THE LAW GOVERNING INTERNATIONAL PRIVATE COMMERCIAL ACTIVITIES OF SPACE TRANSPORTATION

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I. Introduction

When addressing the topic of 'international private commercial space transportation activities,' that are activities of 'spacecraft' and 'space carriers', it should, at the outset, be stressed that a special 'launching law' could and, maybe, should be considered. This writer would like to treat the 'international private commercial launching activity' as one of the forms of international (private commercial) space *transportation* systems (STS).[1] Another form of international private commercial space transportation would then be (the activities of) the aerospace plane, when it is used for purposes of international commercial transportation by private enterprise.

International private commercial launching law thus can be seen as a *lex specialis* of the *lex ferenda* of 'manned' space flight for international commercial transportation purposes. ('Manned' flight includes here ELV's, intending to bring a payload with passengers on board into outer space).

It may be realistic to consider whether public and private air law could and should be made to apply, *mutatis mutandis,* to the launching activity when undertaken by private enterprise, which will then be a commercial activity (so saying above: 'private commercial,' may be a tautology).[2] But first, the question arises, why is a special 'international private commercial *launching* law' needed, respectively, in relation to ELV's, pilotless space objects as a means of international commercial cargo (and eventually passenger?) transportation and reusable (navigable) launchers, transporting cargo and passengers, for remuneration or hire. The reason is that pending the feasibility of a full-fledged international

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1 On this subject, *see, e.g.,* Peter D. Nesgos, *Commercial Space Transportation: A New Industry Emerges,* 16 ANN. AIR & SPACE L. 393-422 (1991); Valérie Kayser, *An Achievement of Domestic Space Law: U.S. Regulation of Private Commercial Launch Services,* 16 *id.* 341-79 (1991). Andrei D. Terekhov, *Passage of Space Objects through Foreign Airspace,* 32 PROC COLLOQ. L. OUTER SPACE 50-55 (1989); C.B. Christensen and R. G. Steen, *Regulation of Commercial Space Transportation,* unpublished paper presented at the 35th IISL Colloquium, Washington D.C., USA, August-Sept. 1992. *See* 43rd International Astronautical Congress "Programme," IISL-92-0043 and "Book of Abstracts," p. 282. [These publications can be obtained through the International Astronautical Federation (IAF) from the International Institute of Space Law, Paris, France].

2 Of course, 'commercial' need not always be 'private'.

space transportation system by private enterprise, *'international'* commercial launching law could promote the commercial transportation of persons and goods from and to the territory of a State to outer space as the destination of the traffic and from outer space back to earth. This law would govern such space transportation activities if: (a) the flight is through foreign airspace; or (b) a foreign payload is carried; or (c) the transportation is effected *by a space carrier who is foreign to the State from where it operates.*[3]

The purpose of this inquiry is to investigate whether and to what extent it is possible and useful to apply the system of regulation, valid in public and private air transportation law, to private, commercial, international space transportation activities. Our starting premise rests on our past experience that whenever commercial exploitation becomes possible, States want to get their 'rightful,' 'legitimate' share.

In public air law, the 'ownership' of the air traffic originating in a country ('ownership' because the State is legally controlling the access to its airspace, *i.e.*, its market) is the basis of distribution by States of the international air traffic market among their national air carriers. The same may become true for private national space carriers inasmuch as States may legally control access to the Earth-Outer Space market which consists of space transportation, satellite telecommunications and remote sensing. Space resources (in place), however, remain outside the control of any State.

II. Methodology

Ms. Tanja Masson-Zwaan in her excellent article on The Aerospace Plane: An Object at the Cross-Roads Between Air and Space Law'[4] in which she demonstrates creative thinking, makes certain distinctions on the basis

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3 For instance, Arianespace launching an Ariane rocket with a payload, from Cape Kennedy. *Cf.* also the third freedom of the air, that is the traffic originating in a country and, therefore, belonging to that country, in case outer space is the destination outside the State's territory. No passenger traffic originates in outer space (it is always return traffic, so there is no fourth freedom of the air involved, although eventually cargo traffic may originate in outer space). Thus the passenger traffic between a State's territory and outer space 'belongs' to that State and its nationals. A foreign space carrier, therefore, would need a special permission to carry that traffic. The cargo traffic originating in outer space, supposedly, 'belongs to mankind.' Its carriage to earth is subject to the permission of the State of the territory of destination.

