1982: Principles Governing the Use by States of Artificial Earth Satellites for International Direct Television Broadcasting, 1982.

Principles on Nuclear Power Sources 1992: Principles Relevant to the Use of Nuclear Power Sources in Outer Space, 1992.

Principles on Remote Sensing 1986: Principles Relating to Remote Sensing of the Earth from Outer Space, 1986.

(d) DOCUMENTS AND OTHER MATERIALS

UN Doc. A/3902, 2 September 1958.

UN Doc. A/5109, 1962.

UN Doc. A/8391 and Corr. 1, 4 June 1971.

UN Doc. A/A.105/C.2 (XI).

UN Doc. A/AC. 105/C.2/L.71 and Corr.1 (1970).

UN Doc. A/AC.105/115, 27 April 1973.

UN Doc. A/AC.105/85, Annex II, 3 July 1970.

UN Doc. A/AC.105/C.2/103, 1 February 2013.

UN Doc. A/AC.105/C.2/2013/CRP.6, 26 March 2013.

UN Doc. A/AC.105/C.2/L.1.

UN Doc. A/AC.105/C.2/L.269.

UN Doc. A/AC.105/C.2/L.91 and Corr.1.

UN Doc. A/AC.105/INF series.

UN Doc. A/AC.105/INF.406.

UN Doc. A/AC.105/INF.407.

UN Doc. A/AC.105/INF.415.

UN Doc. A/AC.105/INF.421.

UN Doc. A/AC.105/PV.203.

UN Doc. ST/SG/SER.E/478.

A note verbale dated 17 April 2002, (A/AC.105/INF.407).

A note verbale dated 18 August 2005, (ST/SG/SER.E/478).

A note verbale dated 19 March 2007, (A/AC.105/INF.415).

A note verbale dated 8 February 2010, (A/AC.105/INF.421).

Draft Agreement on the Principles Governing Activities in the Use of the Natural Resources of the Moon and Other Celestial Bodies (UN Doc. A/AC. 105/C.2/L.71 and Corr.1 (1970).

Draft Code of Rules on the Exploration and Uses of Outer Space of 1963.

The Sofia Guidelines for a Model Law on National Space Legislation of the International Law Association (ILA), UN Doc. A/AC.105/C.2/2013/CRP.6, 26 March 2013.

Agreement Relating to the International Telecommunications Satellite Organization.

Statute of the International Court of Justice.

2. NATIONAL LEGAL MATERIALS

(a) MALAYSIA

(i) Acts

Federation of Malaya Constitution 1957 (*Merdeka* or Independence Constitution).

Malaysian Federal Constitution (as at 1st February 2013).

Malaysian Communications and Multimedia (Licensing) Regulations 2000 (as at 15th March 2013).

Malaysian Communications and Multimedia Act 1998 (Act 588) (as at 15th March 2013).

Malaysian Communications and Multimedia Commission Act 1998 (Act 589) (as at 15th March 2013).

Malaysian Broadcasting Act 1988.

Malaysian Digital Signature Act 1997.

Malaysian Diplomatic Privileges (Vienna Convention) Act 1966.

Malaysian Exclusive Economic Zone Act 1984.

Malaysian Geneva Conventions Act 1962.

Malaysian Postal Services Act 1991.

Malaysian Telecommunications Act 1950.

Malaysian Town and Country Planning Act 1976.

(ii) Agreements

Federation of Malaya Agreement 1948.

Federal Council Agreement 1909.

(iii) Other Materials

Malaysia's Second National Science and Technology Policy.

Malaysia's Vision 2020 (*Wawasan 2020).*

Malaysia's Economic Transformation Programme.

Tenth Malaysia Plan.

Malaysia's New Economic Model.

Undang-Undang Melaka (Laws of Malacca).

Undang-Undang Laut Melaka (Maritime Laws of Malacca).

Adat Temenggung.

Islamic law of the *Shafi`i* school of law.

Adat Perpatih.

Alliance Memorandum 1956.

The Razak Report.

(b) OTHER STATES

(i) Acts and Regulations

14 e-CFR Chapter III, Electronic Code of Federal Regulations: The United States Commercial Space Transportation Regulation, Title 14 (Aeronautics and Space), Chapter III (Commercial Space Transportation, Federal Aviation Administration, Department of Transportation), Electronic Code of Federal Regulations (Data is updated as of January 30, 2013). An updated editorial compilation of the electronic Code of Federal Regulations (e-CFR) material and Federal Register amendments produced by the National Archives and Record Administration's Office of the Federal Registrar (OFR) and the Government Printing Office.

49 USC Chapter 701: The United States Commercial Space Launch Activities, Sections 70101-70121. Title 49 (Transportation), Subtitle IX (Transferred: Commercial Space Transportation), Chapter 701 (Transferred: Commercial Space Launch Activities) of the United States Code, (former chapter 701 was renumbered chapter 509 of Title 51: Former sections 70101-70105a, 70106-70109a, and 70110-70121 were renumbered sections 50901-50923 of Title 51).

51 USC Chapter 509: The United States Commercial Space Launch Act, Title 51 (National and Commercial Space Programs), Subtitle V (Programs Targeting Commercial Opportunities), Chapter 509 (Commercial Space Launch Activities) of the United States Code, Section 50901 – 50923.

NASA Authorization Act: The United States National Aeronautics and Space Administration Authorization Act of 2010, Pub. L. No.111-267, 124 Stat. 2807, 42 USC 18301 (Oct. 11, 2010).

The United States Commercial Space Act of 1998, Pub. L. No. 105-303, 112 Stat. 2843 (October 28, 1998).

The United States Land Remote Sensing Policy Act 1992, Pub. L. No. 102-555, 106 Stat. 4163 (October 28, 1992), 15 USC Chap. 82.

The United States National Aeronautics and Space Act 2010, Pub. L. No. 111–314, 124 Stat. 3328 (December 18, 2010).

The United States National Aeronautics and Space Act of 1958, Pub. L. 85-568, 72 Stat. 426 (July 29, 1958).

The United States Telecommunications Act of 1996, Pub. L. No. 416, Ch. 652, 48 Stat. 1064 (June 19, 1934).

The United States Commercial Space Launch Act 1984.

The United States Commercial Space Launch Amendments Act of 2004.

The United States Communication Satellite Act of 1962.

The United States National Environmental Policy Act.

Australian Space Activities Act 1998 (Act No. 123 of 1998 as amended, amendments up to Act No. 8 of 2010).

Australian Space Activities Regulation 2001.
Belgium Law on the Activities of Launching, Flight Operations or Guidance of Space Object (Text of the Royal Implementing Decree of 19 March 2008).
British Nationality Act 1981.
Brunei Broadcasting Act (Chapter 180).
Brunei Telecommunications Act (Chapter 54).
Indian Cable Television Network (Regulation) Act 1995 (Updated up to 31.08.2007).
Indian Constitution 1950.
Indian Telegraph Act 1885.
Indian Wireless Telegraphy Act 1933.
Info-communications Development Authority of Singapore Act (Cap.137A).
Korean Space Liability Act 2007.
Singaporean Electronic Transactions Act (Cap.88).
Singaporean Telecommunications Act (Cap.323).
South Africa Republic Space Affairs Act (No. 84 of 1993).
Sweden Act on Space Activities (1982:963).
Thailand Patent Act 1979 (as amended).
Thailand Telecommunication Service Act 2001.
The United Kingdom Outer Space Act 1986, 1986 Chapter 38.

(ii) Agreements

Agreement establishing the Asia-Pacific Institute for Broadcasting Development (12 August 1977).
Agreement between Argentina and China on Cooperation in Research and Development in the Field of Aerospace Science (16 May 1988).
Agreement between the United States and Ukraine Regarding the International Trade in Commercial Space Launch Service (21 February 1996).

(iii) Other Materials

The Norms, Guidelines and Procedures for Implementation of the Policy-Framework for Satellite Communications in India, 8 May 2000.

Memorandum of Understanding on Joint Activities in the Field of Human Spaceflight Programme' Memorandum of Understanding on Joint Activities in the Field of Human Spaceflight Programme (Between Indian and Russia), December 2008.

The National Space Policy of the United States of America (June 28, 2010).

Australian Space Engagement and Policy Framework.

Indian Policy Framework for Satellite Communication 1997.

Indian Remote Sensing Data Policy 2011.

Indian National Telecom Policy 2012.

Indian Citizen's Charter.

Indian New Telecom Policy 1999.

Indian Broadband Policy 2004.

Guidelines for Up-linking from India.

Brunei Internet Code of Practice.

Brunei Computer Misuse Order 2000.

3. BOOKS AND MONOGRAPHS

2004 Space Law Conference Paper Assemble, (Beijing: China Institute of Space Law, 2004).

Abdul Aziz Bari, *Malaysian Constitution: A Critical Introduction,* (Kuala Lumpur: The Other Press, 2003).

Abdul Monir Yaacob, *An Introduction to Malaysian Law,* (Bangi: Universiti Kebangsaan Malaysia, 1989).

Ahmad Ibrahim and Ahilemah Joned, *Sistem Undang-Undang di Malaysia,* 3rd printing (2nd. ed.), (Kuala Lumpur: Dewan Bahasa dan Pustaka, 2005).

Ahmad Ibrahim and Ahilemah Joned, *The Malaysian Legal System,* (Kuala Lumpur: Dewan Bahasa dan Pustaka Kementerian Pendidikan Malaysia, 1987).

Ahmad Shamsul, Khadijah Mohamed and Mazita Mohamed, eds., *Undang-Undang Multimedia,* Siri Perkembangan Undang-Undang Di Malaysia, (Kuala Lumpur: Dewan Bahasa dan Pustaka, 2007).

Benkö, Marietta and Kai-Uwe Schrogl, eds., *Space Law: Currents Problems and Perspective for Future Regulation,* (Utrecht: Eleven International Publishing, 2005).

Bogaert, E.R.C. van, *Aspects of Space Law,* (Deventer: Kluwer Law and Taxation, 1986).

Brownlie, Ian, *Principles of Public International Law,* (United States: Oxford University Press, 2008).

Brownlie, Ian, *Principles of Public International Law,* 5th ed. (Oxford: Oxford University Press, 1999).

Collection of the Basic Texts of the International Telecommunication Union adopted by the Plenipotentiary Conference, Edition 2011, (Geneva: ITU, 2011).

Communications and Multimedia Act 1998 (Act 588), Regulations, Rules and Order & Malaysian Communications and Multimedia Commission Act 1998 (Act 589) and Regulations (as at 20 May 2011) (Petaling Jaya: International Law Book Service, 2011).

Country Comparison: Labour Force, The World Fact Book, https://www.cia.gov/library/publications/the-world-factbook/rankorder/2095rank.html, accessed: 29 February 2013.

Davies, J.K., *Space Exploration*, Chambers Encyclopaedic Guides Series, (Edinburgh: W & R Chambers, 1992).

Diederiks-Verschoor, I.H.Ph. and V. Kopal, *An Introduction to Space Law*, 3rd Revised Edition, (The Netherlands: Kluwer Law International, 2008).

Dunk, F.G. von der, Inaugural Lecture, *As Space Law Comes to Nebraska, Space Comes Down to Earth,* Space and Telecommunications Law, University of Nebraska College of Law's, Lincoln, 1st May 2008.

Dunk, F.G. von der, *Private Enterprise and Public Interest in the European 'Spacecape': Towards Harmonized National Space Legislation for Private Space Activities in Europe,* (Leiden: International Institute of Air and Space Law, Faculty of Law, Leiden University, 1998).

Elbert, Bruce R., *The Satellite Communication Applications Handbook*, (Artech House, 2003).

Encyclopaedia Malayan Union, *Nation Master Encyclopaedia*, http://www.nationmaster.com/encyclopedia/Malayan-Union, accessed: 10 October 2011.

Encyclopaedia of Public International Law: Law of the Sea, Air and Space Law, Published under the Auspices of the Max Planck Institute For Comparative Public Law and International Law Under the Direction of Rudolf Bernhardt, (Amsterdam: North-Holland, 1989).

English Text of the IMSO Convention Amended as Adopted by the Twentieth Session of the IMSO Assembly Provisionally Applied from 6 October 2008, http://www.imso.org/pdfs/Public/Basic%20Documents/Convention/IMSO%20CONVENTION%20-%20ENGLISH.pdf, accessed: 30 November 2012.

Evans, Malcolm D., ed., *International Law,* (New York: Oxford University Press Inc., 2003).

Farrington, Anthony, *Trading Places: The East India Company and Asia, 1600-1834,* (London: British Library, 2002).

Fernando, Joseph M., *The Making of the Malayan Constitution,* (The Malaysian Branch of the Royal Asiatic Society, 2002).

Gál, Gyula, *Space Law,* Trans. Móra, (Leiden: A.W. Sijthoff, 1969).

Goldman, Nathan C., *American Space Law: International and Domestic,* (Ames: Iowa State University Press, 1988).

Gorove, Stephen, *Developments in Space Law: Issues and Policies,* Utrecht Studies in Air and Space Law, vol. 10, (Dordrecht: Martinus Nijhoff Publishers, 1991).

