The Legal Loopholes in Space law: The Case of Shin Corporation of Thailand - Temasek Holding of Singapore Business Deal

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[The opinions and conclusions expressed herein are of the author. This article is not intended and should not be thought to represent official ideas, attitudes, or policies of Thailand.]

ABSTRACT

The commercial use of outer space, including the moon and other celestial bodies, particularly in the field of telecommunication has been accelerating in developing countries due to the potential of telecommunication in advancing development. This article aims to present the legal loopholes in space law by examining the commercial space activity, telecommunication service, through the view of Thailand under the framework of GATS. Using the acquisition of Shin Corporation of Thailand, by Temasek Holdings – the Singaporean Government's investment arm – as a case study, the article gives the overview about the Foreign Business Act B.E. 2542 (1999) of Thailand and the Thai regulations according to the GATS commitments on foreign equity cap in order to point out the legal effect and the legal gap resulting from such deal.

CONTENTS

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I. INTRODUCTION

The scandalous 2006 acquisition of Shin Corporation of Thailand, by Temasek Holdings – the Singaporean Government's investment arm – has caused many effects in Thailand. The deal which involved the transfer of 49.6% of shares of Shin Corporation for an approximate amount of Baht 73,300 million was so well-planned that it did not result in the payment of any tax, partially resulting in a bloodless coup and an investigation of the deal. To deal with international economic law and international space law, this article aims to examine and analyse the foreign investment and issues relating to commercial space activities and present the legal loopholes in space law from the viewpoint of Thailand by using the acquisition as a case study.

This article is divided into three main parts: basic telecommunication of Thailand under the framework of the General Agreements on Trade in Services (GATS), Thai laws on foreign investment and legal problems with space law. The first part will explain the general obligations and specific commitments of Thailand under GATS. The telecommunication sector will be the focus of this section as it is part of the business conducted by Shin Corporation. The second part will specifically concentrate on Thai laws by showing the relation

between Thai laws on foreign investment and the abovementioned deal which reflects the weakness and conflict in legislation. In the core of this article, the third part will examine the space law applicable to the case study so as to evaluate the legal aspect.

II. BASIC TELECOMMUNICATION OF THAILAND UNDER THE FRAMEWORK OF GATS

General Agreement on Trade in Services (GATS) is a partially successful product of the conventional sources in the Uruguay round of trade negotiation on 15 April 1994. By mixing the outcome of all negotiations with the fifteen-page Marrakesh Agreement Establishing the World Trade Organization as a "final act" and as a "single package", GATS is an "International Agreement" according to the definition of "treaty" in the Vienna Convention on the Law of Treaties, 1969.[3] Therefore, Thailand, as a member, is obligated to fulfill the final act under the commitments which Thailand submitted to the World Trade Organization (WTO), following the objects and the purposes of the GATS. At the time of the signature of the final act, Thailand had submitted and agreed the schedules of specific commitments in services and some lists of exemption.

The General Agreement on Trade in Services (GATS) consists of three key parts, that is, the framework agreement and its annexes, the schedules of specific commitments and the lists of Most-Favoured Nation Treatment (MFN) exemptions (Article II) submitted by member governments. The first part gives an overview of the telecom service sector of Thailand under GATS and analyzes some considerations on the obligations of the additional commitments, by reference paper, undertaken by Thailand to the WTO. Market access and national treatment as well as the mode of delivery services, access to and use of public telecommunications transport networks and services will be specially focused on so as to link to the next part where the

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[3] *See* Vienna Convention on the Law of Treaties, Jan. 27, 1980, 1155 U.N.T.S. 331, art 2:

(a) "treaty" means an international agreement concluded between States in written form and governed by international law, whether embodied in a single instrument or in two or more related instruments and whatever its particular designation.

domestic law, the Foreign Business Act of Thailand B.E. 2542 (1999), will be taken into consideration.

A. General Obligations of Thailand under GATS

GATS is divided into 6 parts.[4] The general obligations and disciplines, specific commitments and progressive liberalization of part II, III and IV respectively, are the most important features. The part II, general obligations and disciplines, covers several significant principles, but the 5 obligations below are the most important general obligations relating to the telecommunication service,[5] namely,

i. Most Favoured Nation Treatment (MFN)

The MFN treatment is a fundamental principle of GATS being applied across all sectors and all members, and underlying the MFN treatment is the principle of non-discrimination, both de jure and de facto,[6] amongst the members of WTO.[7] Applying this principle to the Thai telecom service, for example, it accordingly means that Thailand shall accord services and service suppliers of any member treatment no less favourable than that provided for like services and service suppliers of any other country in term of the right to access to and use of public telecommunication transport networks and services. Nevertheless, Thailand provided some horizontal commitments according to the Schedule and the list of MFN exemptions attached to the Fourth Protocol. Even the duration of such exemptions, in principle, must be valid for only ten years.[8]

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4 General Agreement on Trade in Services, Jan. 1, 1995, 1869 U.N.T.S. 183 [hereinafter "GATS"].

5 Bunaramrueang Biyabutr, Basic telecommunication Trade in Services in the Framework of WTO and the Implementation of Additional Commitments in Reference Paper: Case Study of Thailand 17 (2005) (unpublished Masters thesis, Faculty of Law, Thammasat University). Also, see World Trade Organisation, *Annex: The General Agreement on Trade in Services (GATS) and Its Relation to the Telecommunication Service Sectors*, http://www.wto.org.

6 European Communities – Banana III, Appellate Body Report, WT/DS27/AB/R ¶ 234 (Sept. 25, 1997).

7 *Supra* note 4, art. II.

8 See the horizontal commitments and specific commitments on Telecom Service of Thailand – World Trade Organisation, *Telecommunication Services*, http://www.wto.org/english/tratop_e/ser v_e/telecom_e/telecom_e.htm.

ii. Transparency

The principle of transparency, laid down in Article III of GATS, requires the Member to publish promptly "all relevant measures of general application" that affect operation of the Agreement as well as to notify the Council for Trade in Services of new or changed laws, regulations or administrative guidelines that significantly affect trade in sectors subject to Specific Commitments.[9] These transparency obligations are particularly relevant in the service areas where the role of regulation – as a trade protective instrument and/or as a domestic policy tool – tends to feature more prominently than in most other segments of the economy.[10]

In brief, by this principle, members have four significant responsibilities to accomplish transparency, namely, (i) publish all relevant laws and regulations, (ii) establish enquiry points in order to provide specific information and respond to requests by service suppliers of any member, (iii) notify the Council for any obligations affected to the Agreements and (iv) protect the confidential information.[11]

iii. Domestic Regulation

Under Article VI, paragraph 2, members are committed to operating domestic mechanisms ("judicial, arbitral or administrative tribunals or procedures") where individual service suppliers may seek legal redressal.[12] At the request of an affected supplier, these mechanisms should provide for the "prompt review of, and where justified, appropriate remedies for, administrative decisions affecting trade in service".[13]

Concisely, members have four main obligations according to the domestic regulation, that is, (i) appeals procedure, (ii) reasonable, objective and impartial

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9 *Supra* note 4, art. III.

10 World Trade Organisation, *The General Agreement on Trade in Services: An Introduction*, March 29, 2006, http://www.wto.org/english/tratop_e/serv_e/gsintr_e.doc.

11 *Supra* note 4.

12 *Supra* note 4.

13 *Supra* note 10.

administration of regulations, (iii) licensing, qualification and technical standards and (iv) taking account of international standards.[14]

iv. Monopolies and Exclusive Service Suppliers

Article VIII, paragraph 1 requires members to ensure that monopolies or exclusive service providers do not act in a manner inconsistent with the MFN obligation and commitments.[15] Article XXVIII (h) specifies, in turn, that a "monopoly supplier" is an entity that has been established by the member concerned, formally or in effect, as the sole supplier of a service.[16] This principle is very significant and strongly repeated in the framework reference paper of Negotiating Group on Basic Telecommunication (NGBT's Regulatory Framework Reference Paper).

v. Business Practices

Similar to Article VIII, Article IX refers to business practices that restrain competition and, thereby, restrict trade other than those falling under the monopoly-related provisions under Article VIII.[17] The Article requires each member to consult with any other member, upon request, with a view to eliminating such practices.

Moreover, there are two special business practices relating to telecom trade in services, namely, Government Procurement laid down under Article XIII, and Progressive Liberalization according to Part IV.

B. Commitments of Thailand under the Fourth Protocol[18]

As noted above, the obligations of any WTO member under GATS consist of the provisions of the Agreement and its Annexes as well as the specific commitments contained in the national schedule. The schedules are relatively complex documents in which each country identifies the service sectors to which it will apply the market access and national treatment obligations of

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14 World Trade Organization, *A Training Package Module: Services: GATS* 19 (1998).

15 *Supra* note 4, art. VIII, para 1.

16 *Supra* note 4, art. XXVIII (h).

17 *Supra* note 4, art. IX.

18 Fourth Protocol to the General Agreement on Trade in Services Concerning Basic Telecommunications, Apr. 30, 1997, 36 I.L.M. 354.

the GATS and any exceptions from those obligations it wishes to preserve.[19] The commitments and limitations are in every case entered with respect to each of the four modes of supply which constitute the definition of trade in services in Article I of the GATS: these are cross-border supply, consumption abroad, commercial presence and presence of natural persons. The definition could be briefly explained below.

Figure 1

Four Modes of Supplying Services under GATS[20]

Mode 1: Cross-border supply	The possibility for non-resident service suppliers to supply services cross-border into the member's territory (e.g. banking or architectural services transmitted via telecommunications or mail);
Mode 2: Consumption abroad	The freedom for the member's residents to purchase services in the territory of another member. On the other hand, it refers to situations where a service consumer (e.g. tourist or patient) moves into another member's territory to obtain a service;
Mode 3: Commercial presence	The opportunities for foreign service suppliers to establish, operate or expand a commercial presence in the member's territory, such as a branch, agency, or wholly-owned (e.g. domestic subsidiaries of foreign insurance companies or hotel chains);
Mode 4: Presence of natural persons	The possibilities offered for the entry and temporary stay in the member's territory of foreign individuals in order to supply a service. (e.g. accountants, doctors or teachers). The Annex on Movement of Natural Persons specifies, however, that members remain free to operate measures regarding citizenship, residence or access to the employment market on a permanent basis.

19 World Trade Organisation, *Guide to Reading the GATS Schedules of Specific Commitments and the List of Article II (MFN) Exemptions,* http://www.wto.org/english/tratop_e/serv_e/guide1_e.htm.

20 World Trade Organisation, *The General Agreement on Trade in Services (GATS): Objectives, Coverage and Disciplines*, http://www.wto.org/english/tratop_e/serv_e/gatsqa_e.htm.

After knowing the four fundamental modes of supply under GATS, the next important issue relates to the legal details of Thailand's commitments on trade in services, particularly the specific commitments and schedules of Thailand under mode 1 and mode 3. Some additional commitments will, then, be explained at the end of this section.

In compliance with GATS Article XX, Thailand's schedule provides a clear description of sectors and sub-sectors, limitations on market access, limitations on national treatment, and additional commitments in four respective columns.[21] The commitments in the Schedule are varied depending on each of the four modes of supply. Notably, mode 1 (cross border) and mode 3 (commercial presence) are most frequently used for the provision of telecom services[22] and comprehensively relates to the next part which takes an account on the domestic law. This paper will not indulge in the details of each commitment, but only exemplify the general commitments – in particular, those on market access and national treatment – in order to provide a background when we consider the ratio of foreign capital in Shin Corporation and Temasek Holdings after the deal.

i. Specific Commitment and Schedules

Admittedly, a specific commitment in a services Schedule is an undertaking to provide market access and national treatment for the service activity in question on the terms, limitations, qualifications and conditions of WTO members.[23] The value of making a commitment is that the members bind themselves by the specified level of market access and national treatment, undertaking not to impose any new measures that would restrict entry into the market or the operation of the service.[24] Commitments can only be withdrawn or modified after agreement of compensatory adjustments with affected countries.[25] The main classifications of commitments could be distinguished.

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21 *Supra* note 8.

22 *Supra* note 8.

23 *Supra* note 4, art. XX ¶ 1.

24 *Supra* note 4, Part IV.

25 *Supra* note 4, art XXI.

1. Market Access

The commitments on market access are the most important. They are specified by all members in their schedules for the protection of the internal market. The market access provisions of GATS – Article VI paragraph 2 – cover six types of restrictions that must not be maintained in the absence of limitations.[26] The restrictions relate to (a) the number of service suppliers, (b) the value of service transactions or assets, (c) the number of operations or quantity of output, (d) the number of natural persons supplying a service, (e) the type of legal entity or joint venture and (f) the participation of foreign capital.[27] These measures, except for (e) and (f), are not necessarily discriminatory, i.e., they may affect national as well as foreign services or service suppliers. All limitations in Schedules fall into one of these categories. They comprise four types of quantitative restrictions plus limitations on types of legal entity and on foreign equity participation.[28]

Applying these conditions of market access to telecommunication service, we can differentiate into two core types: the mode of delivery of service in telecom sector and the access and use of public telecommunications transport networks and services.[29] An example of the mode of delivery of telecom service is "GMPCS" (Global Mobile Personal Communication Service), a service in mode 1 of which most members provide for restrictions in network access, "Roaming" by GSM (Global Systems for Mobile Communications) which follows the movement of consumers in terms of Mode 2, etc.

2. National Treatment

The national treatment obligation under Article XVII of the GATS is to accord to services and service suppliers of any other member treatment no less favourable than is accorded to domestic services and service suppliers.[30] A member wishing to maintain any limitations on national treatment — that

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26 *Supra* note 10, at 6.

27 *Supra* note 4, art. XVI.

28 *Supra* note 8.