In space law the commercial launching activity is also *international*, if a foreign person or persons or foreign-originating goods (foreign payloads) are carried to/from outer space by a national space carrier. This is different in air law, as the nationality of the air traffic is immaterial with respect to the classification of flights as international.

4 *See* Tanja Masson-Zwaan, *The Aerospace Plane: An Object at the Cross-Roads Between Air and Space Law, in* AIR AND SPACE LAW: DE LEGE FERENDA 247*ff.* (1992) [hereinafter DE LEGE FERENDA].

of the *function* of the vehicle. She states that an aerospace plane can function as an aircraft, in which case air law applies; or an aerospace plane can function as a 'spacecraft': then space law applies. But she feels that if the aerospace plane carries passengers between places on earth through outer space, it is still functioning as an aircraft and comes under air law even when transiting and moving in outer space. This is a functional approach to law-making and the application of law.

Ms. Masson-Zwaan also makes a distinction between the transportation from the earth to outer space through *sovereign air space* and back and within outer space, the latter, according to her, being completely free.

Today's air law, in respect of the right of transit (incorporated in the multilateral Air Services Transit Agreement of 1944,[5] annexed to the Chicago Convention of 1944[6]), however, only applies to civil aircraft. Therefore, the Convention and Agreement should be amended (Art. 3) to include *civil space objects*, especially 'spacecraft,' that is a 'space object' when it functions as a commercial means of transportation.

Some further 'creative thinking' is necessary, as intimated by Ms. Masson-Zwaan. First of all, a distinction must be made between the *movement* of space objects and the *carriage* of payloads. As in air law: two different legal regimes should apply, namely. the law of *flight* and the law of (air) *transportation*. The important thing that counts when speaking of the movement of space objects, is *where* such movement takes place. The matter that counts when speaking of transportation, is *from where to where* the traffic is carried. However, such transportation, even within outer space, may not necessarily be free. If it takes place, for instance, by the US-registered Shuttle involving traffic (payloads) from the Russian-registered space station, Mir, to another, say a Chinese-registered space station, this would be subject to the permission of both the Russian Federation and China. The stations, registered by Russia and China, would be under their jurisdiction and control, *i.e.*, the Russian Federation and the Chinese government, respectively. This transportation in public air law is the so-called fifth freedom traffic, the *traffic* 'belonging' to two parties other than the US carrier, *viz.* both Russia and China, each having jurisdiction and control over their space station.

A further point is that Ms. Masson-Zwaan argues, as does the eminent scholar, Manfred Lachs,[7] whose recent death is an irreplaceable loss, that there is a right of innocent passage through foreign air space for

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5 International Air Services Transit Agreement, Dec. 7, 1944, 59 Stat. 1693, 84 U.N.T.S. 389.

6 Convention on International Civil Aviation, Dec. 7, 1944; 61 Stat. 1180, T.I.A.S. 1591, 15 U.N.T.S. 21 (hereinafter Chicago Convention of 1944).

7 *See* Manfred Lachs, *Freedoms of the Air - The Way to Outer Space, in:* DE LEGE FERENDA, at 241.

space objects. They argue that there is 'no right of States to foreclose access to outer space, given the free access of States to all areas of celestial bodies.'[8] They further argue that the Chicago Convention is to be supplemented with effective and efficient freedoms of the air, including the customary right of innocent passage for space objects.[9]

While agreeing with the idea of amending the relevant air law instruments, this writer still believes that there is no customary right of free transit for space objects on the basis of freedom of access to outer space. Small land-locked countries should always be able to reach outer space through international cooperation. These countries should be able to use the facilities of the space powers, which do have launching capabilities without necessarily having to transit foreign air space. After all, international cooperation is one of the main objectives of space law, and States are required to promote and practice international cooperation in their space activities.