Harris, R.A., ed., *International Organisations and Space Law,* Proceedings of the Third ECSL, Colloquium, Perugia, Italy, 6-7 May 1999, (ESA/ESTEC, 1999).

Hermida, Julian, *Legal Basis for a National Space Legislation,* Space Regulations Library Series, vol. 3, (Dordrecht: Kluwer Academic Publisher, 2004).

Hobe, Stephan, Bernhard Schmidt-Tedd and Kai-Uwe Schrogl, eds., *'Project 2001 Plus' – Global and European Challenges for Air and Space Law at the Edge of the 21st Century,* Proceedings of an International Symposium Cologne, 8-10 June 2005, to conclude 'Project 2001 Plus', Schriften zum Luft- und Weltraumrecht/Studies in Air and Space Law, Band 20 / Volume 20, (Koln: Heymanns, 2006).

IISL and ECSL Space Law Symposium 2011 on "A New Look on the Delimitation of Airspace and Outer Space', 20 March 2011, 50th Session of the Legal Subcommittee of the UNCOPUOS, http://www.oosa.unvienna.org/pdf/pres/lsc2011/symp02.pdf, accessed: 19 April 2013.

IISL/ECSL Symposium on "National Space Legislation –Crafting Legal Engines for the Growth of Space Activities", 22 March 2010, Legal Subcommittee Forty-Ninth Session 2010, http://www.unoosa.org/oosa/en/COPUOS/Legal/2010/symposium.html, accessed: 22 April 2013.

Institute of Air and Space Law, Cologne University and Deutsches Zentrum fur Luft- und Raumfahrt (DLR), ed., *Proceedings of the Project 2001 – Workshop on National Space Legislation, 'Need and Prospects for National Space Legislation', at Munich, Germany, 5-6 Dec. 2000*. (Cologne: Institute of Air and Space Law & Chair of International Business Law of the University of Cologne, 2001).

International Telecommunication Union, Final Acts of the Plenipotentiary Conference Guadalajara, 2010, http://www.itu.int/pub/S-CONF-ACTF-2010/en, accessed: 13 May 2014.

Jakhu, Ram S., ed., *National Regulation of Space Activities,* (Dordrecht: Springer, 2010).

Jasentuliyana, Nandasiri and Roy S.K. Lee, eds., *Manual on Space Law*, *Vol. 1*, (Alphen aan den Rijn: Sijhoff & Noordhoff, 1979).

Jasentuliyana, Nandasiri, ed., *Maintaining Outer Space for Peaceful Uses, Proceedings of a Symposium Held in The Haque, March 1984* (Japan: The United Nations University, 1984).

Jasentuliyana, Nandasiri, ed., *Space Law: Development and Scope* (London: Praeger, 1992).

Jasentuliyana, Nandasiri, *International Space Law and the United Nations,* (The Hague: Kluwer Law International, 1999).

Lawson, Philip, *The East India Company: A History,* (London: Longman, 1993).

Lee Mei Pheng, *General Principles of Malaysian Law,* 4th ed., (Shah Alam: Penerbit Fajar Bakti Sdn. Bhd., 2001).

Liebig, Volker and Kai-Uwe Schrogl, *Space Applications and Policies for the New Century,* (Frankfurt: Peter Lang GmbH, Europäischer Verlag der Wissenschaften, 2000).

Long, Mark E., *The Digital Satellite TV Handbook,* (USA: Newnes, 1999).

Lyall, Francis and Paul B. Larsen, *Space Law: A Treatise,* (Surrey: Asgate, 2009).

MacLean, Robert M., ed., *Public International Law Textbook,* 14th Edition, (London: HLT Publications, 1992).

Malaysian Communications and Multimedia Act 1998 (Act 588), Regulations, Rules and Orders & Malaysian Communications and Multimedia Commission Act 1998 (Act 589) and Regulations (Law stated as at 15th March 2013), (Petaling Jaya: International Law Book Services, 2013).

Malaysian Federal Constitution (Law stated is as at 1st February 2013), (Petaling Jaya: International Law Book Services, 2013).

Mani, V.S., S. Bhatt and V. Balakista Reddy, eds., *Recent Trends in International Space Law and Policy,* (New Delhi: Lancers Books, 1997).

Maral, Gerard, Michel Bousquet and Zhili, *Satellite Communications Systems: Systems, Techniques and Technologies,* (United Kingdom: John Wiley & Sons Ltd, 2009).

Martin, Elizabeth A. And Jonathan Law, eds., *Oxford Dictionary of Law*, (New York: Oxford University Press Inc., 2006).

Matte, Nicolas Mateesco, *Aerospace Law: From Scientific Exploration to Commercial Utilization,* (Canada: The Carswell Company Limited, 1977).

Matte, Nicolas Mateesco, ed., *Space Activities and Emerging International Law,* (Canada: Centre for Research of Air & Space Law, 1984).

Mazlan Othman and Ahmad Sabirin Arshad, eds., *TiungSAT-1, From Inception to Inauguration*, (Kuala Lumpur: Astronautic Technology (M) Sdn Bhd, 2001).

Mohd Aimi Zaini Mohd Azhar, *Prinsip Undang-Undang Antarabangsa Yang Mengawal Aktiviti Penerokaan dan Penggunaan Angkasa Lepas Serta Penglibatan Awal Malaysia Dalam Industri Aeroangkasa*, (LL.B Project Paper, Faculty of Law, University of Malaya, Kuala Lumpur, 1995).

NASA, *Astronaut Fact Book (Information Summaries),* (U.S: National Aeronautics and Space Administration, January 2005).

Noichim, C., *The Asean Space Organization: Legal Aspect and Feasibility,* Doctoral Thesis, (Leiden: University of Leiden Faculty of Law, Institute of Air and Space Law, 2008).

Ogunbanwo, Ogunsola B., *International Law and Outer Space Activities,* (The Hague: Martinus Nijhoff Publishers, 1975).

Phillips, Scott C., *Current and Future Legal Implications of Space Tourism and Beyond,* Master Thesis LL.M Air and Space Law, (Leiden: University of Leiden Faculty of Law, Institute of Air and Space Law, 2007).

Proceedings of the 19th Colloquium on the Law of Outer Space, International Institute of Space Law of the International Astronautical Federation, Anaheim, California, USA, 12-15 October 1976, (South Hackensack: Fred B. Rothman & Co., 1977).

Proceedings of the 22nd Colloquium on the Law of Outer Space, International Institute of Space Law of the International Astronautical Federation, Munich, German, September 16-22, 1979, (New York: American Institute of Aeronautics and Astronautics, 1979).

Proceedings of the 2nd Colloquium on the Law of Outer Space, International Institute of Space Law of the International Astronautical Federation, London, U.K., 1959, (Austria: Wien Springer-Verlag, 1960).

Proceedings of the 30th Colloquium on the Law of Outer Space, International Institute of Space Law of the International Astronautical Federation, Brighton, U.K., 10-13 October 1987, (Washington D.C.: American Institute of Aeronautics and Astronautics, 1988).

Proceedings of the 35th Colloquium on the Law of Outer Space, International Institute of Space Law of the International Astronautical Federation, Washington, USA, 28 August-

5 September 1992, (Washington D.C.: American Institute of Aeronautics and Astronautics, 1992).

Proceedings of the 39th Colloquium on the Law of Outer Space, International Institute of Space Law of the International Astronautical Federation, Beijing, China, 8-11 October 1996, (Reston: American Institute of Aeronautics and Astronautics, 1997).

Proceedings of the 40th Colloquium on the Law of Outer Space, International Institute of Space Law of the International Astronautical Federation, Turin, Italy, October 6-10, 1997, (Reston: American Institute of Aeronautics and Astronautics, 1998).

Proceedings of the 43rd Colloquium on the Law of Outer Space, International Institute of Space Law of the International Astronautical Federation, Rio de Janeiro, Brazil, October 2-6, 2000, (New York: American Institute of Aeronautics and Astronautics, 2001).

Proceedings of the 44th Colloquium on the Law of Outer Space, International Institute of Space Law of the International Astronautical Federation, Toulouse, France, October 1-5 October, 2001, (New York: American Institute of Aeronautics and Astronautics, 2002).

Proceedings of the 47th Colloquium on the Law of Outer Space, International Institute of Space Law of the International Astronautical Federation, Vancouver, Canada, October 4-8, 2004, (New York: American Institute of Aeronautics and Astronautics, 2005).

Proceedings of the 48th Colloquium on the Law of Outer Space, International Institute of Space Law of the International Astronautical Federation, Fukuoka, Japan, October 17-21, 2005, (New York: American Institute of Aeronautics and Astronautics, 2006).

Proceedings of the 49th Colloquium on the Law of Outer Space, International Institute of Space Law of the International Astronautical Federation, Valencia, Spain, October 2-6, 2006, (New York: American Institute of Aeronautics and Astronautics, 2007).

Proceedings of the 50th Colloquium on the Law of Outer Space, International Institute of Space Law of the International Astronautical Federation, Hyderabad, India, September 24-28, 2007, (Washington D.C.: American Institute of Aeronautics and Astronautics, 2008).

Proceedings of The Space Law Conference 2006: Asian Cooperation in Space Activities, A Common Approach to Legal Matters' in Bangkok, Thailand, 2-3 August 2006, (Montreal: Institute and Centre for Research of Air and Space Law, McGill University, 2007).

Proceedings of United Nations/International Institute of Air and Space Law Workshop: Capacity Building in Space Law,' in The Hague, Netherlands, 18-21 Nov. 2002, (New York: United Nations, 2003).

Proceedings of United Nations/Nigeria Workshop on Space Law, in Abuja, Nigeria, 21-24 November 2005 (Vienna: United Nations, 2006).

Rau and Kumar, *General Principles of the Malaysian Legal System,* (Shah Alam: International Law Book Services, 2006).

Riesenfeld, S.A., F.M. Abbott, eds. *Parliamentary Participation in the Making and Operation of Treaties: A Comparative Study*, (Dordrecht: Martinus Nijhoff Publishers, 1994).

Ringkasan Eksekutif, Model Ekonomi Baru Untuk Malaysia, Bahagian I: Hala Tuju Dasar Strategik, (Kuala Lumpur: Majlis Penasihat Ekonomi Negara, 2011), http://www.kpkk.gov.my/pdf/artikel/model_ekonomi_baru,pdf, accessed 22 April 2013.

Ross, John A., *Howard W. Sams Guide to Satellite TV Technology,* (Indianapolis: Prompt, 1999).

Sadeh, Eligar, ed., *Space Politics and Policy: An Evolutionary Perspective,* (Dordrecht: Kluwer Academic Publishers, 2002).

Safinaz Mohd Hussein, *Undang-Undang Komunikasi & Multimedia,* (Petaling Jaya: Prentice Hall, 2002).

Schwartz, Mortimer D., ed., *Proceedings of the 19th Colloquium on the Law of Outer Space,* International Institute of Space Law of the International Astronautical Federation, Anaheim, California, U.S.A., October 12-15, 1976 (New York: American Institute of Aeronautics and Astronautics, 1976).

Shaw, Malcolm N., *International Law,* (United Kingdom: Cambridge University Press, 2004).

Space Safety magazines (Issue 1, Fall Edition, 2011).

Tenth Malaysia Plan 2011-2015 (Putrajaya: The Economic Planning Unit, Prime Minister's Department, 2010), http://www.pmo.gov.my/dokumenattached/RMK/RMK10_Eds.pdf, accessed: 22 April 2013.

Thailand Concept Paper, The 47th Session of the United Nations Committee on the Peaceful Uses of Outer Space, June 2-11, 2004, Vienna, Austria.

The Columbia Encyclopedia, Sixth Edition, 2001-2007, http://www.bartley.com/65/ea/EastIndB.html, accessed: 20 January 2012.

The Satellite Encyclopedia, http://www.tbs-satellite.com/tse/online/sat_tiungsat_1.html, accessed: 16 June 2010.

Traa-Engelman, H.L. van, *Commercial Utilization of Outer Space: Law and Practice,* (Dordrecht: Martinus Nijhoff, 1993).

Trindade, F.A. and H.P. Lee, eds., *The Constitution of Malaysia: Further Perspectives and Developments,* (Singapore: Oxfords University Press, 1986).

Tronchetti, Fabio, *The Exploitation of Natural Resources of the Moon and Other Celestial Bodies: A Proposal for a Legal Regime,* Doctoral Thesis, (Leiden: University of Leiden Faculty of Law, Institute of Air and Space Law, 2008).

Tun Mohamed Suffian, *An Introduction to the Legal System of Malaysia,* 2nd ed., (Petaling Jaya: Penerbit Fajar Bakti Sdn Bhd, 1989).

United Nations for Outer Space Affairs, *International Agreements, and Other Available Legal Documents Relevant to Space-related Activities: A List of International Agreements and Other Available Legal Documents Relevant to Space-Related Activities,* (New York: United Nations, 1999).

United Nations Office at Vienna for Outer Space Affairs, *Space Solutions for the World's Problems: How the United Nations Family is Using Space Technology for Sustainable Development*, (Vienna: United Nations).