29 Annex on Telecommunications to GATS.

30 *Supra* note 4, art. XVII ¶ 1.

is any measures which result in less-favourable treatment of foreign services or service suppliers — must indicate these limitations in the third column of its schedule.[31]

In the context of Thailand Telecommunication service, Thailand specified no limitations on national treatment on the supply of public of telecommunication services as long as foreign equity participation does not exceed 40 percent.[32]

ii. Additional Commitments: Reference Paper

The Reference Paper refers to additional commitments, beyond the specific commitments on market access and national treatment, created after the Uruguay round of trade negotiation. Additional commitments are not obligatory but a member may decide in a given sector to make additional commitments relating to measures other than those subject to scheduling under Articles XVI and XVII. These can include, for examples qualifications, standards and licensing matters. The reference paper in telecommunication sector covers six matters: competitive safeguard, interconnection, universal service, licensing processes, independent regulators and allocation of scarce resources.[33] To easily understand these additional commitments on telecommunication service, we can generally classify these matters into four groups: dominance, market access, competition and conditions on telecommunication competition.

In brief, dominance is considered in terms of major suppliers in telecommunication sector, in compliance with the essential facilities for transport network, and whether there is an abuse of dominant position according to competition law. Market access focuses on the transparency of licensing process abiding by MFN and the allocation and use of radio frequency, numbers and right of way which are scarce resources.[34] In terms

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31 *Supra* note 19. See the example of the limitation of national treatment of Thailand.

32 World Trade Organisation, *Telecommunications Commitments and Exemptions*, http://www.wto.org/english/tratop_e/serv_e/telecom_e/telecom_commit_exempt_list_e.htm.

33 World Trade Organisation, *History of Telecommunication Negotiations*, http://www.wto.org.

34 World Trade Organisation, *Reference Paper on Basic Telecommunications – Allocation and Uses of Scare Resources*, http://www.wto.org/english/news_e/pres97_e/refpap-e.htm.

of competition, the detail suggests competitive safeguards by focusing on prevention of anti-competitive practices in telecommunications.[35] Interconnection and universal services are the conditions on telecommunication competition.

Thailand had initially provided specific additional commitments on telecommunication sector covering all six issues but preserved the right on essential facilities and major suppliers.[36]

III. THAI LAWS ON FOREIGN INVESTMENT

To stimulate economic growth in developing countries, foreign direct investment is an important factor. Moreover, a liberal economic policy supports the foreign investment. On the other hand, nationalism still influences developing countries, including Thailand, such that they wish to reserve their resources and business for their citizens. This controversy led to the enactment of law on foreign investment.

Thai laws on foreign investment, without exception, are passed to compromise the two schools of thought, liberalism and nationalism. The first law which defines 'foreigner' and restricts foreigners' business in Thailand can be traced back to the 1972 Announcement No. 281 of the National Executive Council B.E. 2515.[37] The definition of 'foreigner' was amended in 1992. Later due to inconsistency with the then economic conditions, investment and international trade,[38] it was repealed and replaced by the Foreign Business Act B.E. 2542 (1999). The next part will examine these laws with reference to their definition of 'foreign juristic person' and their loopholes before applying the laws to the business deal between Shin Corporation of Thailand and Temasek Holdings of Singapore and examining its consequences.

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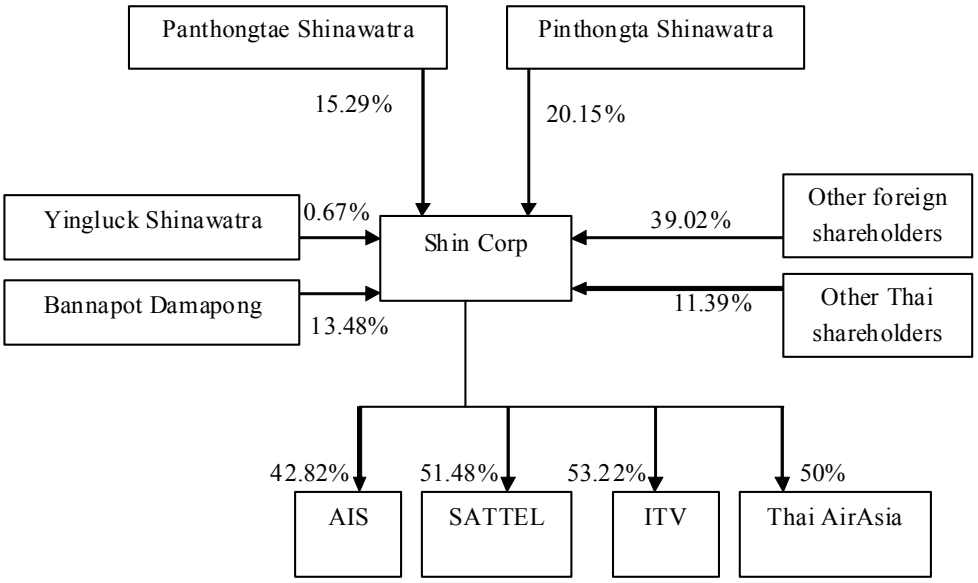
35 World Trade Organisation, *Reference Paper on Basic Telecommunications – Competitive Safeguards*, http://www.wto.org/english/news_e/pres97_e/refpap-e.htm.

36 World Trade Organisation, *Thailand-Condition Initial Offer*, TH/S/O/THA (Sept. 15, 2003). For details, *see* Biyabutr, *supra* note 5, at 93.

37 National Executive Council, Thailand, Announcement No. 281, B.E. 2515 (1972).

38 Remarks on Foreign Business Act, Thailand, B.E. 2542 (1999).

Figure 2
The shareholding structure as on January 20, 2006



A. Background of the Shin Corporation of Thailand – Temasek Holdings of Singapore business deal

In 1991, the Thai government granted a 30-year concession to Shin Corporation (Shin) – founded by Thaksin Shinawatra, former Prime Minister of Thailand and his family – to build, transfer and operate Thai satellites which are named as THAICOM series.

The concession is a Build-Transfer-Operate concession, of which name speaks for itself. Under this concession, Shin had to set up a new company to perform duties under the satellite operation agreement between Shin and MICT (Concession Agreement).[39] Shin Satellite Public Company Limited (SATTEL), which thereafter changed its name to Thaicom Public Company Limited, was founded in order to build satellites and then transfer them to the State. In reciprocation, the right to operate such telecommunication satellites remains with SATTEL.[40]

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39 Satellite Operation Agreement Between Shin and MICT [hereinafter "Concession Agreement"], § 4.

40 Concession Agreement, *supra* note 39, preamble ¶ 3, § 15.

Currently, there are four function satellites under Thailand's communication satellite fleet. THAICOM-1A was launched on December 1993 and on October 1994, THAICOM-2 was launched. THAICOM-3, launched in 1997, was replaced by THAICOM-5 on October 2006 due to power loss. THAICOM-4 or IPSTAR, launched on August 2005 is a new generation of broadband satellite that would serve the demand for high-speed broadband Internet access. They cover areas from Central Europe through Asia coasts.[40]

Figure 2 depicts the shareholding structure of Shin and SATTEL as on January 20, 2006, before the transaction. Shin Corp held shares in SATTEL to the tune of 51.48% which was in compliance with the shareholding ratio condition in the Concession Agreement.[41] The major shareholders of Shin securities, at that time, were the Shinawatras and their relatives.

Temasek is an Asian investment house owned by the government of Singapore. Its markets are mainly Singapore, Asia and other emerging economies. Amongst this, Thailand can be considered as one of its potential market. However, the name of Temasek became familiar to Thai people after the successful takeover of Shin Corp.

Temasek wished to purchase 49.59% of Shin's shares but the then 39.02% foreign shareholding ratio in Shin made such purchase impossible to succeed without turning Shin into a "foreign juristic person" under Thai domestic law. This would also terminate concessions in Shin's subsidiaries. Hence the transaction had to be completed through nominees, namely, Cedar Holdings and Aspen Holdings.

On January 23, 2006, during the term of Prime Minister Thaksin Shinawatra, Temasek – through its nominees – successfully acquired 49.59 % stake of Shin for an approximate amount of Baht 73,300 million, or Baht 49.25 per share. At that time, Baht 40.0171 equalled to USD 1.[42]

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41 FRANCIS LYALL & PAUL B. LARSEN, SPACE LAW: A TREATISE 378 (1st ed. 2009).

42 Concession Agreement, *supra* note 39, § 4.2. The original Concession Agreement mentioned that Shin has to hold at least 51% of the total shares in SATTEL. This clause was amended to decrease the ratio from 51% to 40% on October 27, 2004 during the Shinawatra administration.

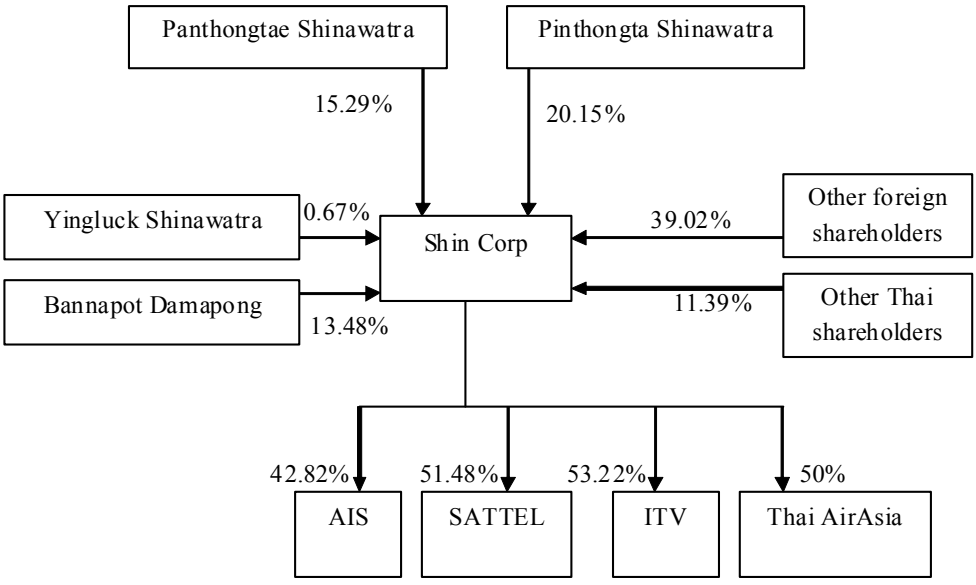
43 Bank of Thailand Foreign Exchange Rate, http://www2.bot.or.th/statistics/ReportPage.aspx?reportID=123&language=th.

Figure 3 indicates the structure of the deal and the shareholding structure after January 23, 2006. The 49.59% of shares were divided into 10.97% and 38.62% and purchased by Aspens Holdings and Cedar Holdings respectively.

This large portion of share acquisition reached the tender offer trigger point. However, with regard to SATTEL's stake, Cedar and Aspen were asked by the Securities and Exchange Commission not to make any tender offer for SATTEL's securities owing to the fact that Cedar and Aspen had no intention to acquire the SATTEL's securities and that it was considered immaterial to Shin's assets value.[44]

After the Shin-Temasek deal, SATTEL, one of the Shin's subsidiaries, operating four communication satellites under the awarded concession is indirectly controlled by Temasek, a Singaporean state-owned enterprise even though Shin changed its shareholding ratio in SATTEL from 51% to 41%.[45]

Figure 3
The shareholding structure as on January 20, 2006



44 *Shin Sell-Off: Ample Rich Ddeal Queried*, THE NATION, Jan. 27, 2006, http://www.nationmultimedia.com/2006/01/27/headlines/index.php?news=headlines_19764598.html.

45 *THAICOM Satellite Is Still Thai*, http://www.krusiam.com/community/forum2/view.asp?forumid=Cate00009&postid=ForumID0016676. As of August 5, 2010 Shin have held shares in SATTEL in an amount of 41.14% according to the Stock Exchange of Thailand, http://www.set.o r.th/set/companyholder.do?symbol=THCOM&language=en&country=US.

B. Thai Domestic Laws on Foreign Investment

To stimulate economic growth in developing countries, foreign direct investment is an important factor. On the other side, nationalism still has influence in developing countries, including Thailand, so they wish to reserve their resources and business for their nationals. This controversy leads to the enactment of general and specific legislations on foreign investment i.e. the Foreign Business Act B.E. 2542 (1999) (FBA), which governs the scope and types of permitted or prohibited business for foreigners in general, and the Telecommunications Business Act, B.E. 2544 (2001), which particularly focuses on telecommunication sector.

i. Foreign Business Act B.E. 2542 (1999) of Thailand

The Foreign Business Act B.E. 2542 (1999) (FBA) defines a foreigner in Section 4. The scope of this paper focuses only on "foreign juristic person", which is defined in Section 4 (2) – (4) as follows.

"Foreigner" means…

(2) Juristic person not registered in Thailand.

(3) Juristic person registered in Thailand having the following characteristics:

  (a) Having half or more of the juristic person's capital shares held by persons under (1) or (2) or a juristic person having the persons under (1) or (2) investing with a value of half or more of the total capital of the juristic person.

  (b) Limited partnership or registered ordinary partner-ship having the person under (1) as the managing partner or manager

(4) Juristic person registered in Thailand having half or more of its capital shares held by the person under (1), (2) or (3) or a juristic person having the persons under (1), (2) or (3) investing with the value of half or more of its total capital.[46]

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46 *Supra* note 38, art. 4.

Subsection (2) is simply understood. Subsections (3)-(4) use the phrase 'capital share'. As a result, in order to be considered a foreign juristic person, more than half of such juristic person's share has to be held by a foreigner. It does not have to track the shareholding ratio of the shareholder again. This clause solved the problem on the interpretation of the repealed law on foreign investment, the Announcement No. 281 of the National Executive Council B.E. 2515 (1972).[47] In other words, it allows foreign firms to set up subsidiaries that are nominally owned by Thais but actually controlled by foreigners.[48]

In addition, the concept of foreign juristic person had been challenged on the basis of voting right structure. The share ratio of 51-49 can be twisted to form a nominee company by mentioning the 51% shares as a preferred share which has less voting right. The outcome is that the foreign shareholders can always control majority vote even though they have a lower share ratio. This practice has been approved by the Thai Ministry of Commerce since 1988.[49]

Since, in practice, foreigners are able to avoid the abovementioned prerequisites by structuring the Thai nominee corporation, to enhance its enforcement Sections 36 and 37 mention the civil and criminal punishment for Thai people and foreigners who violate, assist or support the violation such as a fine, an imprisonment and a stoppage of the business operation or the dissolution of the business or order a cessation of the shareholding or partnership as the case may be.

ii. Telecommunications Business Act, B.E. 2544 (2001) of Thailand

The Telecommunications Business Act, B.E. 2544 (2001) used to have a 75% rule. The telecommunication license shall not be granted to a foreigner

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47 The Council of State rendered legal opinion nos. Nor Ror 0601/866 dated August 2, 1991 and 332/2535 April 1992 that the criteria for juristic person to be considered as foreigner have to consider from the actual capital. In other words, it has to explore into the foreign investment ratio of each juristic person and then calculate altogether. *See* Legal opinion of the Council of State no. 332/2535 April 1992, http://app-thca.krisdika.go.th/Naturesig/CheckSig?whichLaw=cmd&year=2535&lawPath=c2_0332_2535.