International agreement will be required to confirm the right of all States and their nationals or residents to non-discriminatory, national treatment by all other States that are Space Powers, with respect to the licensing of launch activities and the use of launch sites in their territory. Thus international commercial space transportation law will have to impose an obligation on States to grant freedom to foreigners of friendly States, equal to the freedom their own nationals or residents enjoy in their territory in order to enable them to carry out space transportation activities from their territory.

In view of the preceding considerations, this writer doubts the need for a "Convention on Manned Space Flight," which has been jointly drafted in 1988 under the direction of Professors Böckstiegel, Gorove and Vereshchetin in Germany, the U.S. and the former U.S.S.R.[10] In my view such a Convention is unnecessary, inasmuch as manned space flight can be arranged between the participating States by an intergovernmental agreement. Moreover, the relevant Draft in its Article 1, rather loosely and arbitrarily, defines an international manned space flight as a "manned space flight in which persons of at least two or more States or of an international organization take part."

National commercial space activities, in general, can be taken care of by national legislation under Article VI of the Outer Space Treaty and, if international in the sense of more nationalities participating in the

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8 *See* art. I of the 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, art.VI, 18 U.S.T. 2410, T.I.A.S. 6347, 610 U.N.T.S. 205 (hereinafter Outer Space Treaty).

9 *See* also Bin Cheng, *Nationality for Spacecraft?, in*: DE LEGE FERENDA, at 203.

10 For a text of the "Draft for a Convention on Manned Space Flight" (hereinafter Draft), see 18 J. SPACE L. 209 (1990).

activity, by intergovernmental agreement between the States concerned and by contracts between the participants. In order to bind also non-participating States - that is States that do not participate in specific space activities - to rules governing any space activity, general international law is needed. That is the reason why we need new international space law for *private commercial international launching and space transportation activities*, at least insofar as we define an *international* space flight to mean:

- a flight in which more than one nationality participates (the launching of foreign persons or goods, foreign States *procuring* the launching); or

- a flight operated by a space carrier, carrying out space transportation activities from the territory of a foreign State; but especially also

- a flight which leaves the jurisdiction of one's 'own' State, *i.e.*, the launching authority or space carrier (owner or actual operator of the spacecraft concerned) and which enters a foreign jurisdiction.

The two latter categories of flights require a global (UN) Convention. This is even more true, if such flight is an international commercial service offered *by private entities as subjects of international law.*[11]

We will need for the *lex ferenda* of 'spacecraft,' a national registration, giving the spacecraft the nationality of the State of registry and we will have to impose on that State international responsibility for the flight safety of the spacecraft. Also, we will need a definition of a 'national space carrier,' and make that carrier internationally liable under the space transportation contract. In addition, we will need to internationally standardize the national licenses of 'spacecraft-cockpit crew,' cabin crew and, lastly, we will be in need of a definition of 'passengers and shippers' (the latter two as parties to the space transportation contract), their legal status and their respective rights and duties.[12]

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11 *Cf.* also Professor Stephen Gorove, *The Law of Outer Space for all Mankind in the 21st Century - Legal Problems of Manned Space Flight*, at 4 (mimeographed speech delivered at the International Conference on Air Transport and Space Application in a New World, Tokyo, June 2-5, 1993) [hereinafter Legal Problems of Manned Space Flight] in which he argued that "the simplest approach to a determination of the international character of a space flight would be to regard any space flight which is based on an international agreement as an international space flight."

12 Bin Cheng, in the 11 ENCYCLOPEDIA OF PUBLIC INTERNATIONAL LAW 299-303 (1989), says that an 'astronaut' (or 'cosmonaut') is 'any person who ventures into outer space or who travels on board a spacecraft.' Article VIII of the Outer Space Treaty speaks of personnel thereof, *which includes persons when outside their space object, but who do 'belong' to it.* I believe it is right, as Bin Cheng says, that where astronauts are called "envoys of mankind," that is merely done as a figure of speech, not giving them jurisdictional immunities.

The scope of space law is still undefined. There are the 'spatialists' (even though there is not an agreed borderline between the air space and outer space) and there are the 'functionalists.'

Air *transport* law is an example of the functionalist approach, since it applies to the activities of air carriers using 'civil' (transport) aircraft, both on the earth's surface and in the air space.