United Nations Online Index of Objects Launched into Outer Space, http://www.oosa.unvienna.org/oosa/search.do, accessed: 12 March 2013.

United Nations, *United Nations Treaties and Principles on Outer Space and Related General Assembly Resolutions: Status of International Agreements Relating to Activities in Outer Space as at 1 January 2010*, Addendum, Ref.: Sales No. E.08.1.10, ST/SPACE/11/Rev.2/Add.3, (Vienna: United Nations, 2009).

United Nations, *United Nations Treaties and Principles on Outer Space: Text of Treaties and Principles Governing the Activities of States in the Exploration and Use of Outer Space, Adopted by the United Nations General Assembly,* (New York: United Nations, 2002).

US Federal Aviation Administration, *Safety Approval: Guide for Applicants, Version 1.1, (July 20, 2012)*, (Washington D.C., 2012), http://www.faa.gov/about/office_org/headquarters_offices/ast/licenses_permits/safety_approvals/media/Safety_Approval_Guide_1.1.pdf, accessed: 18 February 2013.

Vlasic, Ivan A., ed., *Explorations in Aerospace Law,* (Montreal: McGill University Press, 1968).

Wan Arfah Hamzah and Ramy Bulan, *An Introduction to the Malaysian Legal System,* (Shah Alam: Penerbir Fajar bakti Sdn Bhd, 2004).

Wilson, Andrew, ed., *Galileo The European Programme for Global Navigation Services,* (Noordwijk: European Space Agency, 2005).

Wu Min Aun, *The Malaysian Legal System,* 3rd ed., (Petaling Jaya: Pearson Malaysia Sdn Bhd, 2005).

Yusoff Iskandar and Abd. Rahman Kaeh, *Sejarah Melayu, Satu Perbincangan Kritis dari Pelbagai Bidang,* (Kuala Lumpur: Heinemann, 1978).

4. ARTICLES

Abdul Ghafur Hamid @ Khin Maung Sein, "Judicial Application of International Law in Malaysia: An Analysis", *The Malaysian Bar,* 31 March 2006, http://www.malaysianbar.org.my/international_law/judicial_application_of_international_law_in_malaysia_an_analysis.html, accessed: 14 May 2014.

Abdul Ghafur Hamid @ Khin Maung Sein, "Treaty-Making Power in Federal States with Special Reference to the Malaysian Position", (2003) 30 *Journal of Malaysian and Comparative Law (JMCL)*, 65-88.

Achenbach, Joel, "Space Station is Near Completion, May be the End", *The Washington Post,* 13 July 2009, http://www.washingtonpost.com/wp-dyn/content/article/2009/07/12/AR2009071201977.html, accessed: 25 January 2013.

Ahmad Sabirin Arshad, "Pembabitan Bangsa Melayu Dalam Bidang Angkasa Lepas", *Proceeding on Wacana Minda Melayu Conference at Kuala Lumpur, Malaysia, October 7-9, 2003,* at 1-15.

Ahmad Sabirin Arshad, "Satellite Technology Potentials in Malaysia", *International Conference on Information Technology*, Kuala Lumpur, September 8-10, 1999, Vol.1, Paper 4.

Ahmad Sabirin Arshad, "TiungSAT-1 Technology Transfer Programme", *TiungSAT-1, From Inception to Inauguration,* Eds., Mazlan Othman and Ahmad Sabirin Arshad, (Kuala Lumpur: Astronautic Technology (M) Sdn Bhd, 2001), at 8.

Ahmad Shamsul Abdul Aziz, "Undang-Undang Media", *Undang-Undang Multimedia,* Siri Perkembangan Undang-Undang Di Malaysia, Eds., Ahmad Shamsul, Khadijah Mohamed and Mazita Mohamed, (Kuala Lumpur: Dewan Bahasa dan Pustaka, 2007), at 72-73.

Arellano, Vanessa, "Why GPS Navigators are Necessary for Todays Taxis", http://www.streetdirectory.com/travel_guide/52315/car_parts/why_gps_navigators_are_necessary_for_todays_taxis.html, accessed: 29 June 2012.

Astronautic Technology (M) Sdn. Bhd. and Surrey Satellite Technology Limited, "TiungSAT-1 Microsatellite Mission Design", *TiungSAT-1, From Inception to Inauguration,* Eds., Mazlan Othman and Ahmad Sabirin Arshad, (Kuala Lumpur: Astronautic Technology (M) Sdn Bhd, 2001), at 29.

Ballard, Tony, "National Space Laws: United Kingdom Outer Space Act", *Proceedings of the United Nations/International Institute of Air and Space Law Workshop on Capacity Building in Space Law, The Hague, Netherlands, 18-21 November 2002, ST/SPACE/14,* (New York: United Nations, 2003), at 206.

Bordunov, V.D., "Problem of Interaction between International Outer Space and Domestic Law", (1985) 27 *IISL Colloquium on Law of Outer Space* 23.

Brisibe, T.C. and M.E. Davies, "The Regulation of Commercial Space Launches: The Differences between the National Systems", (2002) 44 *IISL Colloquium on the Law of Outer Space* 46.

Chang, Kenneth, "Obama Calls for End to NASA's Moon Program", *The New Yorks Times,* 1 February 2010, http://www.nytimes.com/2010/02/02/science/02nasa.html?_r=0, accessed: 13 May 2014.

Charoenvimolkul, Kobchai, "Thailand's Communication Satellites, Current Status and Guideline for Space Affairs Development", Space Affairs Bureau, Ministry of Information and Communication Technology Thailand, http://www.aprsaf.org/data/aprsaf15_data/csawg/CSAWG_5f.pdf, accessed: 11 March 2013.

Che Moin Umar, "Policy and Mechanism on National Disaster and Relief Management", National Security Council, Putra Jaya, http://spm.um.edu.my/news/disaster_management_23072008/talk02.pdf, accessed: 14 May 2014.

Chitasombat, Nipant, "National Space Programme, Policies and Legislation in Thailand", *2004 Space Law Conference Paper Assemble,* (Beijing: China Institute of Space Law, 2004), at 96-97.

Close, Roger, "Outer Space Act 1986: Scope and Implementation", *Proceedings of the Project 2001 – Workshop on National Space Legislation, 'Need and Prospects for National Space Legislation', at Munich, Germany, 5-6 Dec. 2000,* Ed. Institute of Air and Space Law, Cologne University and Deutsches Zentrum fur Luft- und Raumfahrt (DLR), (Cologne: Institute of Air and Space Law & Chair of International Business Law of the University of Cologne, 2001), at 141-147.

Cooper, John Cobb, "The Russian Satellite - Legal and Political Problems", *Explorations in Aerospace Law,* Ed., Vlasic, Ivan A. (Montreal: McGill University Press, 1968), at 280.

Davies, Michael, "Space Legislation: The Australian Experience", *Proceedings of the Project 2001 – Workshop on National Space Legislation, 'Need and Prospects for National Space Legislation', at Munich, Germany, 5-6 Dec. 2000.* Ed. Institute of Air and Space Law, Cologne University and Deutsches Zentrum für Luft- und Raumfahrt (DLR), (Cologne: Institute of Air and Space Law & Chair of International Business Law of the University of Cologne, 2001), at 165.

Dempsey, Paul Stephen, "Overview of the United States Space Policy and Law", in *National Regulation of Space Activities,* ed., Jakhu, Ram S., (Dordrecht: Springer, 2010), at 389.

Dempsey, Paul Stephen, "United States Space Law: Commercial Space Launches and Facilities", (2007) *49 IISL Colloquium on the Law of Outer Space* 76.

Doyle, Stephen E., "Concepts of Space Law before Sputnik", (1998) 40 *IISL Colloquium on the Law of Outer Space* 3.

Dunk, Frans von der, "Fundamental Provisions for National Space Laws", *Proceedings of United Nations/Nigeria Workshop on Space Law, in Abuja, Nigeria, 21-24 November 2005* (Vienna: United Nations, 2006), at 261.

Dunk, Frans von der, "Future Developments Relating to Outer Space Treaties", (1998) 40 *IISL Colloquium on the Law of Outer Space* 449.

Dunk, Frans von der, "Heeding the Public-Private Paradigm: Overview of National Space Legislation around the World", *2004 Space Law Conference Paper Assemble,* (Beijing: China Institute of Space Law, 2004), at 25.

Dunk, Frans von der, "Launching From 'Down Under: The New Australian Space Activities Act of 1998", (2001) *43 IISL Colloquium on the Law of Outer Space* 136.

Dunk, Frans von der, "The Sky is the Limit – But Where Does it End", (2006) 48 *IISL Colloquium on Law of Outer Space* 92.

Edward R. F., Jr, "1979 United Nations Moon Treaty Encourages Lunar Minning & Space Development", (1979) *22 IISL Colloquium on the Law of Outer Space* 123.

Emad Hamdy Abdelghaffar Nasr, et al., "Spherical Meal Container Food and Beverage Management System for Space Hotel Spherical Meal Container", 4th IAASS

Conference, Huntsville, USA, 19-21 May 2010, http://www.congrex.nl/10a06/, accessed: 11 April 2012.

Fitzmaurice, Malgosia, "The Practical Working of the Law of Treaties", *International Law,* Ed., Evans, Malcolm D., (New York: Oxford University Press Inc., 2003), at 173.

Freeland, Steven, "Australian National Space Legislation and Policy", *2004 Space Law Conference Paper Assemble,* (Beijing: China Institute of Space Law, 2004), at 104.

Freeland, Steven, "The Australian Regulatory Regime for Space Launch Activities: Out to Launch?", (2005), 47 *IISL Colloquium on the Law of Outer Space* 57.

G. Reintanz, "Vladimir Mandl-the Father of Space Law" (1968), 11 *IISL Colloquium on the Law of Outer Space* 362-365.

Gal, Gyula, "Observations on the Rescue Agreement", in *Maintaining Outer Space for Peaceful Uses, Proceedings of a Symposium Held in The Haque, March 1984,* Ed. Jasentuliyana, Nandasiri, (Japan: The United Nations University, 1984), at 93.

Galloway, Eilene, "Creating Space Law", in *Space Law: Development and Scope,* Ed., Jasentuliyana, Nandasiri, (London: Praeger, 1992), at 248.

Galloway, Jonathan F., "U.S. Space Law: An Overview VIS-A-VIS Commercialization", *2004 Space Law Conference Paper Assemble,* (Beijing: China Institute of Space Law, 2004), at 39-41.

Gerhard, Michael and Kai-Uwe Schrogl, "A Common Shape for National Space Legislation in Europe Summary of Findings and Conclusions of the Project 2001 Plus Workshop", (2005) 47 *IISL Colloquium on Law of Outer Space*, at 82.

Gerhard, Michael and Kai-Uwe Schrogl, "Report of the Working Group on National Space Legislation", *Project 2001, Legal Framework for the Commercial Use of Outer Space, International Colloquium, at Cologne, 29-31 May 2001.* Ed. Institute of Air and Space Law, Cologne University and Deutsches Zentrum fur Luft-und Raumfahrt (DLR), (2001), at 7.

Gerhard, Michael and Kristina Moll, "Perspectives for More National Space Legislation: Introduction by Rapporteurs", in *'Project 2001 Plus' – Global and European Challenges for Air and Space Law at the Edge of the 21st Century',* Proceedings of an International Symposium Cologne, 8-10 June 2005, to conclude 'Project 2001 Plus', Schriften zum Luft- und Weltraumrecht/Studies in Air and Space Law, Band 20 / Volume 20, Eds. Hobe, Stephan, Bernhard Schmidt-Tedd and Kai-Uwe Schrogl, (Koln: Heymanns, 2006), at 22.

Gerhard, Michael, "National Space Legislation-Perspectives for Regulating Private Space Activities", *Space Law: Currents Problems and Perspective for Future Regulation,* Eds., Benkö, Marietta and Kai-Uwe Schrogl, (Utrecht: Eleven International Publishing, 2005), at 84-87.

Goddard, Tom, "What is Precision Farming?", *Proceedings of Precision Farming Conference, January 20-12, 1997, Taber, Alberta, Canada,* http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/sag1951, accessed: 14 March 2014.

Goh, Gérardine Meishan, "Ethir: Singapore as a Delta for Space Law in the Asia-Pacific", (2005) 47 *IISL Colloquium on the Law of Outer Space* 71.

Goldman, Nathan C., "Space Law", *Space Politics and Policy: An Evolutionary Perspective,* Ed., Sadeh, Eligar, (Dordrecht: Kluwer Academic Publishers, 2002), at 164-172.

Gorove, S., "The Growth of Domestic Space Law: A U.S. Example", (1990) 18 (No.2) *Journal of Space Law* 99, at 99.

Haanappel, P.P.C., "Nuclear Power Sources in Outer Space", (1985) 27 *IISL Colloquium on the Law of Outer Space* 215.

Halvorson, Todd, and Bart Jansen, "President Obama to Propose Abandoning NASA's Moon Plan", *SPACE.COM,* 28 January 2010, http://www.space.com/7834-president-obama-propose-abandoning-nasa-moon-plan.html, accessed: 13 May 2014.