48 Choon Yin Sam, *Economic Nationalism in Singapore and Thailand,* 16 SOUTH E. ASIA RES. 433, 454 (2008).

49 Kittipong Urapipattanapong, *Amending Foreign Business Act: Moving Forward or Backward* PRACHACHART BUSINESS NEWS 49 (Jan.18, 2007).

under the law on foreign business. In case of juristic person, the share holding proportion of Thai national should not be less than 75% of its total capital and not less than three fourth of the total number of directors as well as the authorized persons shall be of Thai nationality.[50] However, in 2006, 3 days before the Shin-Temasek deal, the 75% rule was abandoned and replaced with the criteria under the FBA.[51] Hence, Thai companies with 49% of foreign shareholders could apply for a telecommunication license which was in line with the Horizontal Commitments of Thailand to WTO.

C. Application to the Shin Corporation of Thailand – Temasek Holdings of Singapore Business Deal

This part will examine the Thai laws on foreign investment which are applicable to the Shin Corporation of Thailand – Temasek Holdings of Singapore business deal in order to examine the legal loopholes as a result of inefficient laws.

Before the transaction occurred, there had been 39.02% foreign shareholders in Shin and this did not exceed the 49% limitation. Temasek aimed to buy 49.59% of shares from the Shinawatra family and relatives. It was, thus, necessary to restructure the corporation. The 49.59% of shares were split into 10.97% and 38.62% and purchased by Aspens Holdings and Cedar Holdings respectively. Aspens Holdings is a Singapore registered company so it is a foreigner under Section 4(2) of the FBA and its acquisition of a share means acquisition by a foreigner. Adding this 10.97% with 39.02% existing foreign shareholders equals to 49.99% foreign shareholders so Shin reaches its maximum limit to be considered as a Thai entity. The point then is whether Cedar Holdings is a Thai juristic person.

As depicted in the 2nd tier of the structure, Cedar Holdings has three shareholders: Cypress Holdings, Siam Commercial Bank and Kularb Kaew. Cypress Holdings, holding 49% shares in Cedar Holdings, is undoubtedly foreigner. Siam Commercial Bank, a Thai bank, holds 9.9% shares. Kularb Kaew has to be a Thai juristic person so Cedar Holdings cannot be deemed as

50 Telecommunications Business Act, Thailand, B.E. 2544 (2001), §8.

51 Act Amending the Telecommunications Business Act, Thailand, B.E. 2543 (2006).

foreigner and make the entire transaction valid and legal. The fact is that 51% of Kularb Kaew's shares are held by Thai investors and the rest are held by foreigners, so it is a Thai juristic person. Had the Announcement No. 281 of the National Executive Council B.E. 2515 (1972) still been in force, Cedar Holdings and accordingly Shin would have been foreigners under Thai law. Fortunately, the FBA, the enforceable law at the time of transaction, renounces the capital criteria and instead, binds itself with the share criteria. So Kularb Kaew, Cedar Holdings and Shin are *de jure* all Thai.

In short, looking only at the nationality requirement, the transaction is legitimate under the FBA and the Telecommunications Business Act, B.E. 2544 (2001). The concession awarded to AIS, another Shin's subsidiary operating telecommunication service business, and SATTEL cannot be revoked due to this ground.

IV. LEGAL PROBLEMS BECAUSE OF THE TAKEOVER OF THE SATELLITE COMPANY FROM A SPACE LAW PERSPECTIVE

'Taking back Thai satellites… is a patriotic duty for every Thai', the Thai *junta* head said about a year after the transaction was done.[52] This statement shows the importance of satellites and its effect of national pride, particularly in a developing country. In contrast, the other side views this investment as a purely business decision.[53] Regardless of the intention of entry into this transaction, it was accomplished. Yet, what should be considered are its consequences, especially legal consequences. This part will focus only on international space law, beginning with the overview of satellite operation of Thailand and then evaluating the legal aspects. Due to the fact that the Department of Special Investigation has been investigating the case and whether Shin and Temasek breached the FBA or not, this article will analyze the outcome of two scenarios. First, the deal is legal and therefore, Shin is a Thai juristic person and second, that the deal is illegal and Shin is not a Thai juristic person.

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[52] *Duty of every Thai to see satellites returned*, THE NATION (Feb. 19, 2007), http://nationmultimedia.com/2007/02/19/headlines/headlines_30027229.php.

[53] *Thailand May Offer to Buy Shin Assets From Temasek*, BLOOMBERG (Feb. 19, 2007), http://www.bloomberg.com/apps/news?pid=20601080&sid=aXVXTFmjAKNs&refer=asia.

With regard to space law, Singapore and Thailand have become member states of the International Telecommunication Union (ITU) since 1965 and 1883 respectively.[54] As of 2010, Thailand has ratified two out of five outer space treaties, the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (the Outer Space Treaty) and the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space (the Rescue Agreement) while Singapore has also ratified these two treaties plus the Convention on International Liability for Damage Caused by Space Objects (the Liability Convention) as well as signed the Convention on Registration of Objects Launched into Outer Space (the Registration Convention).[55]

A. Geostationary Orbital Slots

Outer space is not subject to national appropriation, mentioned in Article III of the Outer Space Treaty.[56] Geostationary orbit, as part of outer space, has a special value owing to its constant position with respect to the Earth. The non-appropriation had been claimed to exclude geostationary orbit by the equatorial developing countries.[57] However, this claim is considered effectless[58] and the non-appropriation in outer space, including geostationary orbit, is considered customary law as well as treaty law.[59]

Applying this legal concept to this case, irrespective of Shin's and SATTEL's nationality, Thailand does not have an ownership in orbital slots.

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54 International Telecommunication Union, *Membership List*, http://www.itu.int/cgi-bin/htsh/mm/scripts/mm.list?_search=ITUstates&_languageid=1.

55 United Nations Treaties and Principles on Outer Space and Related General Assembly Resolutions Addendum – Status of International Agreements Relating to Activities in Outer Space, ST/SPACE/11/Rev.2/Add.3 (Jan. 1, 2010), http://www.oosa.unvienna.org/pdf/publication s/ST_SPACE_11_Rev2_Add3E.pdf.

56 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, Jan. 27, 1967, 610 U.N.T.S. 205 [hereinafter Outer Space Treaty], art. III.

57 Declaration of the First Meeting of Equatorial Countries (known as the Bogotá Declaration) (Dec. 3, 1976), reprinted in 6 J. SPACE L. 193 (1978).

58 *Supra* note 41, at 62.

59 *Supra* note 41, at 59.

Moreover, the Concession Agreement between MICT and Shin obviously mentions that the right bestowed by the MICT to Shin is the right to operate communication satellites and collect service fees for satellite transponder leasing. Nothing in the Concession Agreement relates to the transfer of orbital slots to Shin or the ownership of slots by the government.

In sum, under the concession condition, a right in the orbital slots belong to the MICT, that is, the state and not the private entity.[60] SATTEL is entitled to use them only to the extent provided under the term in the Concession Agreement.

B. Ownership of Satellite

The Build-Transfer-Operate concession had been elaborated in the Concession Agreement. It stated that the ownership of all satellites shall be the MICT's, after such satellites are launched into their orbital location.[61] This means, thus, that SATTEL does not own any satellite in the THAICOM fleet. It only has the right to operate communication satellites and collect service fees for satellite transponder leasing in return. Briefly, even though the shareholder structure in SATTEL's parent company changed, all of the satellites are still the assets of the state of Thailand.

C. Responsibility and Liability

Before beginning the discussion in detail, it is interesting to note that the Outer Space Treaty in its English text uses the terms 'responsibility' in Article VI and 'liability' in Article VII while the Treaty in other languages, which are equally authentic,[62] does not distinguish between the two. They use the equivalent term of 'responsibility' in both Articles. This inconsistency was questioned by Professor Stephen Gorove followed by the issue of whether international responsibility would entail liability in all situations.[61]

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60 Concession Agreement, *supra* note 39, § 11.

61 Concession Agreement, *supra* note 39, preamble ¶ 3, § 15.

62 Outer Space Treaty, *supra* note 56, art. XVII. In french, the same term *responsabilité* qualified as *responsabilité legale* is used, thus not differentiate in terminology. *See* Bin Cheng, *International Responsibility and Liability for Launch Activities*, *in* THE USE OF AIR AND OUTER SPACE: COOPERATION AND COMPETTION 159, 166 (Chia-Jui Cheng ed., 1998).

63 STEPHEN GOROVE, DEVELOPMENTS IN SPACE LAW: ISSUES AND POLICIES 227 (1st ed, 1991).

Nevertheless, in his article, Professor Bin Cheng examined the different regimes and the scope and meaning of international responsibility and liability with respect to launching activities.[64]

Responsibility in Article VI of the Outer Space Treaty and liability in Article VII are intertwined. Both responsibility and liability are placed in state entities and not any nongovernmental entity because of the intention to ensure that any outer space activity should be carried on in compliance with the international law.[65] Unlike the time when the Outer Space Treaty was drafted, nowadays, private entities increasingly participate in outer space activities. Their states bear international responsibility for activities carried by such private entities by licensing and continuing supervision.[66] Licensing is, hence, an *a priori* administrative step and continuing supervision is a later one.

The possibility that Shin is not a Thai juristic person indicates the weakness of continuing supervision of the State. International space law emphasizes the right or duty of a State to supervise private entities. Domestic law is the mechanism to make this system effective. Unfortunately, specific law on space law does not exist in Thailand and the Concession Agreement cannot be terminated unless the deal is violated by the FBA. In this case study, at least from the Thai side, until the share acquisition agreement had been signed, the public was unaware of the transaction. This questions the proper extent of the 'continuing supervision' concept.

Turning to liability, international space law binds liability with the concept of launching state and categorises 'launching states' into four categories i.e. State launching a space object, State procuring the launching of a space object, State from whose territory a space object is launched and State whose facility a space object is launched.[67] It is undeniable that Thailand is a launching state for every THAICOM satellite.

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64 BIN CHENG, GENERAL PRINCIPLES OF LAW AS APPLIED BY INTERNATIONAL COURTS AND TRIBUNALS 201, 222, 223 (1st ed, 1953).

65 MANFRED LACHS, THE LAW OF OUTER SPACE: AN EXPERIENCE IN CONTEMPORARY LAW-MAKING 122 (1st ed, 1972).

66 Outer Space Treaty, *supra* note 56, art. VI.

67 Outer Space Treaty, *supra* note 56, art. VII; Convention on International Liability for Damage Caused by Space Objects, March 29, 1972, 961 U.N.T.S. 187, art. I (c),.

After the transfer of share in the Shin-Temasek deal, it is doubted whether the acquisition country perceives to be regarded as a launching state.[68] In contrast to Thailand, Singapore has not been involved in any launching, procuring the launching of any THAICOM satellites or offered its territory or facility for the launch of THAICOM satellites; therefore, Singapore is not a launching state under the current definition.

The concept of nongovernmental user's liability under international space law is that the government is directly liable.[69] Consequently, if there is any damage caused by THAICOM, Thailand, as a launching state, not Singapore, will be liable for compensation for the act of SATTEL of which a great number of shares ultimately are held by a foreign juristic person.

Steven Gorove also pointed out that in case the liability is not waived, the nongovernmental user would have to reimburse the government in the end.[70] Looking into the Concession Agreement, it clears the way by placing the entire responsibility of compensation on Shin in case of damage caused by satellites.[71] This clause also shows that SATTEL, under the control of Shin, a party in the Concession Agreement, is the actual controller of satellites. Hence if the Thai government pays any compensation for damage caused by THAICOM satellites, the governmenst can seek recourse from Shin under domestic law and procedure based on the Concession Agreement. Shin's repayment links to Temasek and eventually Temasek's investors. It is worth noting that even though this scenario places liability in the actual controller, the State has to recompense in advance.

Academically speaking, this deal raises concern on the change in status of ownership or control of a space object in case of non-governmental entity while international space law links liability with State or, to be more precise, launching state. In addition, where the State of nationality of the new operator is not the launching state, the transfer of liability between States is suspect.

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68 Committee on the Peaceful Uses of Outer Space, Legal Subcommittee, 748th Meeting, Unedited Transcript, COPUOS/LEGAL/T.748 6-7 (Mar. 26, 2007).

69 *Supra* note 63, at 228.

70 *Supra* note 63, at 228.

71 Concession Agreement, *supra* note 39, § 46.

D. Registration of Space Object and Jurisdiction and Control

Article VIII of the Outer Space Treaty elaborates on jurisdiction and control over space object of a state of registry. The term 'State of registry' was explained as a launching State on whose registry a space object is carried in accordance with article II.[72] Jurisdiction and control are connected with State, not with private entities.[73] Despite the fact that the owner of satellites is the Thai government, SATTEL is entitled to operate and control the satellites including its ground station. When Shin is under the control of Temasek, accordingly, it is doubted whether SATTEL is indirectly controlled by Temasek or not. If so, the jurisdiction and control of space object may be affected.

The importance of registration is not only for identification of space object but also for establishing responsibility, for ownership, for the exercise of control and for liability.[74] In practice, neither Singapore nor Thailand ratified the Registration Convention. Singapore signed but did not ratify the Convention. Since Thailand did not ratify the Convention, it is less possible that Thailand will furnish or register THAICOM satellites to the United Nations. According to the United Nations Office for Outer Space Affairs (UNOOSA)'s website, Thailand is mentioned in the section of the State of registry for all of the five THAICOM satellites although the information is in square brackets and highlighted in green which indicates that the information has not been officially submitted by Thailand.[75]

In case of transfer of in-orbit satellite, the registration must be changed as well. However, the Registration Convention narrows the eligibility of persons to register space object to the launching states.[76] There are a few

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72 Convention on the Registration of Objects Launched into Outer Space, Nov. 12, 1974, 1023 U.N.T.S. 15, art. 1 (c).