In space transportation law, the spacecraft moves in both the air space and outer space. The question that arises is whether it would be useful to adopt a functionalist approach toward commercial space transportation law by, *e.g.*, defining the scope of space law as applying to the activities of 'spacecraft' and 'space carriers,' wherever they take place.[13] And if so, would it be useful to distinguish a 'space transportation law,' separate from general space law and from air transportation law, and apply it to the commercial activities of launching agencies and other 'space carriers,' commercially using space objects as 'spacecraft'? What then would be the definition of 'spacecraft', 'space carrier' and 'space transportation'?

Let us start with 'space transportation.' For regulatory purposes, distinctions may be made between the movements of *'space objects,'* according to where their movements take place, that is:

- when they are being launched and travel through their own, national and/or free air space;
- when they are in transit through foreign air space;[14]

The 'crew' of a spacecraft are the persons who effect professional activities associated with the particular space mission during the flight. *See* Gorove, *Legal Problems of Manned Space Flight, supra* note 8, at 5.

13 A 'functionalist' definition of the scope of space law is given, *e.g.*, by Manfred Lachs in *The International Law of Outer Space.*, 113 RECUEIL DES COURS 33 (1964-III), *quoted in* I.H.PH. DIEDERIKS-VERSCHOOR, AN INTRODUCTION TO SPACE LAW 8 (1993): "Space law is the law meant to regulate relations between States to determine the rights and duties resulting from all activities *directed towards outer space* and within it - and to do so in the interest of mankind as a whole, to offer protection to life, terrestrial and non-terrestrial, wherever it may exist." (Italics supplied).

14 *See also* Stephen Gorove, *Legal Problems of Manned Space Light, supra* note 9, at 2-3. He questions, *inter alia,* whether a flight is to be regarded as a space flight before it reaches outer space. [*Editor's note:* Professor Gorove also questions whether a flight is "a space flight at the time of launching or attempted launching of a manned spacecraft..." He answers these questions in the affirmative, stating that such flights extend "to the embarkation, launch, in orbit, deorbit, reentry, landing and disembarkation phases."]. We could add: and if it never reaches outer space, is aborted and is an unsuccessful attempt. *See* also Convention on International Liability for Damage Caused by Space Objects, March 29, 1972, art. 1(b), 24 U.S.T. 2389, T.I.A.S. 7762, 961 U.N.T.S. 187 (hereinafter Liability Convention).

- when they move in outer space, on or separated from the launch vehicle, orbiting around the earth or around other celestial bodies; and
- when they are traveling on trajectories through outer space or de-orbiting and re-entering.

In these situations, four (or five) different kinds of carrying *payloads* on spacecraft, that is on transportation vehicles,[15] may be distinguished, namely:

- (a) the carriage (transportation) by one's *own* private space carriers of one's own *national* payloads (people, their luggage, goods and mail) between the earth and outer space;
- (b) the carriage (transportation) by one's *own* private space carriers of *foreign* payloads (people, their luggage, goods and mail) between the earth and outer space;
- (c) the carriage (transportation) by *foreign* space carriers of their own *national* or *foreign* (of third States) payloads (people, their luggage, goods and mail) between the territory of the State and outer space;
- (d) the carriage (transportation) of any commercial payloads (people, their luggage, goods and mail) *within* outer space; and possibly,
- (e) (a fifth kind though not a true 'space transportation'): the carriage (transportation) of commercial payloads from A to B, both located on earth, via outer space, with or without a *technical* stop[16] in outer space (*e.g.*, movement by an 'aerospace plane').

National and international space transportation law will have to address these specific activities separately, as these are 'privileges', to be accorded as freely as possible by the States to other States and their nationals. In air law these commercial relationships at present are regulated in bilateral air agreements, as multilateral consensus was not possible and still is not really politically feasible.

In space law, however, the facts - that outer space is declared to be the 'province of all mankind,' and that the freedom of use of outer space and free access to all areas of celestial bodies is stipulated together with the requirements of the use of outer space by all States on a basis of equality and the additional fact that the States are required to promote international cooperation, - may together constitute a fruitful basis for the conclusion of a multilateral convention on international commercial private space transportation.