He, Qizhi, "The Outer Space Treaty in Perspective", (1998) 40 *IISL Colloquium on the Law of Outer Space* 51.

Hilton, Barron, "Hotels in Space", *Space Future*, http://www.spacefuture.com/archive/hotels_in _space.shtml, accessed: 13 May 2014.

Jantarang, Sujate, "THAI-PAHT the Small Satellite for Education", *Cooperation in Space, Euro-Asian Space Week: Where East and West Finally Meet, 23-27 November 1998, Singapore,* http://adsabs.harvard.edu/full/1999ESASP.430..449J, accessed: 12 March 2013.

Jasentuliyana, Nandasiri, "Article 1 of the Outer Space Treaty Revisited", (1989) 17 (No.2) *Journal of Space Law* 129.

Jasentuliyana, Nandasiri, "Ensuring Equal Access to the Benefits of Space Technologies for All Countries", (1994) 10 (No.1) *Space Policy,* at 7.

Jayaraman, K.S., "Indian Space Budget Boost Supports Existing Programs", *Space News*, 1 March 2011, http://www.spacenews.com/civil/110301-indian-space-budget-boost.html, accessed: 28 February 2013.

Kantaatmadja, Mieke Komar, "Development of Broadcasting Laws Related to Satellite Television in the ASEAN Countries", (1997) 39 *IISL Colloquium on the Law of Outer Space* 194.

Kaul, Ranjana, and Ram S. Jakhu, "Regulation of Space Activities in India", in *National Regulation of Space Activities,* ed., Jakhu, Ram S., (Dordrecht: Springer, 2010), at 164.

Kelly, Martin "Overview of United States Government and Politics: Foundation and Principles", available at http://americanhistory.about.com/od/governmentandpolitics/a/amgovoverview.htm, accessed: 23 January 2013.

Kerrest, Armel, "The Need to Implement the Outer Space Treaty through National Law in the Light of the Current and Foreseeable Space Activity", *IISL/ECSL Symposium on "National Space Legislation –Crafting Legal Engines for the Growth of Space Activities", 22 March 2010, Legal Subcommittee Forty-Ninth Session 2010,* http://www.unoosa.org/oosa/en/COPUOS/Legal/2010/symposium.html, accessed: 22 April 2013.

Kolosov, Y, "Background and History of the Outer Space Treaties", (1998) 40 *IISL Colloquium on the Law of Outer Space* 437.

Kopal, Vladimir, "Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, New York, 19 December 1966", *Audiovisual Library of International Law*, http://untreaty.un.org/cod/avl/ha/tos/tos.html, accessed: 13 November 2012.

Kupperman, Helen S., George E. Reese and David J. Thacher, "Maintaining Outer Space For Peaceful Purposes Through International Cooperation", (1988) 30 *IISL Colloquium on the Law of Outer Space* 53.

Lachs, M., "The International Law of Outer Space", (1964-III) 113 *Recueil des Cours,* at 33.

Larsen, Paul B. "Commercial Space Launches", *Proceedings of The Space Law Conference 2006: Asian Cooperation in Space Activities, A Common Approach to Legal Matters' in Bangkok, Thailand, 2-3 August 2006,* (Montreal: Institute and Centre for Research of Air and Space Law, McGill University, 2007).

Laupa Junus, "ATSB Peneraju Teknologi Satelit", Estidotmy, Januari 2007, http://www.akademisains.gov.my/download/estidotmy/2007/JAN%202007/estipg04.pdf, accessed: 14 May 2014.

Lee, Casey, "The Institutional and Policy Framework for Regulation and Competition in Malaysia", *Regulation, Competition and Development: Setting A New Agenda, CRC*

International Workshop, (Manchester, 4-6 September 2002), http://www.cassey.com/fea2002-7.pdf, 20 November 2011.

Lee, Ricky J. and Felicity K. Eylward "Article II of the Outer Space Treaty and Human Presence on Celestial Bodies: Prohibition of State Sovereignty, Exclusive Property Rights, or Both?" (2006) 48 *IISL Colloquium on the Law of Outer Space* 222.

Lee, Ricky J., "The Australian Space Activities Act: Creating a Regulatory Regime for Space Activities", (2000) XXV (No.2) *AIR & Space Law* 57.

Lee, Ricky J., "The Liability Convention and Private Space Launch Service – Domestic Regulatory Responses", (2006) XXXI *Annals of Air and Space Law,* at 371.

Leeds, Joe, "Introduction to the Legal System and Research of the Kingdom of Thailand", *GlobaLex, Hauser Global Law School Program,* http://www.nyulawglobal.org/globalex/Thailand.htm, accessed: 8 March 2013.

Leeke, Matthew, Chris Sear, and others, "An Introduction to Devolution in the UK", *Research Paper 03/84*, 17 November 2003, House of Commons Library, http://www.parliament.uk/documents/commons/lib/research/rp2003/rp03-084.pdf, accessed: 21 January 2013.

Lochan, Rajeev, "Indian Space Programme and Its Policy Dimension", *Proceedings of United Nations/International Institute of Air and Space Law Workshop, 'Capacity Building in Space Law,' in The Haque, Netherlands, 18-21 Nov. 2002,* (New York: United Nations, 2003), 240.

Lord Templeman, "Treaty Making and the British Parliament", *Parliamentary Participation in the Making and Operation of Treaties: A Comparative Study,* Eds., S.A. Riesenfeld, F.M.Abbott, (Dordrecht: Martinus Nijhoff Publishers, 1994), at 159.

Lyall, Francis, "The International Telecommunication Union and Development", (1994) 22 *Journal of Space Law* 23.

Lyall, Francis, "UK Space Law", (1992) 35 *IISL Colloquium on the Law of Outer Space* 386.

Madeleine Russell, "UK Space Sector Trajectory Rises through the Economic Storm", *UK Space Agency,* 12 July 2012, http://www.bis.gov.uk/ukspaceagency/news-and-events/2012/Jul/uk-space-sector-trajectory-rises-through-the-economic-storm, accessed: 2 January 2013.

Malaysia National Space Agency (ANGKASA), "CanSAT- Malaysian Plan", http://www.angkasa.gov.my/siswasat/document/ICW-16)MSA.pdf, accessed: 7 July 2012.

Martin Sweeting, Wei Sun and Mazlan Othman, "TiungSAT-1: Malaysia's Microsatellite Programme", *TiungSAT-1, From Inception to Inauguration,* Eds., Mazlan Othman and Ahmad Sabirin Arshad, (Kuala Lumpur: Astronautic Technology (M) Sdn Bhd, 2001), at 13.

Matte, Nicolas Mateesco, "Space Law", *Encyclopedia of Public International Law: Law of the Sea, Air and Space Law,* Published under the Auspices of the Max Planck Institute For Comparative Public Law and International Law Under the Direction of Rudolf Bernhardt, (Amsterdam: North-Holland, 1989), at 304.

Mazlan Othman and Ahmad Sabirin Arshad, "Role of Small Satellites for Developing Countries", *TiungSAT-1, From Inception to Inauguration,* Eds., Mazlan Othman and Ahmad Sabirin Arshad, (Kuala Lumpur: Astronautic Technology (M) Sdn Bhd, 2001), at 203.

Mazlan Othman, "Next Steps along Malaysia's Trajectory to Space", *TiungSAT-1, From Inception to Inauguration,* Eds., Mazlan Othman and Ahmad Sabirin Arshad, (Kuala Lumpur: Astronautic Technology (M) Sdn Bhd, 2001), at 225.

Mazlan Othman, "The Small Satellite Business: Contributions to and From Developing Countries", *TiungSAT-1, From Inception to Inauguration,* Eds., Mazlan Othman and Ahmad Sabirin Arshad, (Kuala Lumpur: Astronautic Technology (M) Sdn Bhd, 2001), at 217.

Mektrakarn, Wichian, "THAICOM SYSTEM Thailand's First Communications Satellites", *Conference on the South East Asia Regional Computer Confederation, in Kuala Lumpur, 11-14 August 1992* (Kuala Lumpur: Gabungan Komputer Nasional Malaysia, 1992), 5.01.

Michael Sun, "Geography Information System: Think Geo-Spatial!", http://www.atsb.my/index.php/media/razaksatlsupgrlsupg-in-the-media.html, accessed: 11 June 2011.

Mohamed Haikal Isa, "Malaysia's First Micro-Satellite, TiungSAT-1 Launched", http://www.zdnetasia.com/news/hardware/0,39042972,13029638,00.htm, accessed: 15 June 2011.

Mohamed Salleh Abbas, "The Traditional Elements of the Malaysian Constitution", in *The Constitution of Malaysia: Further Perspectives and Developments,* F.A. Trindade and H.P. Lee, eds., (Singapore: Oxfords University Press, 1986), at 1-17.

Mohd Ibrahim Seeni, Mazlan Hashim and Samsudin Ahmad, "Space Education in Malaysian Universities", *Joint Malaysia-China Seminar on Space for Sustainable Development, Kuala Lumpur, Malaysia, September 2-4, 2004*, at 2.

Mohd Roshdi Hassan, "Membina Pesawat Angkasa Suborbital Sendiri", *Utusan Online,* 3 April 2008, http://www.utusan.com.my/utusan/info.asp?y=2007&dt=1009&pub=Utusan_Malaysia &sec=Rencana&pg=re_07.htm, accessed: 14 May 2014.

Mosteshar, Sa'id, "Regulation of Space Activities in the United Kingdom", in *National Regulation of Space Activities,* ed., Jakhu, Ram S., (Dordrecht: Springer, 2010), at 357.

Mustafa Din Subari and M. Saupi Che Awang, "GNSS Radiobeacon Service Availability Study: The SISPELSAT", 3rd FIG Regional Conference, Jakarta, Indonesia, October 3-7, 2004, http://www.fig.net/pub/jakarta/papers/ts_15/ts_15_3_subari_chewang.pdf, accessed: 14 May 2014.

Negi, Chitranjali, "Broadcast Law in India: Indian Laws about Broadcasting Industry", *Santaniello and Partners, International Law Firm,* 23 March 2012, http://www.legalsl.com/en/broadcast-law-in-india.htm, accessed: 1 November 2013.

Norhan Mat Yusoff and Norhizam Hamzah, "The Role of RazakSAT in Remote Sensing", *The Geospatial Resource Portal,* http://www.gisdevelopment.net/magazine/malaysia/2006/apr-jun/26_1.htm, accessed: 7 May 2012.

Norhan Mat Yusoff, "RazakSAT-Technology Advent in High Resolution Imaging System for Small Satellite", http://www.a-a-r-s.org/acrs/proceeding/ACRS2005/Papers/ANS-5.pdf, accessed: 5 Julai 2012; http://www.researchgate.net/publication/228978232_RazakSATTechnology_Advent_in _High_Resolution_Imaging_System_for_Small_Satellite, accessed: 14 May 2014.

Norhizam Hamzah and Mohd Fadhil Sayuti, "TiungSAT-1 Pre-Launch Activities", *TiungSAT-1, From Inception to Inauguration,* Eds., Mazlan Othman and Ahmad Sabirin Arshad, (Kuala Lumpur: Astronautic Technology (M) Sdn Bhd, 2001), at 93.

Norhizam Hamzah, Ahmad Sabirin Arshad and Mohammad Ridwan Hidayat, "TiungSAT-1 Earth Imaging System", *TiungSAT-1, From Inception to Inauguration,* Eds., Mazlan Othman and Ahmad Sabirin Arshad, (Kuala Lumpur: Astronautic Technology (M) Sdn Bhd, 2001), at 47.

Norul Ridzuan Zakaria, "New Space Facility in Muslims Heavyweight Country: Malaysia Spaceport Project", *Onislam,* 24 May 2012, http://www.onislam.net/english/health-and-science/science/457187-spaceport-malaysia-project.html, accessed: 14 May 2014.

Norul Ridzuan Zakaria, *et al*., "Human Factors Engineering In Designing the Passengers' Cockpit of the Malaysian Commercial Suborbital Space Plane", 4th International Association for the Advancement of Space Safety Conference, Huntsville, USA, 19-21 May 2010, http://www.re-entry.com.my/pdf/PAPERHUNTSVILL%202010.pdf, accessed: 14 May 2014.

Norul Ridzuan Zakaria, *et al*., "The Advantages, Potentials and Safety of VTOL Suborbital Space Tourism Operations", 5th IAASS Conference, Paris, France, 17-19 October 2011, http://eprints.usm.my/25130/1/Paris.The_Advantages,_Potentials_and_Safety_of_VTOL_Suborbital_Space_Tourism_Operations.pdf, accessed: 13 May 2014.

Norul Ridzuan Zakaria, *et al.*, "The Symbiotic Relationship between Astronaut Program and Space Tourism Development – A Third World Perspective", 2nd IAASS Conference, Chicago, 14 May 2007, *Space Future,* http://www.spacefuture.com/archive/the_symbiotic_relationship_between_astronaut_program_and_space_tourism_development_a_third_world_perspective.shtml, accessed: 13 May 2014.