73 Bernhard Schmidt-Tedd & Michael Gerhard, *Registration of Space Objects: Which are the advantages for states resulting from registration?*, *in* SPACE LAW: CURRENT PROBLEMS AND PERSPECTIVES FOR FUTURE REGULATION 121, 125 (Marietta Benkö & Kai-Uwe Schrogl eds., 2005).

74 *Supra* note 41, at 84.

75 United Nations Office for Outer Space Affairs, Search Results, http://www.oosa.unvienna.org/oosa/search.do;jsessionid=6453F99374D1F29A78B46981C4D4B684.WEB02.

76 *Supra* note 72, arts. 1 and 2.

cases about transfer of in-orbit satellite which considered registration. For instance, four telecommunication satellites, registered by the United Kingdom, were transferred from the United Kingdom to China in 1997. This case does not generate any problem since China is also a launching state. The United Kingdom declared to the UNOOSA that it ceased to be the State of registry.[77] Correspondingly, the UNOOSA's website shows the state of registry of these four satellites as China (formerly UK).[78] Another one is the BSB-1A transfer from the United Kingdom to Sweden. The information submitted to the UNOOSA shows that states of registry are the United Kingdom and Sweden despite the fact that Sweden is not a launching state.[79] The other case is the transfer from INTELSAT to the Netherlands which is not the launching state. In this case, the Netherlands obviously show its status as not being the 'launching State', 'State of registry' or 'launching authority' but the Netherlands, according to Article VIII of the Outer Space Treaty, bears international responsibility and has jurisdiction and control after the transfer.[80] Accordingly, the UNOOSA made a remark about this fact and did not put the Netherlands in the state of registry.[81] Nevertheless, there has never been any claim about the liable State after the transfer.

These practices are not exactly the same as the Shin-Temasek case in which the satellites were not transferred but the control was. Provided that Shin is of Thai nationality, the green word of 'Thailand' in square brackets as a state of registry in the UNOOSA's website is uncontested. In the event that

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77 United Nations Office for Outer Space Affairs, Information Furnished in Conformity with the Convention on Registration of Objects Launched into Outer Space, ST/SG/SER.E/333, (April 3, 1998), http://www.oosa.unvienna.org/oosa/download.do?file_uid=416.

78 United Nations Office for Outer Space Affairs, Search Results, http://www.oosa.unvienna.org/oosa/search.do?cur=1&objectStatusCrit=&duplicateRegistrationCrit=&spacecraftCrit=&gsoActiveCrit=&nameOfSpaceObjectCrit=&unRegisteredCrit=&docNoIdxCrit=&sarConstellationCrit=&nrbitCrit=&docSeriesIdxCrit=&npsYesNoCrit=&stateOrganizationCrit=CN&dateOfLaunchCrit=&launcherCrit=&submit_btn=SEARCH&spacestationCrit=&internationalDesignatorCrit=&gsoYesNoCrit=&gpsConstellationCrit=&launchFacilityCrit=.

79 United Nations Office for Outer Space Affairs, Information Furnished in Conformity with the Convention on Registration of Objects Launched into Outer Space, ST/SG/SER.E/377, http://www.oosa.unvienna.org/oosa/download.do?file_uid=1493; Yoon Lee, *Registration of space objects: ESA member states' practice*, SPACE POL'Y 44, 47 (2006).

80 Yoon Lee, *id.*, at 48.

81 United Nations Office for Outer Space Affairs, U.N. G.A. Doc. A/AC.105/806 (Aug. 22, 2003); United Nations Office for Outer Space Affairs, U.N. G.A. Doc. A/AC.105/824 (March 16, 2004).

Shin is considered as a foreigner, the government has to check the legality and may lead to the termination of the Concession Agreement or may negotiate for other possible solutions. Nevertheless, in whatsoever case, Singapore, as mentioned earlier, is not the launching state under the international space law definition so it cannot be a state of registry.

However, a few academic questions arise. Can Thailand suspend or stop being considered as a state of registry during the said period? What are the outcomes of that notification? Will it cut the notifying State any connection to the notified space objects? Moreover, since the State which acquired the control of space objects is not the launching state, it cannot literally be eligible to be a state of registry.

V. CONCLUSION

The obligations and commitments of Thailand under the framework of GATS particularly in the basic telecommunications service sector have shown great commitment to foreign equity cap. These obligations and commitments were adapted and transformed into the national law, Foreign Business Act B.E. 2542 (1999) and Telecommunications Business Act B.E. 2544 (2001). However, regarding the gap and weakness of Thailand's domestic law resulting from the deal explained above, it has raised some considerations on nominee company and led to the proposal on revision of definition of 'foreigner' of the FBA. Without harming the principle of progressive liberalization propounded by the WTO, Thailand had an incentive to tackle this issue by revising the definition of "foreigner" of the FBA B.E. 2542 (1999). It is expected that the revision will bridge the legal gap relating the definition of 'foreign juristic person' under the FBA.

Regarding the criterion of share limitation to be considered as 'foreigner' for juristic person, the current FBA weighs on the ratio of shares held by foreigners which leads to the avoidance by setting up a nominee as exemplified by the case of the acquisition on Shin Corporation of Thailand; hence, the newly drafted definition of 'foreigner' is proposed by relying on the stricter criterion of the voting right besides the ratio of share holders and the registration in Thailand. In other words, if foreigners hold less than 49% of shares in a company and have more than half of voting rights, the company is

considered as "foreigner". Notably, the incentive to revise this law is in order to protect the reserved national business from the movement of nominee corporation. Despite the new draft being able to partially fill a loophole, there is still a leak because a foreigner can control the company by having a power to nominate directors regardless of voting rights. In particular, the operation of telecommunication service is highly related to national security. It should not permit foreign dominance through direct and indirect control or influence in setting a policy and engaging in management beyond that allowed by their share ownership. To prevent foreign dominance of local telecommunication business, this idea is similar to the recently drafted regulation proposed by the National Telecommunications Commission regarding the auction of 3G-2.1GHz spectrum licences.

Importantly, such acquisition has indicated great concerns in tackling threats in the international space law especially the state responsibility and liability from the space activity. From the space law point of view, the definition of 'launching state', which allows for four possible categories of States to be liable for damage caused by the launched space object; 1) the State which launches the space object, 2) the States which procures the launching, 3) the State where the launch takes place and 4) the State which owns the facility used in the launching,[82] fails to cover the case of nominee as previously explained.

Given the gradual development of space activities by developing countries in subsequent years, the ambiguous circumstance of the responsibility and liability regime particularly in the case of space activities operated by the nominee of foreigner juristic person should be taken into serious consideration. The interesting question is whether it is an essential point to amend and broaden the definition and scope of "launching state" as well.

It is apparent that the United Nations adopted the Resolution 59/115 on Application of the concept of the "launching State"[83] to encourage States to

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82 C.E.S. Horsford, *Legal Liability in Outer Space – the New Treaty*, 4(2) INT'L REL. 137, 138 (1972) cited by BRUCE A. HURWIZ in STATE LIABILITY FOR OUTER SPACE ACTIVITIES IN ACCORDANCE WITH THE 1972 CONVENTION ON INTERNATIONAL LIABILITY FOR DAMAGE CAUSED BY SPACE OBJECTS 22 (1992).

83 G.A. Res. 59/115, U.N. Doc. A/RES/59/115 (Dec. 10, 2004).

comply with international obligations on international space laws. Therefore, in relation to this case study only, States should implement national laws on the authorization and supervision of the activities in outer space of non-governmental entities under their jurisdiction. Further, it calls on States to voluntarily reveal information on the current practices regarding on-orbit transfer of ownership of space objects.

Although the preamble of this resolution bears in mind the term "launching state" as used in the Liability Convention and the Registration Convention is significant in international space law, it fails to clearly specify whether it covers the nominee case. As a result, as long as the problem of the acquisition of share by foreigner, specifically in commercial space business, has not been seriously solved, Thailand as a member of United Nations should go on strengthening its laws and regulations on supervision. Considering the disadvantage of the developing countries in terms of technological space innovation and a great need of capital in space investments and activities, it needs to be considered whether it is worthy to broaden the view of responsibility and liability regime to cover the State of nationality of the juristic person which has the actual control in the satellite business so that, at least, this liability regime can narrow the gap as well as balance the advantage and disadvantage between nations.

Table 1
Definition of Foreigner

General Agreement on Trade in Services (Article XXVIII (m) (n))	Announcement No. 281 of the National Executive Council (Section 3)	Announcement No. 281 of the National Executive Council (Amended in B.E. 2535 (1992) (Amended Section 3 (1))	Foreign Business Act B.E. 2542 (1999) (This Act repeals the Announcement No. 381 of the National Executive Council.) Section 4	Draft Foreign Business Act
(m) "juridical person of another Member" means a juridical person which is either: (i) constituted or otherwise organized under the law of that other Member, and is engaged in substantive business operations in the territory of that Member or any other Member; or (ii) in the case of the supply of a service through commercial presence, owned or controlled by: 1. natural persons of that Member; or 2. juridical persons of that other Member identified under subparagraph (i);	Foreigner means natural person and juristic person not of Thai nationality and including (1) Juristic person of which half or more capital are belong to foreigner (2) Juristic person having half or more of the juristic person's capital shares held by foreigner or having half or more foreigners as a shareholders regardless how much such foreigners invest (3) Limited partnership or registered ordinary partnership having the managing partner or manager as foreigner	(1) Juristic person of which half or more registered capital are belong to foreigner or juristic person having foreigner or juristic person investing in shares with a value of half or more of the total capital of the juristic person.	"Foreigner" means (1) Natural person not of Thai nationality. (2) Juristic person not registered in Thailand. (3) Juristic person registered in Thailand having the following characteristics: (a) Having half or more of the juristic person's capital shares held by persons under (1) or (2) or a juristic person having the persons under (1) or (2) investing with a value of half or more of the total capital of the juristic person. (b) Limited partnership or registered ordinary partner-ship having the person under (1) as the	"Foreigner" means (1) Natural person not of Thai nationality. (2) Juristic person not registered in Thailand. (3) Juristic person registered in Thailand having the following characteristics: (a) Having half or more of the juristic person's capital shares held by persons under (1) or (2) or a juristic person having the persons under (1) or (2) investing with a value of half or more of the total capital of the juristic person or juristic person having persons under (1) or (2) having authority under the law or article of association or agreement

(n) a juridical person is: (i) "owned" by persons of a Member if more than 50 per cent of the equity interest in it is beneficially owned by persons of that Member; (ii) "controlled" by persons of a Member if such persons have the power to name a majority of its directors or otherwise to legally direct its actions; (iii) "affiliated" with another person when it controls, or is controlled by, that other person; or when it and the other person are both controlled by the same person;			managing partner or manager (4) Juristic person registered in Thailand having half or more of its capital shares held by the person under (1), (2) or (3) or a juristic person having the persons under (1), (2) or (3) investing with the value of half or more of its total capital.	on voting right to have half or more of voting right of the total voting right of the juristic person. (b) Limited partnership or registered ordinary partner-ship having the person under (1) as the managing partner or manager (4) Juristic person registered in Thailand having half or more of its capital shares held by the person under (1), (2) or (3) or a juristic person having the persons under (1), (2) or (3) investing with the value of half or more of its total capital or juristic person having persons under (1) or (2) having authority under the law or article of association or agreement on voting right to have half or more of voting right of the total voting right of the juristic person.

A New Liability Regime for the Space Sector – an Economic Imperative

Lotta Viikari[1]

Abstract

It is not always easy to establish liability pursuant to international law of outer space, yet damages in the space sector can be considerable. The damaging potential of space activities can exceed the capacity of any single space faring entity to make reparation. Absolute and unlimited liability could render the highly hazardous activities uninsurable. Complex causation questions may complicate the situation further. The mere determination of the liable entity can be a problem. Accordingly, allocation of losses within a larger community of relevant entities to balance the competing concerns would seem useful. It could better retain the economic viability of the space sector, yet still secure adequate indemnification for damages. Compensation claims for damage resulting from particularly risky activities should be facilitated, but operators of activities that are deemed necessary yet entail high risks should be shielded from excessive claims. The setting in the space sector seems in many respects similar to that in the use of nuclear power, which also entails significant risks. In this sector, the solutions adopted include, inter alia, a three-tiered system of compensation with absolute but limited liability of the operator of a nuclear installation, coupled with limited liability of the state in which the installation is located, and an international compensation fund. There are also certain other examples of international trust fund mechanisms serving very similar purposes which the space sector could draw inspiration from.

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[1] This article is based largely on the author's presentation given in the 60th International Astronautical Congress, 12-16 October 2009, Daejeon, South Korea. Lotta Viikari is Professor of Public International Law and Director of the Institute of Air and Space Law at the University of Lapland, Rovaniemi, Finland. Previously, she has served as an Acting Professor of Private International Law at the University of Lapland and as an Assistant Professor in Constitutional Law and International Law at the University of Joensuu, Finland. Additionally, she has had various researcher positions at the University of Lapland. Professor Viikari holds a degree of Doctor of Laws (University of Lapland), a degree of Licentiate of Administrative Sciences (University of Joensuu), and a Master of Laws degree (University of Lapland). She has published especially in the areas of space law, international environmental law, and law of the sea. Her publications include three monographs of which The Environmental Element In Space Law: Assessing The Present And Charting The Future Studies In Space Law, Vol 3 (2008) has been awarded the Social Science Book Award of the International Academy of Astronautics (2009) and the Finnish Lawyers ´ Society Award for the best legal PhD dissertation in Finland (2007).