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15 Spacecraft are manned space objects commercially exploited for transportation purposes, that is space objects with a person or persons on board being transported for remuneration or hire.

16 Note that if one *commercial* stop in space is made, the transportation may (also) come under category (a), (b) or (c), and if two or more commercial stops in space are made, (also) under category (d).

III. *New legal regimes?*

There has not been much legal development on a global, U.N.-involved, basis with respect to commercial space activities. There seems to be no urgent need for new rules as it may prove possible that the legal problems which present themselves in practice, can be solved by national legislation, intergovernmental bilateral and regional agreements and contract law.

At present, only a limited number of States are actually participating in space activities and private enterprise of even fewer countries is commercially active in outer space. In view of this, it may be useful to investigate whether new rules can promote international private space activities and whether such activities can be carried out by private participants belonging to more States.

It is my belief that, first of all, an international agreement on the standardization of national legislation with respect to the licensing of private launching activities (international private launch and space transportation) can promote such activities, assuming that an international regime of 'fair' competition can be established. Next, the international regulation of the carriage of payloads through foreign air space and from/to foreign territory should be brought under special 'freedoms of launch and space transportation,' comparable to the freedoms of the air, but should be granted more liberally.

Under the 1984 Commercial Space Launch Act payloads launched from the US or by US citizens are not considered to be 'exported.'[17] But to launch payloads, private enterprise does require a launch license from the DoT's Office of Commercial Space Transportation, and an export license is also needed for satellites and component parts manufactured in the US. If private enterprise wants its own launching site, the DoT also has to issue a license.[18]

As has been mentioned beforehand, friendly States should have non-discriminatory access (national treatment) to launching sites of other States, if they cannot reach outer space from their own territory in an economically and politically acceptable manner.

What is advocated in this article is not only a general agreement on an international freedom to carry payloads from any suitable place on earth to outer space, but also an international freedom to carry traffic

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17 Commercial Space Launch Act, 49 U.S.C. app. §§ 2601-23 (1982).

18 COCOM consensus is required (US, Canada, EEC countries, except Spain, Japan, Turkey and Australia) and the Missile Technology Control Regime (Agreement) may apply. A launch in itself is not an 'export,' but the 'transfer of control' (registration) of a satellite to a foreign person is 'export,' and requires government approval. For details, see Arms Export Control Act of 1976, 22 U.S.C. 2778 (1988); Export Administration Act of 1979, 50 U.S.C.A. app. §2414 (West 1991); International Traffic in Arms Regulations, 22 C.F.R. Ch.1, Subch. M. *See also* Space News, Aug. 16-22, 1993.

'originating' *(i.e.* making a stop-over) in outer space, from outer space to any suitable place on earth. Under such circumstances, private space carriers of all countries may freely compete for launch transportation.

Speaking of special launching law and space transportation law, it may appear that a functionalist approach is thereby adopted. However, this is not the case, since in our opinion, it will be preferable to adhere to the 'spatialist' approach, respecting the existing rules of the air and air transportaion law in force for activities in the air space, and the rules of space law and space transportation law, for activities in outer space. Furthermore, and in any case, an 'international' element of launch and space transportation is necessary to justify the drafting of an international legal regime for launch and space transportation inasmuch as outer space as such is not 'foreign' territory.[19]

Space activities are generally considered to be 'international,' if they are based on an international agreement, that is when more than one State or their nationals participate in the space activity. We would prefer to define 'international': (a) in the operational sense as cross-border flight[20] and (b) for transportation purposes, as the movement of payloads between areas under different jurisdictions.[21]

IV. Special Launching and Space Transportation Law[22]

Next to the existing regime in air law of the 'traffic rules of the air'[23] and the information to be furnished by the launching States as registration States, amounting to 'traffic rules of outer space,'[24] a new special legal regime should be drafted for the movement of spacecraft through the air space and through outer space and in orbits around the

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19 Under the Chicago Convention of 1944, *Air* services are 'international' when they pass through the air space of more than one State.

20 *Cf. also* art. 12 of the Chicago Convention of 1944 with respect to the rules of the air over the high seas.

21 *Cf. also* art. VII of the Outer Space Treaty.