Petri Liukkonen, "Jules Gabriel Verne (1828-1905)", http://www.kirjasto.sci.fi/verne.htm, accessed: 30 October 2012.

Pg.Hj.Tahir, Pg.Kasmirhan, "Brunei Legal Regime on ICT: Are Our Law Conducive Enough?", http://www.bruneiresources.com/pdf/nasis_s2_6.pdf, accessed: 18 March 2013.

Pracha, Mehmood, "Studies on National Space Laws and Policies in Asia Pacific Region", (2008) 50 *IISL Colloquium on the Law of Outer Space* 24.

Reddy, V. Balakista, "Commercialization and Privatization of Space Industry in India: Legal Issues and Challenges", (2008) 50 *IISL Colloquium on the Law of Outer Space* 545.

Reddy, V. Balakista,"Space Law and Space Policy in India", *Recent Trends in International Space Law and Policy,* Eds., Mani, V.S., S. Bhatt and V. Balakista Reddy, (New Delhi: Lancers Books, 1997), at 118.

Reijnen, G.C.M., "The History of the Draft Treaty on the Moon", (1976) 19 *IISL Colloquium on the Law of Outer Space*, 357.

Rivkin, David and Diana McCaffrey, "U.S. No Longer A Space-Faring Nation", *The Hill's Global Affairs Blog,* 22 February 2010, http://thehill.com/opinion/op-ed/82727-us-no-longer-a-space-faring-nation, accessed: 14 May 2014.

Rivoire, Jean, "How to Introduce the Law into the Space", (1960) 2 *IISL Colloquium on the Law of Outer Space* 9.

Roy S. K. Lee, "Assistance to and Return of Astronauts and Space Objects", *Manual on Space Law*, *Vol.1,* Eds., Jasentuliyana, Nandasiri and Roy S.K. Lee, (Alphen aan den Rijn: Sijhoff & Noordhoff, 1979), at 55.

Safinaz Mohd Hussein, "Service Provider Licensing System in the Malaysian Communications and Multimedia Industry", (2004) 3 *Journal of Information, Law and Technology (JILT),* http://www2.warwick.ac.uk/fac/soc/law2/elj/jilt/2004_3/hussein/, accessed: 15 May 2014.

Sagar, D., "The Privatisation of INMARSAT: Special Problems", *International Organisations and Space Law, Proceedings of the Third ECSL, Colloquium, Perugia, Italy, 6-7 May 1999,* Ed., Harris, R.A., (ESA/ESTEC, 1999), at 127, http://articles.adsabs.harvard.edu//full/1999ESASP.442..127S/0000127.000.html, accessed: 30 November 2012.

Sagar, D., "The Privatisation of Inmarsat", *Proceedings 41st Colloquium* (Melbourne, 1998), at 205-223.

Siemon, Noel, and Steven Freeland, "Regulation of Space Activities in Australia", in *National Regulation of Space Activities,* ed., Jakhu, Ram S., (Dordrecht: Springer, 2010), at 38.

Siti Atikah Mohamed Hashim, "National Disaster and Remote Sensing in Malaysia", 2nd JPTM Meeting, Bangkok, Thailand, http://www.aprsaf.org/data/jptm2_pdf/JPTM200606_12.pdf, accessed: 14 May 2014.

Thirlway, Hugh, "The Sources of International Law", *International Law,* Ed., Evans, Malcolm D., (New York: Oxford University Press Inc., 2003), at 117-120.

Tremayne-Smith, Richard J, "The Outer Space Act 1986: UK Experience", *Berlin Workshop, January 2004, Project 2001+*, http://www.docstoc.com/docs/34413827/OUTER-SPACE-ACT-1986, accessed: 5 January 2013.

Twitchell, Karen, "Monitoring Rice Crops from Space", (09.01.1998), *The International Development Research Centre,* http://www.idrc.ca/en/ev-5530-201-1-DO_TOPIC.html, accessed: 28 December 2009; http://idl-bnc.idrc.ca/dspace/handle/10625/22471, accessed: 14 May 2014.

UK Space Agency, "The UK Space Sector", http://www.bis.gov.uk/assets/ukspaceagency/docs/uk-space-sector-technologies-and-capabilities.pdf, accessed: 3 January 2013.

V. Kopal, "Vladimir Mandl-Founder of Space Law" (1968) 11 *IISL Colloquium on the Law of Outer Space* 357-361.

Vargo, Frank, "U.S. Manufacturing Remains World's Largest", 14 March 2011, http://shopfloor.org/2011/03/u-s-manufacturing-remains-worlds-largest/18756, accessed: 23 January 2013.

Vereshchetin, V.S. and Danilenko, Gennady M., "Custom as a Source of International Law of Outer Space", (1985) 13 *Journal of Space Law* 23.

Vorwig, Petra A., "Regulation of Private Launch Services in the United States", in *National Regulation of Space Activities,* ed., Jakhu, Ram S., (Dordrecht: Springer, 2010), at 413.

Williamson, Mark, "The UK Parliamentary Space Committee: The Emergence of A Space Lobby?", (May, 1992) 8 *Space Policy* 159.

Zhao, Yun, "National Space Legislation, with Reference to China Practice", *Proceedings of the Space Law Conference 2006, Asian Cooperation in Space Activities: A Common Approach to Legal Matter,' at Bangkok, Thailand, 2-3 August 2006,* (Montreal: Centre for Research of Air and Space Law, McGill University, 2007).

5. NEWS

"China GPS Rival Beidou Starts Offering Navigation Data", *BBC News Technology,* 27 December 2011, http://www.bbc.co.uk/news/technology-16337648, accessed: 13 May 2014.

"China's Beidou GPS-Substitute Opens to Public in Asia", BBC News, 27 December 2012, accessed: 13 May 2014.

"Cosmos-2479- New Geostationary Early Warning Satellite", *Russian Strategic Nuclear Forces,* 30 March 2012, http://russianforces.org/blog/2012/03/cosmos-2479_-_the_last_geostat.shtml, accessed: 13 May 2014.

"Dana Besar Majukan Satelit Jimat Kos Sewa" *Berita Harian,* 24 April 2009.

"First Global Xpress Satellite Successfully completes In-Orbit Testing", *Inmarsat Press Releases,* http://www.inmarsat.com/press-release/first-global-xpress-satellite-successfully-completes-orbit-testing/, accessed: 13 May 2014.

"Genesis II Successfully Launched", *BigelowAerospace.com,* 28 June 2007, http://web.archive.org/web/20080206080325/http://www.bigelowaerospace.com/news/?Genesis_II_Launched, and http://www.space.com/news/businessmonday_040524.html, accessed: 13 May 2014.

"Government Unveils New Remote Sensing Data Policy", 5 July 2011, http://www.dnaindia.com/india/report_government-unveils-new-remote-sensing-data-policy_1562713, accessed: 6 March 2013.

"India Space Ambitions", Asia *Sentinel*, 08 March 2013 http://www.asiasentinel.com/society/indias-space-ambitions/, accessed: 4 May 2013.

"India Steps up Space Program with Big Budget, Bigger Satellites and a Leap to Mars", *RT.com,* 30 September 2012, http://rt.com/news/india-space-satellite-budget-331/, accessed: 29 February 2013.

"Internet Usage in Asia", *Internet World Stats Usage and Population Statistic,* 30 June 2012, http://www.internetworldstats.com/stats3.htm, accessed: 27 February 2013.

"ISRO Puts on Hold Moon Mission Chandrayaan 2", *India Today,* 15 May 2011, http://www.bharat-rakshak.com/NEWS/newsrf.php?newsid=14750, accessed: 13 May 2014.

"KLIA can be turned into Space Port", *Sunday Star*, 4 July 1999.

"Lima Sekolah Terbaik ke Perancis", *Utusan Malaysia,* 23 May 2011.

"Malaysia Astronaut Set to Launch", *BBC News,* 10 October 2007, http://news.bbc.co.uk/2/hi/asia-pacific/7036933.stm, accessed: 14 May 2014.

"Malaysia Mulls Prayer Guidelines for Muslim Astronauts", *TMCnet*, 25 April 2006, http://pgoh13.com/muslim_astronauts.php, accessed: 14 May 2014.

"Malaysian a Full-Fledged Cosmonaut, Says Ex-Astronaut", *The Star Online,* 11 October 2007, http://thestar.com.my/news/story.asp?file=/2007/10/11/nation/19142225&sec=nation, accessed: 14 May 2014.

"Malaysian Guide for Muslim Astronauts*", IslamOnline.net & Newspapers,* 1 May 2007, http://staging.onislam.net/english/index.php, accessed: 1 October 2012.

"Malaysian Guide for Muslim Astronauts", *Turks.US Daily World EU News,* 2 May 2007, http://www.turks.us/article.php?story=20070502064845245, accessed: 14 May 2014.

"MEASAT-3a enters Commercial Service", *MEASAT breaking News*, 17 July 2009, http://www.measat.com/investor_calendar.html, accessed: 13 May 2014.

"MEASAT-3a Satellite Successfully Launched", *MEASAT breaking News*, 22 June 2009, http://www.measat.com/investor_calendar.html, accessed: 14 May 2014.

"Menangi Penyertaan di Kem Angkasa Eropah: Pertandingan Mereka Bentuk kapal Angkasa Kebangsaan", *Utusan Malaysia,* 3 January 2011.

"Milestone for Australian Satellite as Space Effort Hits Wall", *Space Daily,* 15 December 2004, www.spacedaily.com, accessed: 20 January 2005.

"Mission in Space", *The Star Online,* 11 October 2007, http://thestar.com.my/news/story.asp?file=/2007/10/11/nation/19136025&sec=nation, accessed: 10 July 2012.

"NASA TV Coverage Set for Space Station Crew Exchange", *NASA News Releases,* 24 September 2007, http://www.nasa.gov/home/hqnews/2007/sep/HQ_M07122_Exp_15_and_16_crew_exchange_prt.htm, accessed: 14 May 2014.

"Norm, Guideline, and Procedures for Satellite Communications Announced by ISRO", *Asia.spaceref,* 8 May 2000, http://asia.spaceref.com/news/viewpr.html?pid=1762, accessed: 3 March 2013.

"Overview of Indian Space Sector 2010", http://115.113.225.49/webcms/Upload/Antrix-CII-Deloitte%20report%20on%20Indian%20Space%20Sector%202010.25Aug102.pdf, accessed: 23 May 2011.

"Program Angkasawan Negara Kedua Diteruskan", *Utusan Online,* 4 January 2012, http://www.utusan.com.my/utusan/info.asp?y=2012&dt=0104&pub=Utusan_Malaysia&sec=Terkini&pg=bt_19.htm, accessed: 14 May 2014.

"RazakSAT Mampu Kesan Pembakaran Terbuka", *Berita Harian,* 23 March 2006.

"Russia Launches Thai Satellite on Converted Missile", *RIANOVOSTI,* 1 October 2008, http://en.rian.ru/russia/20081001/117363703.html, accessed: 12 March 2013.

"Russia to Take Indian Astronaut on Space Mission In 2013", *Space Travel Exploration and Tourism*, 11 December 2008, http://www.space-travel.com/reports/Russia_To_Take_Indian_Astronaut_On_Space_Mission_In_2013_999.html, accessed: 1 June 2011.

"Satelit 3b Baharu MEASAT dilancarkan 29 Mei", *Utusan Online,* 2 May 2014, http://www.utusan.com.my/utusan/Dalam_Negeri/20140502/dn_42/Satelit-3b-baharu-MEASAT-dilancarkan-29-Mei, accessed: 2 May 2014.

"Senyum Kambing" Column, *Utusan Malaysia,* 24 August 1999.

"Singapore's First Locally Made Satellite Launched into Space", *AsiaOne News,* 20 April 2011, available at http://www.asiaone.com/News/AsiaOne+News/Singapore/Story/A1Story20110420-274651.html, accessed: 15 March 2013.

"Spacecraft: Manned: ISS: Chronology", http://www.russianspaceweb.com/iss_chronology.html, accessed: 13 May 2014.

"Supply of Transponder Capacity on MEASAT-3a To ASTRO", 27.05.2009, *MEASAT breaking News*, http://www.measat.com/investor_calendar.html, accessed: 13 May 2014.

"Thaichote, the First Thai Earth Observation Satellite", http://www.gistda.or.th/gistda_n/en/index.php?option=com_content&view=article&catid=3:newsflash&id=240:thaichote, accessed: 12 March 2013.

"THAICOM Announces the THAICOM 6 Satellite Project", 31 May 2011, http://www.thaicom.net/eng/press.aspx?id=287, and http://www.thaicom.net/SAT_THCOM6.aspx, accessed: 11 March 2013.

"The Role of RazakSAT in Remote Sensing", *The Geospatial Resource Portal,* http://www.gisdevelopment .net/magazine/Malaysia/2006/apr-jun/26_1.html, accessed: 28 December 2009.

"UN Moon Treaty Falling to US Opposition Groups", *National Space Society,* March 1985, http://www.nss.org/settlement/L5news/1982-opposition.htm, accessed: 27 January 2013.