CONTENTS

I. INTRODUCTION

Liability for damages in the space sector is problematic in various ways. Firstly, it can already be a challenge to determine the most appropriate (or even any) liable entity or entities. This is partly due to deficiencies in the legal instruments of the international law of outer space. The five U.N. space treaties date back to the 1960s and 1970s; at that time, it was not easy to imagine the needs of the modern space sector in this respect. It can also be difficult to determine the source of damages which take place in outer space, possibly tens of thousands of kilometres from the Earth. In addition, complex causation questions cannot be avoided. Consider, for instance, the problems in attributing damage to particular pieces of space objects and, moreover, the potential cumulative effects of damaging events. Additional problems may derive from the fact that, pursuant to the 1972 Convention on International Liability for Damage Caused by Space Objects (hereinafter Liability Convention),[2] there may be various 'launching states' equally liable for compensation.[3]

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[2] Convention on International Liability for Damage Caused by Space Objects, Nov. 29, 1971, 961 U.N.T.S. 187.

[3] The term "launching state" includes "(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". *See* Convention on International Liability for Damage Caused by Space Objects, art. I.c.

The problems related to liability in the space sector are manifold and involve various aspects of law and policy. Some of them have been know for decades, some are of more recent origin. What is common to many of them is that they revolve around questions of significant economic importance. This article focuses on these issues.

In the following pages, the article will first explain, in brief, why an improved liability system increasingly is an economic imperative for the space sector. After that, the current international liability regime pertaining to space activities and its shortcomings are examined. The article will then move to the area of nuclear liability, which could serve as a model for an improved liability regime for the space sector. In addition, some other liability regimes are also examined for the same purpose. Finally, a proposal for a new space liability regime is presented, as well as certain particularly important lessons that the space sector ought to learn from the analogous areas of human activity.

II. WHY DO WE NEED A BETTER LIABILITY SYSTEM FOR SPACE ACTIVITIES?

From an economic point of view, the current international regulation of liability in space activities entails various problems. One of these is the above mentioned fact that, pursuant to the Liability Convention, a single damaging incident may involve several 'launching states' who are equally liable for compensation. This can result in overlapping insurance coverage. Obviously, at least from the point of view of the victim, "too much" insurance is normally better than no insurance at all. However, from the point of view of insurance markets, such a situation is far from desirable. In addition, the extensive definition of a launching state used by the convention can result in rather unfair outcomes in terms of liability. At the same time, however, the definition remains vague enough to complicate in many cases the determination of which states in fact can be seen as constituting liable launching states.

Moreover, the damaging potential of space activities exceeds the capacity of any single space faring entity to make reparation. In particular, if nuclear power sources are used, damage can be considerable. For instance, if

radioactive materials from defunct satellites enter the atmosphere and fall down to densely inhabited areas of the Earth, the consequences can be drastic.[4] Even in the case of less serious incidents, absolute and unlimited liability (as currently established by the Liability Convention for damages taking place on Earth) would directly raise the costs of space activities and thus limit the development of space industry. It could also render what are inherently highly hazardous activities uninsurable.[5] Additionally, the victims´ well-secured position may occasionally be excessively strong from the perspective of space faring entities.

Where damages occurring in outer space are concerned, the Liability Convention offers a fault liability system. This system entails numerous problems of legal and economic nature which necessitate a more feasible liability regime sooner or later. The current system can result in very high damages also where incidents in outer space are in question. The apportioning of liabilities among different states involved can be complicated and may even lead to unfair or quite haphazard outcomes.

Furthermore, the criteria offered by the Liability Convention for determining compensation are rather ambiguous; so is even the definition of damage that needs to be compensated. Additionally, damage to environment of the global commons, any activity involving a mere risk of damage, as well as damage to nationals of the launching state and foreign nationals participating in the space operation fall completely outside the scope of the current international space liability regime. Even in relatively unequivocal cases of compensable damage proving the fault and/or the causality required can be impossible.

On balance, the space sector needs a clearer, fairer and more rational liability system. Above all, the allocation of losses within a larger community

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[4] Thus far the most famous incident of the type has been the *Cosmos 954* case, where a former USSR nuclear-powered satellite disintegrated over remote northern areas of Canada in 1978. The case was settled by an ad hoc protocol between the two countries in 1981. Protocol between the Government of Canada and the Government of the Union of Soviet Socialist Republics 1981, Apr. 2, 1981, 20 I.L.M. 689. *See more* below. For a more detailed treatment of the *Cosmos 954* case, *see* PHILIPPE SANDS, PRINCIPLES OF INTERNATIONAL ENVIRONMENTAL LAW, 897-898 (2003).

[5] Insurance can even represent c. 1/4 of the budget of a space mission. Laurence Ravillon, *Arbitral Disputes in the Space Activities Sector* 7 INT'L BUS. L. J. 801, 814 (2003).

of relevant entities is necessary to balance the competing concerns and retain the economic viability of the space sector, while still securing adequate indemnification for damages. On the one hand, compensation claims for damage resulting from particularly risky activities (even when undertaken with all due care) should be facilitated. On the other, operators of activities that are deemed necessary (or at least socially beneficial) but entail high risks should be shielded from excessive claims.[6]

In areas of human activities analogous to the space sector, liability has often been shared between the producer of damage and society according to different kinds of formulae. This is also called "socialization of risks".[7] For instance, limited liability for ship owners in maritime law has existed since at least the 17th century. Such treatment has been justified by the highly dangerous nature of maritime transport and its necessity for society.[8] Some "socialization of risks" would seem necessary also in the space sector. In this respect the most feasible area to draw inspiration from might not be maritime but nuclear law.

III. CURRENT LIABILITY REGIME OF THE UN SPACE LAW

In principle, the U.N. space treaties provide a party suffering a loss as a result of space activities with a very favourable international liability regime as compared to most other areas of hazardous activities. The general rule, according to Article VI of the Outer Space Treaty,[9] is that states bear international responsibility for activities in space. Article VII, moreover, establishes international liability of launching states. The launching state is

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6 Jutta Brunnée, *Of Sense And Sensibility: Reflections On International Liability Regimes As Tools For Environmental Protection* 53 INT'L & COMP. L. Q. 351, 357 (2004).

7 Guido Fernando Silva Soares & Everton Vieira Vargas, *The Basel Liability Protocol on Liability and Compensation for Damage Resulting from Transboundary Movements of Hazardous Wasted and Their Disposal* 12 Y.B. OF INT'L ENVTL. L. 69, 74 (2003).

8 *See* Robin R. Churchill, *Facilitating (Transnational) Civil Liability Litigation for Environmental Damage by Means of Treaties: progress, problems, and prospects,* 12 Y.B. OF INT'L ENVTL. L. 3, 35-36 (2003). It has been argued, however, that in the modern world such special treatment of a particular industry constitutes no longer justifiable subsidies. *Id.*

9 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and other Celestial Bodies, Jan. 27, 1967, 610 U.N.T.S. 205.

liable for damage to another state party or to its natural or juridical persons caused by its space object "or its component parts on the Earth, in air or in outer space, including the Moon and other celestial bodies". The Liability Convention complements these provisions by setting out more detailed rules for cases of "space damage" involving different states.

First, the Liability Convention establishes two separate regimes of liability: one of absolute liability (without any ceiling) to be applied in the case of damage caused by a space object "on the surface of the Earth or to aircraft flight" (Art. II),[10] and another based on fault liability which applies when the damage occurs in outer space (Art. III).[11] All space activities are ultra-hazardous. Therefore it has been deemed appropriate that those engaged in such activities (and gaining profit from them) should also bear the risk of any ensuing damage, whereas possible victims on Earth deserve full compensation. Article V of the Liability Convention improves the possibilities of victims of damage to obtain compensation by establishing joint and several liability of all launching states for joint launches and the right of the victim state to seek the entire compensation from any or all of the launching states.

The intention of the liability regime of all of the U.N. space treaties has indeed been to give a high level of protection to third parties not involved in a space project. Pursuant to the preamble to the Liability Convention, a focal motive for the convention was the "need to elaborate effective international rules and procedures concerning liability for damage caused by space objects and to ensure, in particular, the prompt payment under the terms of this Convention of a full and equitable measure of compensation to victims of

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9 Pursuant to art. VI, exoneration from absolute liability is to be granted "to the extent that a launching State establishes that the damage has resulted either wholly or partially from gross negligence or from an act or omission done with intent to cause damage on the part of a claimant State or of natural or juridical persons it represents", except in cases where the launching state has caused the damage by violating international law. *See* Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and other Celestial Bodies, art. VI.

10 Such inclusion of two parallel systems of liability within a single multilateral convention is quite unusual in international law. Another example is the (not yet in force) Basel Protocol on Liability and Compensation for Damage Resulting from Transboundary Movements of Hazardous Wastes and their Disposal, (Dec. 10, 1999) http://www.basel.int/meetings/cop/cop5/docs/prot-e.pdf, *see* art. 4 and art. 5, Silva Soares and Vieira Vargas, *supra* note 7, at 94.

such damage". As is stated in a document called "Advantages of Adherence to the Convention on International Liability for Damage Caused by Space Objects" (produced by a Working Group on the Status and Application of the Five United Nations Treaties on Outer Space under the Legal Subcommittee of the UNCOPUOS), "[b]y concentrating internationally the concept of absolute or objective and unlimited liability for any damage caused by space objects on the surface of the Earth or to aircraft in flight, the [Liability] Convention has become a unique case and a real novelty in contemporary public international law concerning the protection of victims".[12]

However, although this system may, by and large, afford victims of space operations considerable protection, it can appear far less just from the point of view of the states involved in the launch of a space object. Firstly, the Liability Convention does not apply at all to "damage caused by a space object of a launching State to: (a) Nationals of that launching State; (b) Foreign nationals during such time as they are participating in the operation of that space object from the time of its launching or at any stage thereafter until its descent, or during such time as they are in the immediate vicinity of a planned launching or recovery area as the result of an invitation by that launching State" (Art. VII). This limitation obviously excludes many of those most likely to suffer damage in case of an accident. Secondly, a major problem in this respect is the overly extensive definition of a launching state. Pursuant to the Liability Convention, "[t]he term 'launching State' means: (i) A State which launches or procures the launch of a space object; (ii) A State from whose territory or facility a space object is launched (Art. I.c).[13] Hence, most launches will involve several launching states, of which only few typically have a real say in the operation of the space mission. Application of the Liability Convention may thus result in liability of states that are in fact little more than "innocent bystanders".

It may even be complicated to determine which states constitute the launching states under the Liability Convention. Above all, the procurement

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12 *Report of the Legal Subcommittee on the work of its 45th session 2006, held in Vienna from 3 to 13 April 2006,* Annex I, Appendix, para. 3, U.N. Doc. A/AC.105/871 (Apr. 24, 2006).

13 Para. 3 of art. V of the Liability Convention further specifies that a state "from whose territory or facility a space object is launched shall be regarded as a participant in a joint launching". On the concept of launching state, *see also* G.A. Res. 59/115, U.N. Doc. A/RES/59/115 (Jan. 25, 2005).

of the launching of a space object is anything but an unequivocal expression, particularly where space objects launched by private entities are concerned. "Procurement" may be interpreted to include financial backing for a launch, a request by one state to another to launch a satellite of the requester or a private individual or enterprise providing payload for a launch, for instance. Any such link could cause a country to be considered a "launching state". Even state members of an international organization requesting the launch services of some state could be considered states "procuring" the launch of a space object. On the other hand, such activities as supplying minor components to the payload or the sale of a satellite should not be enough to qualify as "procurement".[14] The Liability Convention does not, however, define the concept in detail. Particularly in light of the rapid development of launching technology and privatization of the space sector, the definition of the term "launching state" is increasingly insufficient.[15]

Application of the UN space treaties may, thus, result in somewhat questionable outcomes. The Liability Convention also regulates situations where damage is 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, and of damage thereby being caused to a third State or to its natural or juridical persons", in which case "the first two States shall be jointly and severally liable to the third State" (Art. IV.1). In principle, this means that, for instance, if a piece of space debris hits a spacecraft of another state and this causes further damage to a third state, both the launching state of the debris (where its identity can be established) and that of the ("innocent") spacecraft damaged by it are jointly and severally liable for possible damage to any other states. In the case of damage which occurs in outer space, fault liability applies (Art. IV.1.b),

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14 Carl Q. Christol, *Protection of the Space Environment - Debris and Power Sources in* THE USE OF AIRSPACE AND OUTER SPACE FOR ALL MANKIND IN THE 21ST CENTURY – PROC. OF THE INT'L CONF. ON AIR TRANSPORT & SPACE APPLICATION IN A NEW WORLD 253, 271-272 (1993).

15 *Review of the Status of the Five International Legal Instruments Governing Outer Space*, para. 11.c, Working paper submitted by Germany on behalf of Austria, Belgium, Czech Republic, Denmark, Finland, France, Greece, Hungary, Ireland, Italy, Netherlands, Norway, Poland, Portugal, Romania, Spain, Sweden, Switzerland and the United Kingdom of Great Britain and Northern Ireland, UNCOPUOS Legal Subcommittee 37th session, Mar. 23 – Apr. 3, 1998, U.N. Doc. A/AC.105/C.2/L.211/Rev.1 (March 30, 1998).

whereas for damage on Earth (or to aircraft in flight) liability is absolute (Art. IV.1.a). If a spacecraft with a nuclear power source (NPS) is involved and parts of it fall back to Earth, the damage may be very grave and the ensuing absolute liability accordingly significant. Moreover, the victims are allowed to ask for full compensation from any one of the liable states, who are then to apportion it between themselves according to fault (Art. IV.2). Consequently, if there is no fault on behalf of the launching state of the NPS-equipped spacecraft but only on the part of the launching state of the piece of debris (no matter how small that piece is), the latter is to pay all of the compensation pursuant to the Liability Convention.[16] Even in such a case, the victims of damage on Earth can, on the other hand, legitimately demand the entire compensation from the innocent state, which may eventually encounter difficulties in collecting it from the state at fault (despite its undeniable right to do so pursuant to the Liability Convention).