"Virgin Galactic Successfully Completes SpaceShipTwo Glide Flght Test and Rocket Motor Firing on the Same Day", *SpaceRef.Com,* 28 June 2012, http://www.spaceref.com/news/viewpr.html?pid=37626, accessed: 13 May 2013.

A caricature described a proposal to develop Kuala Lumpur International Airport to a spaceport by 2020, *Utusan Malaysia*, 24 August 1999.

Achenbach, Joel, "Space Station is Near Completion, May be the End", *The Washington Post,* 13 July 2009, http://www.washingtonpost.com/wp-dyn/content/article/2009/07/12/AR2009071201977.html, 27 January 2013.

Amos, Jonathan, "Muscular' UK Space Agency Launched", *BBC News,* 23 March 2010, http://news.bbc.co.uk/2/hi/science/nature/8579270.stm, accessed: 1 January 2013.

Amos, Jonathan, “Sir Richard Branson’s Virgin Galactic Spaceship Ignites in Flight”, *BBC,* 23 April 2013, http://www.bbc.com/news/science-environment-22344398, accessed: 13 May 2014.

Amree Ahmad, Norhayati Yahya, “RazakSAT Sensitif Suhu”, *Kosmo Online*, 19 April 2009, http://www.kosmo.com.my/kosmo/content.asp?y=2009&dt=0419&pub=Kosmo&sec=Rencana_Utama&pg=ru_05.htm, accessed: 14 May 2014.

Arellano, Vanessa, “Why GPS Navigators are Necessary for Todays Taxis”, http://www.streetdirectory.com/travel_guide/52315/car_parts/why_gps_navigators_are_necessary_for_todays_taxis.html, accessed: 14 May 2014.

Azmi Hassan, “Faedah Pasang GPS di Batuan Tengah”, *Utusan Online,* 19 June 2008, http://utusan.com.my/utusan/info.asp?y=2008&dt=0619&pub=Utusan_Malaysia&sec=Rencana&pg=re_05.htm, accessed: 2 October 2012.

Azmy Mohamed, “Teruskan Program Angkasawan Negara”, *Utusan Online,* 6 Februari 2012, http://www.utusan.com.my/utusan/info.asp?y=2012&dt=0206&pub=Utusan_Malaysia&sec=Pendidikan&pg=pe_01.htm, accessed: 14 May 2014.

Azriel, Merryl, “Spaceport to be built in Malacca”, *Space Safety Magazine,* 10 May 2012, http://www.spacesafetymagazine.com/2012/05/10/spaceport-malaysia-built-malacca/, accessed: 14 May 2014.

Bagla, Pallava, “NASA praises ISRO, Offers Training for Indian Astronauts”, 14 July 2012, http://www.ndtv.com/article/india/nasa-praises-isro-offers-training-for-indian-astronauts-243319, accessed: 1 March 2013.

Belfiore, Michael, “International Space Dominance: 7 Nations Launching the Next Space Race”, *Popular Mechanics,* 1 October 2009, http://www.popularmechanics.com/science/space/4307281, accessed: 13 May 2014.

Chang, Kenneth, “Obama Calls for End to NASA’s Moon Program”, *The New Yorks Times,* 1 February 2010, http://www.nytimes.com/2010/02/02/science/02nasa.html?_r=0, accessed: 13 May 2014.

Chua, Melissa, “SingTel Aims to Double Satellite Business”, *Telecomasia.net,* 11 May 2011, http://www.telecomasia.net/content/singtel-aims-double-satellite-business, accessed: 15 March 2013.

Clark, Stephen, “Space Station Partners Set 2028 as Certification Goal”, *Spaceflight Now,* 11 March 2010, http://spaceflightnow.com/news/n1003/11station/, accessed: 13 May 2014.

Coppinger, Rob, “PICTURES: Virgin Galactic Unveils Dyna-Soar Style SpaceShipTwo Design and Twin-Fuselage White Knight II Configuration”, *Flightglobal.com,* 23

January 2008, http://www.flightglobal.com/news/articles/pictures-virgin-galactic-unveils-dyna-soar-style-spaceshiptwo-design-and-twin-fuselage-white-knight-221031/, accessed: 13 May 2014.

David, Leonard, "Virgin Galactic's Private Spaceship Makes Safe Landing after Tense Test Fllight", *Space.com,* 17 October 2011, http://www.space.com/13297-virgin-galactic-spaceshiptwo-test-flight-glitch.html, accessed: 13 May 2014.

Halvorson, Todd, and Bart Jansen, "President Obama to Propose Abandoning NASA's Moon Plan", *SPACE.COM,* 28 January 2010, http://www.space.com/7834-president-obama-propose-abandoning-nasa-moon-plan.html, accessed: 23 October 2012.

Jayaraman, K.S., "Indian Space Budget Boost Supports Existing Programs", *Space News*, 1 March 2011, http://www.spacenews.com/civil/110301-indian-space-budget-boost.html, accessed: 28 February 2013.

Keuser, Sigurd De, "Launch of Genesis I Pathfinder Ushers in a New Era of Commercial Space Development", *SpaceFellowship.com,* 15 July 2007, http://spacefellowship.com/news/art1616/launch-of-genesis-i-pathfinder-ushers-in-a-new-era-of-commercial-space-development.html, accessed: 13 May 2014.

Laupa Junus, "ATSB Peneraju Teknologi Satelit", *Estidotmy*, Januari 2007, http://www.akademisains.gov.my/download/estidotmy/2007/JAN%202007/estipg04.pdf, accessed: 14 May 2014.

M. Jegathesan, "Malaysia Unveils Two Final Male Astronaut Candidates", 4 September 2006, *Space Daily Your Portal to Space*, http://www.spacedaily.com/reports/Malaysia_Unveils_Two_Final_Male_Astronaut_Candidates_999.html, accessed: 14 May 2014.

Madeleine Russell, "UK Space Sector Trajectory Rises Through the Economic Storm", *UK Space Agency,* 12 July 2012, http://www.bis.gov.uk/ukspaceagency/news-and-events/2012/Jul/uk-space-sector-trajectory-rises-through-the-economic-storm, accessed: 2 January 2013.

Malaysia National Space Agency (ANGKASA), "CanSAT - Malaysian Plan", http://www.angkasa.gov.my/siswasat/document/ICW-16)MSA.pdf, accessed: 7 July 2012.

Malaysia Space Centre Brochure, "A Passage to Space", http://www.angkasa.gov.my/sites/default/files/artikel/Bahasa%20Melayu/Menu/Mengenai%20Kami/Kampus/Pusat%20Angkasa%20Negara/pusat%2520angkasa%2520cover%2520BI.jpg, accessed: 21 April 2013.

Mayer, Steven, "Space Ship Completes 24th Test Flight in Mojave", *HispanicBusiness.com,* 4 April 2013, http://www.hispanicbusiness.com/2013/4/4/space_ship_completes_24th_test_flight.htm , accessed: 13 May 2014.

Michael Sun, "Geography Information System: Think Geo-Spatial!", http://www.atsb.my/index.php/media/razaksatlsupgrlsupg-in-the-media.html, accessed: 11 June 2011, http://www.malaysiagis.com/index.php/local-gis/news/328-geography-information-system-think-geo-spatial-, accessed: 13 May 2014.

Mohamed Haikal Isa, "Malaysia's First Micro-Satellite, TiungSAT-1 Launched", *Bernama,* 26 September 2000*,* http://www.zdnetasia.com/news/hardware/0,39042972,13029638,00.htm, accessed: 14 May 2014.

Mohd Roshdi Hassan, "Membina Pesawat Angkasa Suborbital Sendiri", *Utusan Online,* 3 April 2008, http://www.utusan.com.my/utusan/info.asp?y=2008&dt=0403&pub=Utusan_Malaysia &sec=Rencana&pg=re_08.htm, accessed: 13 May 2014.

Moskowitz, Clara, Staff Writer, "First Weightless Wedding Planned", *SPACE.COM*, 2 June 2009, http://www.space.com/6786-weightless-wedding-planned.html, accessed: 13 May 2014.

N Laupa Junus, "Melancong ke Angkasa Melalui Malaysia", *Utusan Online,* 31 August 2002, http://www.utusan.com.my/utusan/info.asp?y=2002&dt=0831&pub=utusan_malaysia& sec=rencana&pg=re_06.htm&arc=hive, accessed: 14 May 2014.

Rajeswari Pillai Rajagopalan, "Should India Declare a Space Policy?", *The Diplomat,* 31 August 2013, http://thediplomat.com/2013/08/should-india-declare-a-space-policy/, accessed: 14 May 2014.

Ramesh, Randeep, "India to Launch Its First Astronauts into Space by 2015", 23 February 2009, http://www.guardian.co.uk/world/2009/feb/23/india-space-astronauts, accessed: 1 March 2014.

Ritikos, Jane, "Russian Envoy Confirms That Malaysian Is Not a 'Mere Passenger", *The Star Online,* 4 October 2007, http://thestar.com.my/news/story.asp?file=/2007/10/4/nation/19072942&sec=nation, accessed: 14 May 2014.

Rivkin, David and Diana McCaffrey, "U.S. No Longer A Space-Faring Nation", *The Hill's Global Affairs Blog,* 22 February 2010, http://thehill.com/opinion/op-ed/82727-us-no-longer-a-space-faring-nation, accessed: 17 October 2012.

Sim Leoi Leoi, "Tapping into Space Research", *The Star Online,* 22 September 2007, http://thestar.com.my/news/story.asp?file=/2007/9/22/nation/18514133&sec=nation, accessed: 14 May 2014.

Sim Leoi Leoi, "Tapping into Space Research", *The Star Online,* 22 September 2007, http://thestar.com.my/news/story.asp?file=/2007/9/22/nation/18514133&sec=nation, accessed: 14 May 2014.

Smith, Marcia, "ESA Formally Agrees to Continue ISS Through 2020", *spacepolicyonline*.com, 27 April 2011, http://www.spacepolicyonline.com/news/esa-formally-agrees-to-continue-iss-through-2020, accessed: 13 May 2014.

Surrey Satellite Technology, "Third Satellite Launch this year for SSTL: TiungSAT 1 in Orbit", 27 September 2000, *SpaceRef*, http://www.spaceref.com/news/viewpr.html?pid=2696, accessed: 15 May 2014.

Sutton, Jane and Phil Stewart (eds.), "NASA Wants Proposals for Space Taxis", 10 August 2009, *Reuters*, http://www.reuters.com/article/newsOne/idUSTRE57944520090810, accessed: 13 May 2014.

Tan Cheng Li, "Malaysia's Rainforests Being Insidiously Replaced with Plantations of Clones", *The Malaysian Star,* 7 July 2009.

Tan Cheng Li, "Malaysia's Rainforests Being Insidiously Replaced with Plantations of Clones", mongabay.com, 20 July 2009, http://news.mongabay.com/2009/0719-rubber_malaysia.html, accessed: 14 May 2014.

The Financial Express, "Internet Subcriber Base in India May Reach 150 mn: Report", 5 September 2012, http://www.financialexpress.com/news/internet-subscriber-base-in-india-may-reach-150-mn-report/998389, accessed: 27 February 2013.

Thompson, Andrea, "Edge of Space Found", *Space.com,* 9 April 2009, http://www.space.com/6564-edge-space.html, accessed: 20 April 2013.

Vargo, Frank, "U.S. Manufacturing Remains World's Largest", 14 March 2011, http://shopfloor.org/2011/03/u-s-manufacturing-remains-worlds-largest/18756, accessed: 23 January 2013.

Writers, Staff, "Circus Tycoon Recalls 'Amazing Ride' in Space", *Space Travel,* 13 October 2009, http://www.space-travel.com/reports/Circus_tycoon_recalls_amazing_ride_in_space_999.html, accessed: 13 May 2014.

Writers, Staff, "India Plans Manned Space Mission in 2016", *Space Travel,* 27 January 2010, http://www.space-travel.com/reports/India_plans_manned_space_mission_in_2016_999.html, accessed: 13 May 2014.

Writers, Staff, "Russia Set to Launch Manned Spacecraft In 2017", *Space Travel,* 27 January 2010, http://www.space-travel.com/reports/Russia_Set_To_Launch_Manned_Spacecraft_In_2017_999.html, accessed: 13 May 2014.

Xin Dingding, "China Aiming to have Its Own GPS In Place by 2012", *GPS Daily,* 18 January 2010, http://www.gpsdaily.com/reports/China_Aiming_To_Have_Its_Own_GPS_In_Place_By_2012_999.html, accessed: 13 May 2014.

Zaitsev, Yury, "Nuclear Power in Space", *Space Daily*, 15 August 2007, http://www.spacedaily.com/reports/Nuclear_Power_In_Space_999.html, accessed: 13 May 2014.

6. SLIDE PRESENTATIONS

Charoenvimolkul, Kobchai, "Thailand's Communication Satellites, Current Status and Guideline for Space Affairs Development", Space Affairs Bureau, Ministry of Information and Communication Technology Thailand, http://www.aprsaf.org/data/aprsaf15_data/csawg/CSAWG_5f.pdf, accessed: 11 March 2013.