As concerns the amount of reparation for damage, Article XII provides that compensation for harm caused by space activities shall "provide such reparation in respect of the damage as will restore the person, natural or juridical, State or international organization on whose behalf the claim is presented to the condition which would have existed if the damage had not occurred". This standard could result in very high damages, particularly in the case of harm to the health or lives of people. On the other hand, the very general reference in Article XII to "international law and the principles of justice and equity" for determining the compensation is open to a variety of interpretations. The preamble to the Liability Convention states equally ambiguously that the payment should be "a full and equitable measure of compensation". Damage is, moreover, only compensable if it results in "loss of life, personal injury or other impairment of health; or loss of or damage to property of States or of persons, natural or juridical, or property of international intergovernmental organizations" (Art. I.a). This excludes any damage to the environment itself, whether occurring in outer space or on Earth in areas outside the national sovereignty of states. Hence, a potential polluter does

16 This illustrative example has been presented by Armel Kerrest, *Space Debris, Remarks on Current Legal Issues* PROC. OF THE THIRD EUROPEAN CONF. ON SPACE DEBRIS 869, 870-871 (2001). The author suggests that liability rules should be amended so as to avoid outcomes where damage resulting from nuclear pollution is not compensated by the user of the NPS. *Id.* at 873.

not need to worry much about environmental losses, even when they can affect the environment significantly, as long as there is no damage to "foreign" property or persons. As mentioned above, the Liability Convention also restricts its scope by excluding damage caused to citizens of the same country which launched the space object in question, as well as to foreign nationals participating in that space operation (Art. VII). Furthermore, under Article III, persons (as well as property) must be on board a space object in order to recover damages, a condition which in principle would, for instance, exclude incidents in which astronauts engaged in extravehicular activities are killed.

It is also questionable whether the Liability Convention's "damage" actually covers anything but clearly material damage. If it is interpreted to include only strictly material damage, instances like interference caused by telecommunication satellites to space activities of others would, at worst, not fall under the scope of the Liability Convention's provisions at all.[17] Moreover, the ambiguous terminology of the Liability Convention can even be interpreted to exclude all damages caused by space debris: it applies to damage "caused by a space object" and the only definition Article 1.d gives for a space object is that it includes "component parts of a space object as well as its launch vehicle and parts thereof". Such a definition is very vague, being nearly no definition at all. This provision appears to refer to space objects that are entire units, extending at most to component parts (also unitary) thereof.[18] There seems to be no great difficulty in designating inactive satellites as well "space objects". The situation gets most complicated in the case of little pieces of debris, as one can argue that such an item constitutes neither a space object nor a component part of one (nor a launch vehicle or a part thereof). It seems especially debatable whether a piece of fragmentation debris and micro-particulate matter can be regarded as a "space object" or a "component part". Even less clear is the situation with other types of pollution

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17 *See* Carl Q. Christol, *Protection of Space from Environmental Harms* 4 ANNALS OF AIR & SPACE L. 433, 447-450 (1979).

18 The provision has even been interpreted as dealing with not only entire but preferably fully operating units, i.e., "functioning unitary entities". Christol, *supra* note 14, at 256. (According to the author, harms produced by space debris nevertheless invoke liability under the existing treaty regime. *Id.*)

and contamination, including space mission litter. Questions have also been presented regarding the legal status of rockets that never reach outer space, for instance, due to a launch failure.[19]

However, if space debris does not qualify as a space object for the purposes of the Liability Convention, the instrument becomes largely meaningless in establishing liability for space activities. The most common and hazardous form of potential damage related to space activities would then fall wholly outside the scope of any international legal regulation.[20] Consequently, it has been argued that "anything which has been launched into outer space whatever its size" qualifies as a "space object".[21] Alternatively, space debris can even be regarded as a "component part" of a space object.[22] Such a practical approach with a focus on safety and environmental concerns – by considering space debris as constituting either a space object or at least a component part of it – seems to be the only feasible interpretation given the hazards space debris poses today.[23] The question of a legal distinction between a valuable spacecraft and worthless space debris obviously still requires serious consideration. If space debris should be defined as a space object under the U.N. space treaties, it has been recommended that an additional protocol be elaborated for determining exactly which provisions of the space treaties apply to space

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19 Howard A. Baker, *Liability for Damage Caused in Outer Space by Space Refuse* 13 ANNALS OF A. & SPACE L. 183, 209 (1988). It has been pointed out that if an object simply ceases to be functional, this should have no influence on its legal status. The fact that even an attempted launch qualifies as "launching" under the Liability Convention (art. I.b) also seems to support the conclusion. See GEORGE T. HACKET, FORUM FOR AIR AND SPACE LAW VOLUME 2: SPACE DEBRIS AND THE CORPUS IURIS SPATIALIS 58 (Marietta Benkö & Willem de Graaff eds., 1994).

20 On technical aspects of space debris in more detail, *see* LOTTA VIIKARI, THE ENVIRONMENTAL ELEMENT IN SPACE LAW: ASSESSING THE PRESENT AND CHARTING THE FUTURE 31-45 (2008).

21 *See* Kerrest, *supra* note 16, at 870 and 873 footnote 1. *See also* the *European Code of Conduct for Space Debris Mitigation,* (June 28, 2004) http://www.stimson.org/wos/pdf/eurocode.pdf. The Code of Conduct defines *space debris* as "[a]ny man made space object including fragments and elements thereof, in Earth orbit or re-entering the Earth's atmosphere, that is non-functional", and *space object* as "[a]ny man-made space system and any of its components or fragments" The *Code of Conduct*, *ibid*. at 13-14.

22 This is the position taken in *The Report of the ESA Space Debris Working Group* 67 (Nov. 1988).

23 One explanation presented for the lack of a substantive definition of the term "space object" in the Liability Convention (and other UN space treaties) is that there was a common understanding of the meaning of the term at the time these instruments were drafted. *See* HACKET, *supra* note 19, at 56-57. For a discussion concerning the notions "damage" and "space object" in UN space treaties, *see*, *e.g., Report of the 64th Conference of the ILA* 164-167 (1991).

debris and which to valuable space objects. If space debris is not deemed to be a space object, the protocol could determine when it is perhaps permissible to remove or re-orbit space debris in order to prevent collisions or close encounters with functional spacecraft.[24]

Regardless of the interpretation of "space object", mere activity involving a risk of damage, no matter how hazardous, can never result in liability under the provisions of the U.N. space treaties. Moreover, even in cases of indisputable material damage, proving the fault and the causality required is often an insurmountable obstacle. For instance, even if debris particles of all sizes were included in the legal definition of a "space object", great practical difficulties would remain in establishing liability of the launching state. In most cases, it is almost impossible to prove in a given case that the damage was even caused by space debris, that a particular piece of debris is part of a registered space object of a certain state and, furthermore, that there exists such fault (when the incident takes place in outer space) on the part of the launching state that it can be held liable for the damage.[25] More generally, there are obvious difficulties involved in establishing any fault when standards of conduct for handling the environmental hazards of space activities have yet to be adopted.[26] This seems problematic particularly in the case of damage caused by space debris. Moreover, it is very difficult, if not impossible, to ascertain what kind of damage certain debris can cause, let alone when a particular form of damage will occur. Even where some kind of a prediction of a possible collision can be made, there rarely exists any possibility of carrying out manoeuvres to avoid it. Not surprisingly, the rationale for fault-based liability for damage caused in outer space has been frequently questioned.[27]

Thus far the only claim that has ever been presented under the Liability Convention has been that of Canada in the *Cosmos 954* case, where a former

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24 *See* INTERNATIONAL ACADEMY OF ASTRONAUTICS, COSMIC STUDY ON SPACE TRAFFIC MANAGEMENT 15 (Corinne Contant-Jorgenson, Petr Lála & Kai-Uwe Schrogl eds., 2006).

25 The situation is typically less complicated where damage is caused by space debris falling down to Earth: there is no need to establish fault because the absolute liability regime applies and, moreover, objects that are capable of entering the Earth atmosphere tend to be large and heavy and thus more likely to be identifiable. *See* Kerrest, *supra* note 16, at 870.

26 Nicolas M. Matte, *Environmental Implications and Responsibilities in the Use of Outer Space* 14 ANNALS OF AIR & SPACE L. 419, 435 (1989).

27 *E.g.,* Baker, *supra* note 19, at 214-215; HACKET, *supra* note 19, at 211-212.

USSR nuclear-powered satellite disintegrated over remote northern areas of Canada in 1978. The Canadian claim for some 6 million Canadian dollars was based on the Liability Convention, the Outer Space Treaty and general principles of international law.[28] It covered, *inter alia*, the costs of restoring the territory rendered partly unfit for use by radioactive debris scattered over large areas, hence constituting damage to property within the meaning of the Liability Convention.[29] Canada also reserved the right to present additional claims, e.g., for compensation for the costs of establishing a Compensation Commission under the Liability Convention. Eventually, however, the dispute was not resolved by invoking the Liability Convention but by a protocol between the two states in 1981.[30] The Soviet Union agreed to pay 3 million Canadian dollars "in full and final compensation" which Canada in turn accepted "in full and final settlement of its claim".[31] However, the *Cosmos 954* case provides an interesting precedent in one important respect concerning the interpretation of the Liability Convention: at least in this incident "space debris" was evidently considered a "space object" as it sufficed, in the light of the initial Canadian claim, to establish liability under the Liability Convention.[32] On the other hand, it can be argued that the case only supports the conclusion that particularly hazardous (radioactive) space debris constitutes a "space object" under the UN space law. Besides, the Soviet Union never officially admitted liability.[33]

IV. NUCLEAR LIABILITY

As has been explained above, the current international space liability system as established by the UN Liability Convention is far from satisfactory.

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28 *Statement of the Canadian Claim*, paras. 14-24, 18 I. L. M. 899 (1979).

29 The total costs of the Canadian government were apparently much higher, however (some 14 million Canadian dollars); what is more, the US helped with the cleanup operations. Jason Reiskind, *Toward a Responsible Use of Nuclear Power in Outer Space: the Canadian initiative in the United Nations* 6 ANNALS OF AIR & SPACE L. 461, 463 (1981).

30 *Supra* note 4.

31 For a more detailed treatment of the *Cosmos 954* case, *see* SANDS, *supra* note 4, at 897-898.

32 However, the Soviet Union never officially admitted liability and the dispute was ultimately not resolved by invoking the Liability Convention. Besides, it can be argued that the case only supports the conclusion that particularly hazardous (radioactive) space debris constitutes a "space object" under the UN space law. Baker, *supra* note 19, at 211-213.

33 Baker, *supra* note 19, at 211-213.

There is no question about whether it needs to be improved or not – the question is merely how long we can afford to live without a better system. Thus far the space sector has been spared of considerable damaging incidents but as soon as a major accident necessitating a feasible space liability system occurs, we will most likely be in trouble in terms of liabilities. Creating a better space liability system may not be an easy task, yet an imperative one. It would be wise to try to learn from the solutions of similar areas of human activity while we still have time. The setting in the space sector seems, in many respects, similar in particular to that in the use of nuclear power, which also entails significant risks. There the solutions adopted include a three-tiered system of compensation with absolute but limited liability of the operator of a nuclear installation, coupled with limited liability of the state in which the installation is located, and an international compensation fund.

This is the system of liability sharing in Western Europe, which is embodied in several instruments, starting with the OECD's Paris Convention on Third Party Liability in the Field of Nuclear Energy[34] of 1960 and the IAEA's Vienna Convention on Civil Liability for Nuclear Damage[35] of 1963, the former of which was strengthened by the Brussels Supplementary Convention[36] in 1963. These were the first treaties to facilitate international civil liability claims for environmentally harmful activities.[37] Most Western European countries are parties to these conventions which were linked in 1988 by a Joint Protocol Relating to the Application of the Vienna Convention and the Paris Convention[38] that combined the two into one expanded liability regime.

In its first tier, this regime combines operator liability and insurance obligations. The system is based, at the first level, on strict (absolute) liability

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34 Convention on Third Party Liability in the Field of Nuclear Energy, as amended by the additional Protocol of 28th January 1964 and by the Protocol of 16th November 1982, July 29, 1960, 956 U.N.T.S. 264.

35 Convention on Civil Liability for Nuclear Damage, May 21, 1963, 1063 U.N.T.S. 265.

36 Convention of 31st January 1963 Supplementary to the Paris Convention of 29th July 1960, as amended by the additional Protocol of 28th January 1964 and by the Protocol of 16th November 1982, Jan. 31, 1963, 1041 U.N.T.S. 358.

37 The Paris Convention is regional in scope, whereas the Vienna Convention is a global treaty.

38 Joint Protocol Relating to the Application of the Vienna Convention and the Paris Convention, Sept. 21, 1988, 1456 U.N.T.S. 101.

of the operator of a nuclear installation, whereby there is no need to prove fault or negligence.[39] Although irrespective of fault, liability of the nuclear installation operator is qualified by limitations on the amount of compensation to be paid and time. According to the Vienna Convention, "[t]he liability of the operator may be limited by the Installation State to not less than US $5 million for any one nuclear incident" (Art. V). Furthermore, the Paris Convention set a maximum liability of 15 million Special Drawing Rights (SDRs, as defined by the International Monetary Fund),[40] which was increased by the Brussels Supplementary Convention up to 300 million SDRs (Art. 3).[41] In order to secure indemnification for damages, the operator is required to maintain insurance (or other form of financial security) covering its liability.[42] This has resulted in national insurance pools where several insurance companies contribute to cover a small part of the liability of an operator, as the capacity for individual insurers to cover nuclear risks is usually limited.[43] In addition to limitations on amount, the liability of a nuclear installation operator is limited in time: a general rule is that compensation rights are extinguished if damage claims are not instituted within ten years.[44] The 10-year period was set because insurance usually is not available for longer.[45] A 1997 Protocol to Amend the Vienna Convention on Civil Liability

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39 *See* the Vienna Convention, art. II and the Paris Convention, art. 3. An exception to this is "damage caused by a nuclear incident directly due to an act of armed conflict, hostilities, civil war, insurrection" or "a grave natural disaster of an exceptional character" (unless the law of the installation state provides to the contrary). *See* the Vienna Convention, art. IV.3 and the Paris Convention, art. 9.

40 States may also establish by national legislation greater or lesser amounts of operator liability (though not less than five million SDRs; art. 7.b). Most states have set such national limits. Churchill, *supra* note 8, at 8.

41 300 million SDRs is currently equal to about 470 million US dollars. For more about the SDR, *see* http://www.imf.org/external/np/exr/facts/sdr.htm. For the daily USD value of an SDR, *see* http://www.imf.org/external/np/fin/data/rms_sdrv.aspx. The 1997 Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage also sets a 300-million-SDR limit on the operator´s liability. *See* Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage, Sept. 12, 1997, 36 I.L.M. 1462 (1997), art. 7.

42 *See* the Paris Convention, art. 10 and the Vienna Convention, art. VIII.

43 For more details about the operation of such national insurance pools, *see* Tom Vanden Borre, *Are nuclear operators liable and insured in case of an Act of Terrorism on a Nuclear Installation or Shipment? Rethinking Nuclear Energy and Democracy after 09/11*, Presented at a Symposium organized by PSR/IPPNW in Switzerland (2002), http://www.ippnw.ch/content/pdf/Sympo_26042002/VandenBorre.pdf.

44 *See* the Paris Convention, art. 8 and the Vienna Convention, art. VI.

45 Churchill, *supra* note 8, at 9.

for Nuclear Damage (see more below) introduced an extended period of 30 years for presenting claims for death and personal injury (Art. 8). This seems quite reasonable, considering for instance that cancers may materialize relatively slowly after the actual exposure to radiation.[46]

On the second tier, the risks from the use of nuclear energy are borne by the state in which the nuclear installation is located: above the operator's limit of liability, claims are covered by supplementary public funds of the installation state up to a total of 175 million SDRs.[47] For damages exceeding this limit, there is a further third tier – an international compensation fund to which the convention parties jointly contribute in proportion to their installed nuclear capacity and gross national product (GNP).[48] The limit on damages which the international fund will cover is 125 million SDRs (thus the total compensation available from all sources is 300 million SDRs).[49] This third tier is a form of international collective loss sharing which, by taking into account the amount of nuclear capacity of contracting states, partly also emphasizes the idea of making the polluter pay. The primary liability of the nuclear installation operator obviously derives from the same principle. Nevertheless, it has been asserted that the basic concept behind this liability regime is actually not that of the polluter-pays principle but rather an equitable sharing of the risk of ultra-hazardous activities, which also involves an element of state subsidy.[50]

The system of the Vienna and Paris Conventions met with criticism for its failure to cover purely environmental damage, for instance.[51] A significant amendment to the system was introduced in 1997 by a Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage. Among other

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46 Churchill, *supra* note 8, at 11.

47 *See* the Brussels Supplementary Convention, art. 3.b.

48 Under the Brussels Supplementary Convention, contributions to the international fund are based (50 per cent) on the ratio between the GNP of each states party and the total of the GNPs of all of them for the year preceding the nuclear incident, and (50 per cent) on the ratio between the thermal power of the reactors in the territory of each party and the total thermal power of the reactors sited in all of them (art. 12.a).

49 *See* the Brussels Supplementary Convention, art. 3.b.iii.

50 *See* PATRICIA W. BIRNIE & ALAN E. BOYLE, INTERNATIONAL LAW & THE ENVIRONMENT 94 (2002).

51 *See* Churchill, *supra* note 8, at 10-11.

things, the protocol broadened the definition of nuclear damage to include environmental damage and preventive measures: the new definition refers specifically to economic loss, the cost of measures to reinstate a significantly impaired environment, loss of income resulting from that impaired environment and the cost of preventive measures (Art. 2.2) – all of which are likely to constitute major parts of damage resulting from a serious nuclear incident.[52] The 1997 protocol also increased the limit of operator liability under the Vienna Convention to 300 million SDRs (of which a maximum of 150 million may be paid from public funds if the installation state so wishes) and simplified the procedure for amending the liability limits in the future (Art. 7). Moreover, the protocol extended the geographical scope of the Vienna Convention to "apply to nuclear damage wherever suffered" (Art. 3).[53] However, although in force, this protocol has thus far gained only five members.[54]

In 1997, another instrument dealing with compensation, the Convention on Supplementary Compensation for Nuclear Damage[55] was adopted. This free-standing treaty offers the possibility of a global nuclear regime in that it can be adhered to by all states regardless of whether they are parties to any existing nuclear treaties (or have nuclear installations on their territories).[56] It presents, for instance, a new formula (building upon the 1963 Brussels Supplementary Convention) for joint state contributions to the retrospective

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52 *Nuclear Energy Agency, Background Information Note For The Press Communiqué On The Revision Of The Paris Convention On Nuclear Third Party Liability And Of The Brussels Supplementary Convention*, Press Communiqué (Feb. 10, 2004), http://www.nea.fr/html/general/press/2004/2004-01-note.html.

53 However, a state party may decide to exclude (by national legislation) from the application of the Vienna Convention "damage suffered (...) in the territory of a non-Contracting State; or (...) in any maritime zones established by a non-Contracting State in accordance with the international law of the sea" provided that this non-Contracting State at the time of the nuclear incident "has a nuclear installation in its territory or in any maritime zones established by it in accordance with the international law of the sea; and (...) does not afford equivalent reciprocal benefits" (art. 3).

54 The ratifying states are Argentina, Belarus, Latvia, Morocco and Rumania. In addition there are 10 other signatory states.

55 Convention on Supplementary Compensation for Nuclear Damage, Sept. 12, 1997, http://www.iaea.org/Publications/Documents/Conventions/supcomp.html (not yet in force).

56 However, a state not party to the Paris Convention or the Vienna Convention must have comparable national legislation. If a state has civilian nuclear power plants, it must also be a party to the Convention on Nuclear Safety *see* arts. XVIII-XIX, June 17, 1994, 33 I.L.M. 1514 (1994).

international fund for amending nuclear accidents.[57] Pursuant to the formula, states would contribute funds in accordance with their nuclear capacity and an amout based on the ratio of their contributions to the UN budget (Art. IV.1). However, this convention is not yet in force.[58]

In 2004, the contracting parties to the Paris and Brussels Conventions signed protocols[59] to amend the instruments which increased their compatibility with the IAEA Conventions amended/adopted in 1997. Like the Vienna Convention as amended by the 1997 protocol to it, the revised Paris Convention contains a detailed definition of "nuclear damage", allowing for a broader range of damage to be compensated than the previously existing categories of personal injury and damage to property only (Art. I.a.vii.). Equally important was the expansion of the geographical scope of the convention: the revision allows for victims in more countries to be compensated in case of a nuclear accident with trans-boundary implications.[60]

The most important change introduced by the amending protocol, however, was the substantial increase in the three tiers of compensation of the Brussels Supplementary Convention: the new limits of liability set by the protocol are a minimum of 700 million Euros for the nuclear installation operator, a maximum of 500 million Euros for the installation state, and a collective state contribution of at most 300 million Euros (Art. 3, paras. a-b.). The resulting total of 1.5 billion Euros is a considerable increase over the previous SDR amounts established by the Brussels Supplementary Convention (approximating a total of 350 million Euros only). Beyond this new available total compensation, it is at least tacitly assumed that the installation state

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57 Pursuant to this formula, states would contribute funds in accordance with their nuclear capacity and an amout based on the ratio of their contributions to the UN budget (art. IV.1).

58 It has gained only four ratifications (by Argentina, Morocco, Rumania and the USA).

59 Protocol to amend the Convention On Third Party Liability In The Field Of Nuclear Energy of 29th July 1960, as amended by the additional protocol of 28th January 1964 and by the protocol of 16th November 1982, the Paris Convention, Feb. 21, 2004, http://www.nea.fr/html/law/paris_convention.pdf, and Protocol to amend the convention of 31st January 1963 Convention of 29th July 1960 on third party liability in the field of nuclear energy, as amended by the additional protocol of 28th January 1964 and by the protocol of 16th November 1982 (Brussels Supplementary Convention), Feb. 21, 2004, http://www.nea.fr/html/law/brussels_supplementary_convention.pdf.

60 Compare the original art. 2 of the Paris Convention and the same article as amended by the protocol.

will cover any damage in excess of the 1.5 billion Euros.[61] The 2004 protocol also changed the convention's unit of account to Euro, to avoid fluctuations in the value of the SDR.[62]

V. OTHER LIABILITY REGIMES

Another interesting precedent for the space sector is provided by the liability system of the International Convention on Liability and Compensation for Damages in Connection with the Carriage of Hazardous and Noxious Substances by Sea,[63] which establishes the "International Hazardous and Noxious Substances Fund" (Art. 13) to provide compensation (up to 250 million SDR per incident) for damage which is not compensated in the first tier by ship owners.[64] The fund is financed by contributions from the importers and receivers of cargo containing hazardous or noxious substances. The convention has not, however, received enough ratifications to enter into force.[65]

A related system is that established by the International Convention on Civil Liability for Oil Pollution Damage[66] and the complementary International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage,[67] according to which supplementary funds for compensation of damages are provided by the oil industry, i.e., all persons receiving oil by sea in contracting states (Art. 10 *et seq.*). Unlike in the context of nuclear liability, there have been many claims pursued under

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61 Uranium Information Centre, *Civil Liability for Nuclear Damage*, UIC Nuclear Issues Briefing Paper # 70 (May 2006), http://www.uic.com.au/nip70.htm.

62 S*ee Nuclear Energy Agency*, *supra* note 52. Furthermore, the protocol altered the shares which provide the basis of joint state contributions to the international fund: 65 per cent based on installed nuclear generating capacity and 35 per cent on the ratio between the GNP of each contracting party and the GNPs of all of them (art. 12.a).

63 Convention on Liability and Compensation for Damages in Connection with the Carriage of Hazardous and Noxious Substances by Sea, May 3, 1996 (not yet in force), 35 I.L.M. 1415 (1996).

64 Art. 14.5. In accordance with this system, liability is shared in the first tier between the ship owner and the receiver of the cargo (art. 7). Insurance is compulsory (art. 12). There are sliding-scale limits on liability, depending on the ship tonnage (art. 9).

65 For a more detailed account of the convention, *see*, *e.g.,* Churchill, *supra* note 8, at 21-22; Silva Soares & Vieira Vargas, *supra* note 7, at 82-84.

66 Convention on Civil Liability for Oil Pollution Damage, Nov. 29, 1969, 973 U.N.T.S. 3.

67 Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, Dec. 18, 1971, 1110 U.N.T.S. 57.

the international oil pollution liability regime, both against ship owners and the Fund.[68]

One more example is the Basel Protocol on Liability and Compensation for Damage Resulting from Transboundary Movements of Hazardous Wastes and their Disposal,[69] which also has yet to enter into force. Again, there is strict liability, balanced by a liability ceiling (Arts. 4, 12; Annex B). Moreover, there is a time limit for claims, either ten years from the incident (Art. 13.1) or five years "from the date the claimant knew or ought reasonably to have known of the damage" (Art. 13.2). Fault liability applies when damage is caused by non-compliance with the Basel Convention or by "wrongful intentional, reckless or negligent acts or omissions" (Art. 4). In such cases also the liability ceilings of the system are not applicable (Art. 12.2). Insurance or other financial security is required (Art. 14).[70] The system includes a trust fund mechanism, the Technical Co-operation Trust Fund, which is maintained by voluntary contributions. It is, however, not a compensation fund for covering damage that exceeds the liability limits of the protocol;[71] the protocol only provides that, "[w]here compensation under the Protocol does not cover the costs of damage, additional and supplementary measures aimed at ensuring adequate and prompt compensation may be taken using existing mechanisms" (Art. 15.1), with these including the Technical Co-operation Trust Fund. The second paragraph of the article further states that, "[t]he Meeting of the Parties shall keep under review the need for and possibility of improving existing

68 Churchill, *supra* note 8, at 19. For a more detailed treatment of international liability and the fund system in oil pollution, *see, e.g.*, SANDS, *supra* note 4, at 912-923. For an informative assessment of conventions concerning liability for pollution from ships, *see* Churchill, *supra* note 8, at 15-22.

69 Basel Protocol on Liability and Compensation for Damage Resulting from Transboundary Movements of Hazardous Wastes and their Disposal, Dec. 10, 1999 (not yet in force), http://www.basel.int/meetings/cop/cop5/docs/prot-e.pdf.

70 Another very similar system is that provided by the 2003 Protocol on Civil Liability and Compensation for Damage Caused by the Transboundary Effects of Industrial Accidents on Transboundary Waters, which provides for strict operator liability (art. 4) with liability ceilings (art. 9 and Annex II) and time-limits for claims (art. 10), as well as fault liability in case of "wrongful intentional, reckless or negligent acts or omissions" (art. 5). Protocol on Civil Liability and Compensation for Damage Caused by the Transboundary Effects of Industrial Accidents on Transboundary Waters to the 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes and to the 1992 Convention on the Transboundary Effects of Industrial Accidents, May 21, 2003 (not yet in force), available at http://www.unece.org/env/civil-liability/documents/protocol_e.pdf.

71 The liability limits are in Annex B.

mechanisms or establishing new mechanisms". During the negotiations, developing and developed states were in disagreement over the need to establish an international fund for complementing inadequate compensation. The outcome of the disagreement was the obscure Article 15.[72]

The channelling of liability directly to the actual operators has often encountered resistance. An example set in another context is the 1993 Convention on Civil Liability for Damage Resulting from Activities Dangerous to the Environment (Lugano Convention),[73] which was negotiated under the auspices of the Council of Europe. The Lugano Convention applies generally to all potentially environmentally harmful activities and envisages, in principle, strict and unlimited liability of operators.[74] In order to secure compensation, it requires states to ensure that operators conducting dangerous activities in their territory have appropriate insurance or other financial security (Art. 12). Initially, the idea was to develop a complementary instrument concerning an additional compensation fund (similar to the fund established for compensation for oil pollution damage). However, due to the reluctance of states to adhere to the Lugano Convention, this plan has been put aside.[75] Nevertheless, the convention has not managed to receive even the three ratifications required for it to enter into force (Art. 32.3).

One more example of a system of strict liability of the operator (combined with mandatory insurance requirements; Arts. 13-17) is that of the 1989 Convention on Civil Liability for Damage Caused during Carriage of Dangerous Goods by Road, Rail and Inland Navigation Vessels.[76] This convention provides for limits of liability though (Arts. 9-12). Nevertheless, it has thus far only one State party (Liberia) and has thus also not entered into force.