Moin Umar, "Policy and Mechanism on National Disaster and Relief Management", National Security Council, Putra Jaya, http://spm.um.edu.my/news/disaster_management_23072008/talk02.pdf, accessed: 25 June 2012.

Mustafa Din Subari, "MALAYSIA REPORT TO GEOSS AP SYMPOSIUM: Working Together towards a Secure and Prosperous Society", http://www2.restec.or.jp/geoss/materials/PDF/plenary/11_Malaysia_Subari.pdf, accessed: 7 May 2012.

Mustafa Din Subari, "Malaysia Space Related Activities 2011: Country Report", http://www.aprsaf.org/annual_meetings/aprsaf18/pdf/program/day3/11_Malaysia%20Country%20Report.pdf, accessed: 14 May 2014.

Mustafa Din Subari, "Update on Malaysian GNSS Infrastructure", Third Meeting of the International Committee on Global Navigation Satellite System (ICG), Pasadena, California, United States of America, December 8-12, 2008, http://www.oosa.unvienna.org/pdf/icg/2008/icg3/13.pdf, accessed: 29 June 2012.

N.N. Mahmood, "Report on the Development of Space Technology and Applications in Malaysia", http://aprsaf.nasda.go.jp/members/updated/malaysia/macres/main.html, accessed: 28 March 2003.

Peanvijarnpong, Chanchai, "THEOS: Thailand Earth Observation System", Sharing of Space Technology for Satellite Development, 4th Sentinel-Asia Joint Project Team Meeting, 7 September 2007, Manila, http://www.aprsaf.org/data/jptm4_pdf/Special_Session_Satellite_Development_in_Thailand.pdf, accessed: 12 March 2013.

Pedrazzi, Marco, "Are there Indications for Upper and Lower Limits for Air Space and Outer Space in Air Law, Space Law, and National Legislation?", IISL and ECSL Space Law Symposium 2011 on A New Look on the Delimitation of Airspace and Outer Space, 20 March 2011, 50th Session of the Legal Subcommittee of the UNCOPUOS, http://www.oosa.unvienna.org/pdf/pres/lsc2011/symp02.pdf, accessed: 19 April 2013.

Perek, Lubos, "Is Customary Law a Source of Space Law?", IISL and ECSL Space Law Symposium 2011 on A New Look on the Delimitation of Airspace and Outer Space, 20 March 2011, 50th Session of the Legal Subcommittee of the UNCOPUOS, http://www.oosa.unvienna.org/pdf/pres/lsc2011/symp02.pdf, accessed: 19 April 2013.

Siti Atikah Mohamed Hashim, "National Disaster and Remote Sensing in Malaysia", 2nd JPTM Meeting, Bangkok, Thailand, http://www.aprsaf.org/data/jptm2_pdf/JPTM200606_12.pdf, accessed: 25 June 2012.

Tremayne-Smith, Richard J, "The Outer Space Act 1986: UK Experience", *Berlin Workshop, January 2004, Project 2001+*, http://www.docstoc.com/docs/34413827/OUTER-SPACE-ACT-1986, accessed: 5 January 2013.

7. REPORT, REVIEW, PLAN, GUIDELINE, STATEMENT, SPEECH, SUMMARY, BOOKLET, BROCHURE, AND POSTER

"A Brief History of Malaysian International Space Tourism Initiative (July 1999 – 2011)," Pamphlet, *5th anniversary of Space Tourism Society Malaysia Chapter*, July 2011. Available also at http://www.scribd.com/doc/59298184/A-Brief-History-of-International-Malaysian-Space-Tourism-Initiative-July-1999-2011, accessed: 13 May 2014.

"A Passage to Space", Brochure, Malaysia Space Centre, http://www.angkasa.gov.my/sites/default/files/artikel/Bahasa%20Melayu/Menu/Mengenai%20Kami/Kampus/Pusat%20Angkasa%20Negara/pusat%2520angkasa%2520cover%2520BI.jpg, accessed: 21 April 2013.

"A Review of Current Australian Space Activities: Executive Summary, April 2010, A Report to the Space Policy Unit, Department of Innovation, Industry, Science & Research", *Asia Pacific Aerospace Consultants Pty Ltd*, http://www.space.gov.au/Documents/APAC%20Final%20Report%20-%20Current%20Space%20Activities%20April%202010%20-%20Executive%20Summary.pdf, accessed: 15 January 2013.

"Annual Report 2007", Malaysian Remote Sensing Agency, http://www.remotesensing.gov.my/articlePrint.cfm?id=389, accessed: 14 May 2012.

"Annual Report 2008", MEASAT Global Berhad, http://www.measat.com/investor_bod_annual.html, and http://www.measat.com/corp_profile_history.html, both accessed: 4 April 2012.

"Dasar Sains Teknologi Negara 2", Ministry of Science, Technology and Innovation (MOSTI), http://www.mosti.gov.my/index.php?option=com_content&view=article&id=2032&Itemid=611&lang=en, accessed: 22 April 2013.

"Final Report of the Global Navigation Satellite System (GNSS) Implementation Team (GIT)", *The 13th Meeting of the Asia-Pacific Economic Cooperation (APEC), 27-19 July 2009, Singapore,* http://www.apec-tptwg.org.cn/new/Archives/tpt-wg32/Intermodal/GIT%20Final%20Report.pdf, accessed: 14 May 2014.

"Garis Panduan Pertama Penyediaan Rancangan Malaysia Kesepuluh, 2011-2015: Prospek Ekonomi dan Hala Tuju Strategik", http://www.epu.gov.my/html/themes/epu/html/RMKE10/rmke10_english.html, accessed: 22 April 2013.

"Guidelines for Up-linking from India", http://www.trai.gov.in/uplinkingPolicy.asp, accessed: 1 June 2011.

"Imagine Annual Report 2007", The Astro All Asia Networks Plc.

"Internet Subscriber Base in India May Reach 150 mn: Report", The Financial Express, http://www.financialexpress.com/news/internet-subscriber-base-in-india-may-reach-150-mn-report/998389, accessed: 5 September 2012.

"Making Difference Annual Report 2009", The Astro All Asia Networks Plc., http://www.astroplc.com/09/pdf/AnnualReport2009.pdf, accessed: 26 April 2012.

"Malaysian Guide for Muslim Astronauts", *IslamOnline.net & Newspapers,* 1 May 2007, http://staging.onislam.net/english/index.php, accessed: 1 October 2012.

"MXI 1st Brochure (New & Improved)", Brochure, *Space Tourism Society Malaysia Chapter (STS-MC)*.

"Norm, Guideline, and Procedures for Satellite Communications Announced by ISRO", *Asia.spaceref,* 8 May 2000, http://asia.spaceref.com/news/viewpr.html?pid=1762, accessed: 3 March 2013.

"Outlook of Fish Forecasting in Malaysia Based on Sea-Surface Temperature (SST) and Chlorophyll Concentration (Period: 22-28 December 2009)", http://www.met.gov.my/pdf/agromet/sst_cc.pdf, accessed: 14 May 2012.

"Overview of Indian Space Sector 2010", http://115.113.225.49/webcms/Upload/Antrix-CII-Deloitte%20report%20on%20Indian%20Space%20Sector%202010.25Aug102.pdf, accessed: 23 May 2011.

"Report for Typhoon Committee", Malaysian Meteorological Department, *40th Session, Macao, China, 21-26 November 2007*, http://severe.worldweather.org/tcc/creport.htm, accessed: 21 June 2012.

"Report of the Committee on the Peaceful Uses of Outer Space on the Work of its First Session", UN Doc. A/5109, 1962.

"Ringkasan Eksekutif, Model Ekonomi Baru Untuk Malaysia, Bahagian I: Hala Tuju Dasar Strategik", (Kuala Lumpur: Majlis Penasihat Ekonomi Negara, 2011), http://www.kpkk.gov.my/pdf/artikel/model_ekonomi_baru,pdf, accessed 22 April 2013.

"Seaborne Spaceport", Pamphlet, *Space Tourism Society Malaysia Chapter (STS-MC)*.

"Space Master Plan for Thailand 2004-2014", *Chulalongkorn University*, 28 February 2005, http://lerson.org/public/space/2005SpacePlan091E.pdf, accessed: 13 March 2013.

"Statement by Colonel Nazari Abd Hadi, Representative of Malaysia, on Agenda Item 51: International Cooperation in the Peaceful Uses of Outer Space", Malaysia Permanent Mission to the United Nations, *Fourth Committee of the 67th Session of the United Nations General Assembly*, New York, 18 October 2012, http://www.un.int/malaysia/GA/67/2012-10-18%20Outer%20Space.pdf, accessed: 14 May 2014.

"Tenth Malaysia Plan 2011-2015", The Economic Planning Unit, Prime Minister's Department, Putrajaya (2010).

"Thailand Concept Paper", *The 47th Session of the United Nations Committee on the Peaceful Uses of Outer Space*, June 2-11, 2004, Vienna, Austria.

"Thailand Supreme Court Opinion Summaries", *Supreme Court Opinion,* Thailand Law Forum, http://www.thailawforum.com/supremecourtopinions.html, accessed: 8 March 2013.

"The MEASAT Global Berhad Annual Report 2008 and 2009", http://www.measat.com/investor_bod_annual.html, accessed: 13 May 2014.

"The Space Report 2011 Reveals Continued Space Sector Growth Driven by Commercial Businesses", *27th National Space Symposium Press Releases,* 6 April 2011, http://2011.nationalspacesymposium.org/media/press-releases/space-report-2011-reveals-continued-space-sector-growth-driven-commercial-busin, accessed: 23 January 2013.

Aerospace Engineering Postgraduate's brochure, Department of Aerospace Engineering, UPM, http://www.eng.upm.edu.my/html/en/postgraduate-aerospace, accessed: 5 May 2012.

APRSAF leaflet (English), http://www.aprsaf.org/about/leaflet.php, accessed: 3 December 2012.

Charoenvimolkul, Kobchai, "Thailand's Communication Satellites, Current Status and Guideline for Space Affairs Development", Space Affairs Bureau, Ministry of Information and Communication Technology Thailand, http://www.aprsaf.org/data/aprsaf15_data/csawg/CSAWG_5f.pdf, accessed: 11 March 2013.

Consulate General of Malaysia Karachi, The Ministry of Foreign Affairs Wisma Putra, "East Coast Economic Region (ECER)-Part ½", http://www.kln.gov.my/perwakilan/karachi/event/1260, accessed: 25 June 2012.

Country Report 2003: Malaysia, "The Malaysian Experience and Future Direction on Disaster Management", http://www.adrc.asia/countryreport/MYS/2003/page2.html, accessed: 13 May 2014.

IAASS's poster on "Suborbital Safety Technical Committee", *5th IAASS Conference, 17-19 October 2011*. Versailles, Paris.

Malaysia's New Economic Model.

Mohd Najib Tun Abdul Razak, speech delivered during the *Third Asian Ministerial Conference on Disaster Risk Reduction,* Putra World Trade Centre, Kuala Lumpur, 2nd December 2008, http://www.pmo.gov.my/?menu=speech&page=1677&news_id=87&speech_cat=11, accessed: 13 May 2014.

Mustafa Din Subari, "MALAYSIA REPORT TO GEOSS AP SYMPOSIUM: Working Together towards a Secure and Prosperous Society", at 2, http://www.restec.or.jp/geoss_ap1/materials/PDF/plenary/11_Malaysia_Subari.pdf, accessed: 13 May 2014.

Mustafa Din Subari, "Malaysia Space Related Activities 2011: Country Report", http://www.aprsaf.org/annual_meetings/aprsaf18/pdf/program/day3/11_Malaysia%20Country%20Report.pdf, accessed: 22 April 2013.

Mustafa Din Subari, "Update on Malaysian GNSS Infrastructure", *Third Meeting of the International Committee on Global Navigation Satellite System (ICG), Pasadena, California, United States of America, December 8-12, 2008,* http://www.oosa.unvienna.org/pdf/icg/2008/icg3/13.pdf, accessed: 14 May 2014.

N.N. Mahmood, "Report on the Development of Space Technology and Applications in Malaysia", http://aprsaf.nasda.go.jp/members/updated/malaysia/macres/main.html, accessed: 28 March 2013.

National Security Council (NSC) Directive No.20 on "Policy and Mechanism on National Disaster and Relief Management".

Peterson, Daneen G., "America is a Constitutional Republic … NOT a Democracy", Speech Given in Salt Lake City, Utah, 9 September 2006, http://www.stopthenorthamericanunion.com/NotDemocracy.html, accessed: 14 May 2014.

Space Tourism Society Malaysia Chapter (STS-MC), "Commercial Suborbital Spaceflight as a Tool to Promote Interest of Space Travel in Developing Countries", a high-resolution poster, *12th Annual International Symposium, the International Space University*, France, February 2008, http://www.klia.com.my/poster3.jpg, accessed: 6 July 2008.

Space Tourism Society Malaysia Chapter (STS-MC), Poster, *5th IAASS Conference, 17-19 October 2011,* Versailles, Paris.

The Astro All Asia Networks Plc. Making Difference Annual Report 2009, http://www.astroplc.com/09/pdf/AnnualReport2009.pdf;

"East India Company, British", *The Columbia Encyclopaedia, Sixth Edition, 2001-2007,* http://www.bartley.com/65/ea/EastIndB.html, accessed: 20 January 2012.

"Encyclopaedia Malayan Union", *Nation Master Encyclopaedia*, http://www.nationmaster.com/encyclopedia/Malayan-Union, accessed: 10 October 2011.

"International Telecommunication Union (ITU)", *Gale Encyclopaedia of E-Commerce,* 2002, http://www.encyclopedia.com, accessed: 10 December 2010.

"Pangkor Engagement" *Encyclopaedia Britannica,* http://www.britannica.com/EBchecked/topic/441250/Pangkor-Engagement, accessed: 15 May 2014.

"Spacecraft: Manned: ISS: Chronology", http://www.russianspaceweb.com/iss_chronology.html, accessed: 17 October 2012.

"Table 4-8: Licensing in Malaysia [4.5.3] ICT Regulation Toolkit", http://www.ictregulationtoolkit.org/en/PracticeNote.2554.html, accessed: 8 September 2012.

"Thailand Concept Paper", *The 47th Session of the United Nations Committee on the Peaceful Uses of Outer Space*, June 2-11, 2004, Vienna, Austria.

"Thailand Supreme Court Opinion Summaries", *Supreme Court Opinion,* Thailand Law Forum, http://www.thailawforum.com/supremecourtopinions.html, accessed: 8 March 2013.

"The History of the "Zeitschrift für Luft- und Weltraumrecht, ZLW" (German Journal of Air and Space Law), available at http://www.uni-koeln.de/jur-fak/instluft/geschichte/01_08.pdf, accessed: 13 May 2014.

"TiungSat 1 (MySat 1, OSCAR 46, MO 46", *Gunter's Space Page*, http://space.skyrocket.de/doc_sdat/tiungsat-1.htm, all accessed: 13May 2014

"Top Space Faring Nations", *International Space Agencies, Prasad's Research,* January 2006, http://home.att.net/~s-prasad/TSFN.htm; and http://en.wikipedia.org/wiki/Spacefaring, accessed: 17 October 2012.

National Security Council (NSC) Directive No.20 on "Policy and Mechanism on National Disaster and Relief Management".

The Satellite Encyclopaedia, http://www.tbs-satellite.com/tse/online/sat_tiungsat_1.html, accessed: 15 May 2014.

9. CASES

Beubari Union, in re. A 1960 SC 845.

Heliliah bt Haji Yusof, Internal Application of International Law in Malaysia and Singapore (1969) 1 Singapore Law Review, 62-71 at 65.

Maganbhai vs. Union of India, A.1969 SC 783 (789,807).

Moti Lal vs. U.P., 1951 All. 257 F.B. (Allahabad High Court's decision).

North Sea Continetal Shelf Cases (1969) ICJ Rep. at 3.

Olofsen v Government of Malaysia [1966] 2 MLJ 300.

Pan American World Airways v. Department of Trade, [1976] 1 Lloyd's L.R. 257 (C.A.) (U.K.).

PP v Oie Hee Koi [1968] 1 MLJ 148 (Privy Council Appeal from Malaysian Federal Court).

State of W.B. vs. Jugal, A 1969 SC 1171 (para. 6) (Indian Supreme Court's decision).

The Government of the State of Kelantan v. the Government of the Federation of Malaya and Tunku Abdul Rahman Putra Al-Haj, [1963] MLJ 355 (Federation of Malaya High Court).

Village Holdings Sdn Bhd v Her Majesty the Queen in Right of Canada [1988] 2 MLJ 656 (High Court, Kuala Lumpur).

10. INTERNET AND WEB-BASED RESOURCES

http://aerospace.eng.usm.my/

http://app2.nea.gov.sg/

http://astnet.asean.org/

http://bigelowaerospace.com/

http://bruneiweather.com.bn/

http://cns.miis.edu/research/space/malaysia

http://cto.int/

http://dos.gov.in/

http://en.wikipedia.org/

http://encyclopedia2.thefreedictionary.com/

http://eng.iiu.edu.my/

http://engineering.mit.edu/

http://engineering.stanford.edu/

http://eoedu.belspo.be/en/satellites/

http://etp.pemandu.gov.my/

http://europatientrights.eu/

http://fkm.uitm.edu.my/v1/

http://geografi.um.edu.my/

http://iaaweb.org/

http://info.singtel.com/

http://ips.um.edu.my/

http://jpt.mohe.gov.my/

http://law.leiden.edu/

http://law.um.edu.my/

http://lkim.gov.my/

http://masscomm.uitm.edu.my/v1/

http://mib.nic.in/

http://mic.gov.sg/

http://money.cnn.com/magazines/

http://nekmat.com/

http://planetarysocietyindia.blogspot.com/

http://scosa.lapan.go.id/

http://space.skyrocket.de/

http://spacefellowship.com/

http://spacetourismsociety.org/

http://spaceportmalaysia.com/v2/

http://staging.onislam.net/

http://suborbitalex.arc.nasa.gov/

http://tcns.thaicom.net/

http://theknowledgeworld.com/

http://www.agc.gov.my

http://www.angkasa.gov.my

http://www.answers.com/

http://www.antrix.gov.in/

http://www.aprsaf.org/

http://www.aptsec.org/

http://www.arabsat.com/

http://www.arianespace.com/

http://www.docstoc.com/docs/18274167/Annual-Report-ASTRO, accessed: 13 May 2014.

UK Space Agency, "The Size and Health of the UK Space Industry: A Report for the UK Space Agency, Executive Summary November 2010", http://www.bis.gov.uk/assets/ukspaceagency/docs/industry/oxecon%20executive%20summary%20for%20final%20web%20version.pdf, accessed: 3 January 2013.

UNGA, Committee on the Peaceful Uses of Outer Space, "Report of the Legal Subcommittee on its Forty-Ninth Session" (Vienna, 9-18 June 2010), A/AC.105/942.

UNGA, Committee on the Peaceful Uses of Outer Space, "Report on the United Nations/Ukraine Workshop on Space Law on the Theme "Status, Application, and Progressive Development of International and National Space Law" (Kyiv, 6-9 November 2006), A/AC.105/880.

UNGA, Committee on the Peaceful Uses of Outer Space, Legal Subcommittee, Forty-Seventh Session, (Vienna, 31 March – 11 April 2008), A/AC.105/C.2/L.269.

United Nations document symbol: A/AC.105/INF.406. http://www.oosa.unvienna.org/oosa/Reports/inf406.html, accessed: 7 November 2012.

United Nations Office at Vienna for Outer Space Affairs, *Space Solutions for the World's Problems: How the United Nations Family is Using Space Technology for Sustainable Development*, (Vienna: United Nations).

US Federal Aviation Administration, "Safety Approval: Guide for Applicants, Version 1.1, (July 20, 2012)", (Washington D.C., 2012), http://www.faa.gov/about/office_org/headquarters_offices/ast/licenses_permits/safety_approvals/media/Safety_Approval_Guide_1.1.pdf, accessed: 18 February 2013.

8. OTHERS

"Australia's Political System", http://www.abc.net.au/ra/federasi/tema1/aus_pol_chart_e.pdf, accessed: 15 January 2013.

"Country Comparison: Labour Force, The World Fact Book", https://www.cia.gov/library/publications/the-world-factbook/rankorder/2095rank.html, accessed: 29 February 2013.

"Definition of Dengue", *MedicineNet.com*, http://www.medterms.com/script/main/art.asp?articlekey=6625, accessed: 14 May 2014 http://www.asean.org/

http://www.asri.org.au/

http://www.astro.com.my/

http://www.astromalaysia.com.my/

http://www.asylum.com/

http://www.atsb.my/

http://www.bartley.com/

http://www.bbc.co.uk/

http://www.bis.gov.uk/

http://www.boeing.com/

http://www.britannica.com/

http://www.brunet.bn/

http://www.cia.gov/library/

http://www.civil-aviation.gov.bn/

http://www.comlaw.gov.au/

http://www.commerce.gov/

http://www.congrex.nl/

http://www.cranfield.ac.uk/

http://www.crisp.nus.edu.sg/

http://www.cto.int/

http://www.defense.gov/

http://www.dfat.gov.au/

http://www.dot.gov.in/

http://www.dso.org.sg/

http://www.eng.upm.edu.my/

http://www.esa.int/

http://www.eumetsat.int/

http://www.eurocontrol.fr/

http://www.faa.gov/

http://www.fas.org/

http://www.fcc.gov/

http://www.fco.gov.uk/

http://www.fksg.utm.my/

http://www.fws.gov/

http://www.garmin.com/

http://www.gisdevelopment.net/

http://www.gov.uk/bis/

http://www.gpsdaily.com/

http://www.iafastro.com/

http://www.icao.int/

http://www.ictregulationtoolkit.org/

http://www.ida.gov.sg/

http://www.iislweb.org/

http://www.iium.edu.my/

http://www.ila-hq.org/

http://www.ilwr.de/

http://www.imo.org/

http://www.imso.org/

http://www.inmarsat.com/

http://www.intelsat.com/

http://www.isae.fr/

http://www.isro.gov.in/

http://www.itso.int/

http://www.itu.int/

http://www.jupem.gov.my/

http://www.kjc.gov.my/

http://www.kkmm.gov.my/

http://www.klia.com.my/

http://www.kpkk.gov.my/

http://www.mace.manchester.ac.uk/

http://www.mada.gov.my/

http://www.mardi.gov.my/

http://www.marine.gov.my/

http://www.mcgill.ca/iasl/

http://www.mci.gov.sg/

http://www.mcmc.gov.my/

http://www.measat.com/

http://www.met.gov.my/

http://www.mict.go.th/

http://www.mimos.my/

http://www.minbuza.nl/

http://www.mincom.gov.bn/

http://www.mmu.edu.my/

http://www.mohe.gov.my/

http://www.moondaily.com/

http://www.most.go.th/

http://www.mosti.gov.my/

http://www.nasa.gov/

http://www.nationmaster.com/encyclopedia/

http://www.newspaceglobal.com/

http://www.nps.gov/

http://www.nrct.go.th/

http://www.ntu.edu.sg/

http://www.oosa.unvienna.org/

http://www.orbital.com/

http://www.parliamentaryspacecommittee.com/

http://www.remotesensing.gov.my/

http://www.russianspaceweb.com/

http://www.satlaunch.net/

http://www.satreci.com/

http://www.sea-launch.com/index.html

http://www.skmm.gov.my

http://www.space.com/

http://www.space.gov.au/

http://www.space.mict.go.th/

http://www.space.org.sg/

http://www.spacefuture.com/

http://www.spaceislandgroup.com/

http://www.spacelaw.olemiss.edu/

http://www.spacemart.com/

http://www.spacesafetymagazine.com/

http://www.spaceshiptwo.net/

http://www.space-travel.com/

http://www.spacex.com/

http://www.sstl.co.uk/

http://www.starhub.com/

http://www.state.gov/

http://www.tbs-satellite.com/

http://www.telbru.com.bn/

http://www.thaicom.net/

http://www.thecommonwealth.org/

http://www.thespacerace.com/

http://www.tm.com.my/

http://www.tmd.go.th/

http://www.townplan.gov.my/

http://www.trai.gov.in/

http://www.uitm.edu.my/

http://www.ukm.my/

http://www.ukspaceagency.bis.gov.uk/

http://www.um.edu.my/

http://www.un.int/

http://www.un.org/

http://www.unescap.org/

http://www.uni-koeln.de/

http://www.un-spider.org/

http://www.upm.edu.my/

http://www.usm.my/

http://www.utem.edu.my/

http://www.utm.my/

http://www.uum.edu.my/

http://www.virgingalactic.com/

http://www.water.gov.my/

http://www.wawasan2020.com/

Curriculum Vitae

Che Zuhaida Saari was born on 17 May 1971 in Kota Bharu, Kelantan, Malaysia. She graduated from International Islamic University of Malaysia (IIUM), Kuala Lumpur, with a Bachelor of Laws in 1995 and a Bachelor of Laws (*Syariah*) in 1996. She was admitted as an Advocate and Solicitor of the High Court of Malaya in September 1997 and as a member of the Malaysian Bar Council. She worked as a lawyer from 1997 to 2000 at Messrs Anuar, Hong and Ong, a law firm in Kuala Lumpur. In 2000, she enrolled in a Master of Laws programme (on a part-time basis) in the Faculty of Law, University of Malaya, Kuala Lumpur, and then successfully obtained an LL.M in 2002. Indeed, the programme acquainted her with Air and Space Law courses.

From 2000 to 2002, she was a law teacher at the Department of Law, Matriculation Centre, International Islamic University of Malaysia, Kuala Lumpur. In 2002 she was promoted to the post of Lecturer and continued her service until June 2007. In July 2007, she joined the Faculty of *Syariah* and Law of the Islamic Science University of Malaysia (USIM), Negeri Sembilan, and is currently working as a law tutor in the Faculty.