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72 Silva Soares & Vieira Vargas, *supra* note 7, at 94. For a more detailed treatment of the history of the Basel Protocol, *see id.*

73 Convention on Civil Liability for Damage Resulting from Activities Dangerous to the Environment, June 21, 1993 (not yet in force), 32 I.L.M. 1228 (1993).

74 Chapter II. There are exemptions in art. 8, though.

75 Churchill, *supra* note 8, at 27-28.

76 Convention on Civil Liability for Damage Caused during Carriage of Dangerous Goods by Road, Rail and Inland Navigation Vessels, Oct. 10, 1989, http://www.unece.org/trans/danger/publi/crtd/doc/crtd_e.doc (not yet in force).

VI. A PROPOSAL FOR AN IMPROVED SPACE LIABILITY REGIME

Given the potential for massive adverse impacts caused by space activities, this sector would need feasible and functional risk management just as the other areas of human activity entailing risks of similar severity. This should include clear allocation of the burden of compensation between private and governmental stakeholders within a system where the victim of harm can easily, and without excessive cost, identify the entity from which to demand reparation in the first instance. From the point of view of anyone suffering damage the latter is essential; from the point of view of the space industry, the former.

Obviously, compensation for the victims of accidents and other negative consequences of space activities cannot be guaranteed simply by making the immediate actor at fault pay; the polluter-pays principle does not work very well in the space sector. The reasons have been explained above in more detail. They include the problems of potentially very high damages, as well as questions of proof and establishing fault (when damages taking place in outer space are concerned). Instead, tiered systems and collective loss-sharing arrangements similar to those adopted in other fields of high-risk activities internationally could prove useful in channelling the risks and ensuring means for adequate compensation.

One tool for achieving a balance between interests of the various stakeholders in the space sector might be an international 'space damage fund' or similar instrument that takes into account the extent of states' space activities as well as their economic situation.[77] When designing such a system, one needs to keep in mind the developing countries' demand that it is the space faring nations who should bear the costs of their activities. At the national level as well, those gaining the economic benefits of space activities ought to bear the primary responsibility. A system which does not appear fair both internationally and nationally would be unable to create much incentive to comply with the rules.

Hence, a mechanism similar to the post-disaster compensation regime of the nuclear sector in Western Europe could be one option. The first tier would

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77 Motoko Uchitomi, *Sustainable Development in Outer Space - applicability of the concept of sustainable development to space debris problems* PROC. OF THE FORTY THIRD COLLOQUIUM ON THE L. OF OUTER SPACE 71, 77-78 (2000).

consist of strict operator/owner liability with compulsory insurance (or other financial security). It has been argued, however, that the common requirement in civil liability treaties of insurance coverage for the full limit of operator liability – even where this is restricted to a certain sum – may not necessarily be an advantageous one. At worst, it could discourage damage prevention as liability is covered by insurance in any case. On the other hand, if the safety record and practices of operators directly affected the terms of insurance, this would encourage (or even require) them to act more cautiously.[78] Hence, the introduction of absolute but limited operator liability with obligatory insurance could optimally prove quite useful.

Operator liability (and the insurance to cover it) would then be backed up by supplementary state liability and, ultimately, by an international joint state fund. The international fund could be financed by contributions based on economic factors as well as the amount of space activities. Such a system seems fair in many ways. It does not burden an individual operator with excessive liability, yet clearly directs liability towards it that is commensurate with its control over and benefits derived from the hazardous activities. At the same time, it secures compensation by resorting to the next tiers if needed. In addition, the level of state liability and the international fund would be constructed in a way that takes cognizance of states' actual role in space activities as well as their economic capacity. Again, perceived fairness is essential.

In cases where the liable entity remains unknown, the entire reparation for damage should come from the international fund. This would be very useful where damage caused by debris that cannot be traced back to any launching state is concerned, for instance.[79] With the compensation fund as

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78 *See* Churchill, *supra* note 8, at 36.

79 For a proposal for a fund which would cover damage caused by unknown debris, *see* Kerrest, *supra* note 16, at 870; JOEL S. GREENBERG, ECONOMIC PRINCIPLES APPLIED TO SPACE INDUSTRY DECISION 395 (2003); Nandasiri Jasentuliyana, *Strengthening International Space Law: the role of the United Nations* PROC. OF THE THIRD ECSL COLLOQUIUM ON INT'L ORGANISATIONS AND SPACE L. 87, 91 (1999). Some decades ago, a proposal was made for a fund to cover only damage caused by re-entering, unidentifiable space objects impacting the Earth. *See* Paul G. Dembling & Swadesh S. Kalsi, *Pollution of Man's Last Frontier: Adequacy of Present Space Environmental Law in Preserving the Resource of Outer Space*, XX NEDERLANDS TIJDSCHRIFT VOOR INTERNATIONAAL RECHT 125, 145 (1973). The establishment of an international fund to compensate victims of damage caused by space objects has also been suggested in Bruce A. Hurwitz, *An International Compensation Fund for Damage Caused by Space Objects* PROC. OF THE THIRTY-FOURTH COLLOQUIUM ON THE LAW OF OUTER SPACE 201 (1992).

only the last resort, disadvantages related to such funds, e.g., a diminished preventive effect, are also minimized.[80] In addition to state resources, the international fund could be augmented also by the space industry.[81]

VII. LESSONS TO LEARN

In addition to utilizing liability regimes of areas similar to the space sector as technical models when designing a new space liability regime it is, however, of utmost importance that also the shortcomings of the other liability systems are thoroughly examined. The different kinds of civil liability treaties outside the space sector have been criticized for not providing compensation in cases of damage to non-economic components of the environment when restoration is not possible (irreparable ecological damage), for instance. Even where damage is in principle compensable, it may not be fully compensated, either due to limits of liability or because the funds available eventually prove insufficient. Another problem seems to be that many liability systems do not address adequately the problems in establishing a causal link between the damage and the harmful activity suspected of having caused it.[82] Causality presents a considerable challenge for any space-related liability regime as well.

Nevertheless, in practice, there are few other possibilities than international funds for providing even somewhat adequate compensation for damage in case of a major space accident. This limitation is obviously due to the extent of damage but also to the likely difficulties in even identifying the liable entity, or the 'launching state' with substantial enough connection with the damage, and, moreover, establishing fault. As explained above, a fund could be harnessed for providing compensation even in cases where the source of damage cannot be identified or fault established.

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80 For an assessment of the potential disadvantages of compensation fund systems, *see* NICOLAS DE SADELEER, ENVIRONMENTAL PRINCIPLES: FROM POLITICAL SLOGANS TO LEGAL RULES 59 (2002); Alan E. Boyle, *Making the Polluter Pay? Alternatives to State Responsibility in the Allocation of Transboundary Environmental Costs*, *in* INTERNATIONAL RESPONSIBILITY FOR ENVIRONMENTAL HARM 363, 363 (Francesco Francioni & Tullio Scovazzi eds., 1991). It should be noted, moreover, that some states have abstained from ratifying the Vienna Convention and Paris Convention examined above, because it may be possible to obtain greater compensation for nuclear damage outside this regime through national legislation. *See* Churchill, *supra* note 8, at 9-10.

81 Churchill, *supra* note 8, at 40.

82 Churchill, *supra* note 8, at 34-35, 37-38.

However, a fund cannot operate without funds. Accordingly, the space faring nations might not be too receptive to such ideas as they could be placed under an obligation to make available significant amounts of money for potential damage reparation. Considering the precedents from other areas of international activities, prospects for a 'space damage fund' seem increasingly bleak: most of the above-mentioned civil liability systems with compensation funds (with the exception of the oil pollution compensation mechanisms) have either not entered into force at all or have done so to a limited extent only. A liability system which is in force on a low level of commitment or just between few or relatively irrelevant contracting states can be worse than no liability system at all. At least it is likely to remain of little consequence.

In practice, the industrialized states have succeeded in furthering their agendas while the priorities of less developed states have been largely ignored. One example is the negotiation concerning the 1999 Basel Protocol on Liability and Compensation for Damage Resulting from Transboundary Movements of Hazardous Wastes and their Disposal, where private economic interests prevailed over the demands of developing countries concerning a global fund to assist in cleaning waste spills where reparation cannot be obtained from any other entity.[83] Considering the less successful examples of international liability systems in gaining acceptance and functionality, the rationality of spending the limited negotiating resources on developing new liability regimes has in fact been seriously questioned.[84]

Moreover, these mechanisms are retrospective: they are activated only when a damaging incident has already taken place. Especially in cases of major environmental disasters, this can easily lead to solutions that are 'too little, too late'. Even if pure environmental damage were compensated in principle, the compensation would remain an extremely problematic question for various reasons, some beyond the sphere of international space law, not least the challenges related to calculating the value of such damage in monetary terms. The challenges in valuing damage seem to become even more problematic if viewed from the perspective of the insurance industry.[85]

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83 *See* Silva Soares & Vieira Vargas, *supra* note 7, at 103-104.

84 *See*, *e.g.*, Churchill, *supra* note 8, at 32; Brunnée, *supra* note 6, at 351.

85 *Report of the 64th Conference of the ILA 1991*, *supra* note 23, at 178-179.

Even if these issues were resolved, there would be additional challenges in designing the liability system, including questions such as the determination of the relevant damage and appropriate time limits for liability given that the occurrence of damage in outer space may involve (very) long time lags. The difficulties in addressing and evaluating cumulative effects of damage in space would complicate the situation further.

On balance, it would clearly be far more effective to prevent damage altogether, all the more so as there does not exist sufficient technology for eradicating the space debris already generated, for instance. Obviously, 'restitution in kind' is in most cases practically impossible where degradation of outer space is concerned. In particular in cases of creation of considerable amounts of space debris, the only feasible remedy at the moment is financial compensation. The next problematic question would then be to whom such compensation ought to be directed as outer space is a completely international area. One suggestion has been to make compensatory payments to those states which "have a vital interest in the contaminated orbital regions", i.e., states whose existing space activities or those under preparation are hampered by the space debris.[86] However, the identification of such states and the allocation of payments might not be an easy task either.

Hence, a more feasible system could be an international fund that also supports preventive measures. Such a fund could be put in action in a preventive sense at least as concerns harm prevention in cases where a potentially damaging incident has already taken place or where there is a substantial threat of such an incident. An even more advanced preventive mechanism would be one where an international fund is harnessed to provide deterrent support for complying with damage prevention measures, i.e., prior to the actual occurrence of any foreseeable damage. For instance, it has been proposed in the discussions of the UNCOPUOS that "ways and means to provide technical and economic support" should be explored to alleviate the cost impact that compliance with space debris mitigation measures inevitably has on space operations.[87] A fund mechanism applicable for preventive

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86 *See* HACKET, *supra* note 19, at 173-174.

87 *E.g.*, para. 113 of the *Report of the Scientific and Technical Subcommittee of the UNCOPUOS on its 43rd session*, Vienna, Feb. 20 – March 3, 2006, U.N. Doc. A/AC.105/869 (March 16, 2006).

purposes could be one option to create such support. A fund mechanism seems practical also because it could provide a relatively effective anticipatory way to secure the availability of assets when needed.[88] A fund system has been proposed even for the removal of obsolete space objects which obviously would greatly diminish the risk of damaging accidents.[89] The costs of such removal are still quite prohibitive, however.

However, the application of economic mechanisms for controlling space activities might prove infeasible also due to the fact that these activities do not completely fit into the framework of realities and rationality on which economic mechanisms are typically built. For instance, the presumption behind the polluter-pays principle is that the charges related to polluting activities increase in proportion to the seriousness of pollution. Hence it should be in the interest of the polluters to reduce environmental degradation emanating from their activities.[90] This obviously requires that the charges are set at a level adequate for generating such a preventive effect. In the space sector, this level would typically need to be quite high, considering how expensive space activities are in the first place. Given the high risks involved, this could prevent space activities altogether. Economic instruments may even be used for penalizing undesirable behaviour by levying charges which are substantially higher than the costs that the behaviour actually results in. This should further increase the preventive function of such instruments, but for space activities it would easily entail exorbitant costs. On the other hand, despite the extreme expenses involved, economic considerations do not necessarily always play the most prominent role in space mission design and operation; this is most definitely the case where national security interests are at stake.

VIII. CONCLUSION

The amount of space activities is rising steeply. It seems to be only a matter of time when this sector also will, in practice, need a feasible regime

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88 *See* MARK WILLIAMSON, SPACE: THE FRAGILE FRONTIER 270 (2006). For a more detailed discussion concerning fund mechanisms, *see* VIIKARI, *supra* note 20, at 225-230.

89 *Report of the 64th Conference of the ILA 1991*, *supra* note 23, at 176, 178.

90 DE SADELEER, *supra* note 80, at 36.

for the allocation of liabilities. The current liability system established by the U.N. space treaties is quite outdated and will hardly be able to satisfy the space sector for much longer. Although it provides the victim of damage a relatively secure position, liabilities may be allocated somewhat randomly. Economic risks for space actors are excessive. In many cases even securing damages for the victims can be difficult, if not impossible.

This article has proposed a novel approach drawing on international liability systems of similar areas of high-risk activities. Well-designed tiered systems and collective loss-sharing arrangements could prove useful in channelling the risks and ensuring means for adequate compensation in the space sector. The first tier could consist of absolute but limited operator/ owner liability with compulsory insurance. This could be backed up by supplementary state liability and, ultimately, by an international fund. If the source of damage cannot be identified or fault cannot be established, the entire reparation could come from the fund. This would be the case where damage has been caused by unknown space debris, for instance.

Such a system should include clear allocation of the burden of compensation between different stakeholders within a system where the victim of harm can easily identify the entity from which to demand reparation. At best, it could even support preventive measures, instead of providing mere post-disaster compensation.

Although it might not be realistic to expect the space sector to endorse such a progressive approach in the very near future, the experiences from analogous areas of high-risk activities suggest that sooner or later something similar will also be needed for space activities. Otherwise space activities will one day no longer be economically feasible. Solutions adopted for similar situations in other fields of human activity should therefore be thoroughly examined in order to avoid unnecessary failures in regulating space liabilities.