22 For discussions of spacial launching and transportation law, see also the author's PRINCIPLES OF OUTER SPACE LAW IN HINDSIGHT, pt. V (1991) and HANNEKE L. VAN TRAA-ENGELMAN, COMMERCIAL UTILIZATION OF OUTER SPACE - LEGAL ASPECTS, ch. III (1989).

23 *See* Annex 2 to the Chicago Convention of 1944.

24 Convention on the Registration of Objects Launched into Outer Space, Jan. 14, 1975, art. IV, 28 U.S.T. 695, T.I.A.S. 8480, 1023 U.N.T.S. 15 (hereinafter Registration Convention). Note that space objects, other than aircraft, have to registered with the Secretary General of the UN *each time they are being launched.*

earth and, possibly, around other planets or on trajectories through outer space.

Apart from these mainly operational rules, which should apply to the mere movement of spacecraft through the air space and through outer space, the regulation of the economic side of launch and space transportation deserves special attention.

To identify spacecraft with aircraft for the purpose of defining the scope of a 'launching and space transportation law,' the definition of 'aircraft' should be amended so as to include 'any man-made vehicle, capable of moving or actually moving in the earth's air space.' At the same time, the 'airspace' could be (rather arbitrarily) defined as 'the space between the earth territorial surface (including buildings), and above sea level, up to a height of about 110 kms.' Also, a 'spacecraft' could be defined as 'any vehicle made by man, actually moving or being stationed in outer space.' Its movements or stationing would come under space law only when taking place in outer space.[25] A 'spacecraft'[26] or space vehicle[27] would then be defined as a manned space object, used by a 'space carrier' (NASA, a government space carrier; Arianespace, a private space carrier) for the carriage of payloads for remuneration or hire.

"Space object' is a generic term covering spacecraft, space vehicles, satellites, etc.[28] Movements of launch vehicles, as spacecraft, carrying payloads intended to be delivered into and to be active in outer space, would come under the rules of air and air transportation law, *when moving in the air space.* [29] A 'space carrier' would be an entity operating a

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25 *Cf. also* I.H.PH. DIEDERIKS-VERSCHOOR, AN INTRODUCTION TO SPACE LAW 9 (1993) where she states that as component parts are part of a space object under the Liability Convention, art. I.(d). Since this 'definition' was taken over in art. I.(b) of the the Registration Convention which thereby expanded the scope of jurisdiction and control of the registration State (art. VIII of the Outer Space Treaty), she concludes that "...as far as jurisdiction and control are concerned, a 'space object' is an 'object launched into outer space."

26 For the use of this term, see Agreement on the Rescue of Astronauts, the Return of Astronauts, and the Return of Objects Launched into Outer Space, April 22, 1968, art.1, 19 U.S.T. 7570, T.I.A.S. 6599, 672 U.N.T.S. 119 (hereinafter Rescue Agreement). *See also* art. 10 of the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies - adopted by the U.N. Gen. Assembly on December 5, 1979, *opened for signature* on Dec. 18, 1979, *entered into force* July 11, 1984 *(not in force for the United States),* U.N. Doc. A/RES/34/68 (1979) [hereinafter Moon Agreement].

27 This term is used, for instance, in art. V of the Outer Space Treaty and art. 8 of the Moon Agreement,

28 *Cf.* Bin Cheng, 11 ENCYCLOPEDIA OF PUBLIC INTERNATIONAL LAW 299-303 (1989).

29 Dr. René Oosterlinck, ESA's Chief of Personnel Management, states that a US law of August 8, 1979, amending the NASA's Authorization Act, defines a 'space vehicle' as "an object intended for launch, launched or assembled in outer space

spacecraft for public launch and space transportation for remuneration or hire. A regime, like that of Article 5 of the Chicago Convention of 1944, could be made applicable to such movements, if undertaken by a *foreign* space carrier from a State's territory (unilateralism). Launchings - if considered as non-scheduled flights and based on a contract between a space carrier and the State where the carrier is located (or one of that State's national agencies or that State's nationals), and effected from the territory or facility of that State, and assuming that the spacecraft or launching vehicle stays within the own national jurisdiction (own air space) of the State or over the high seas before entering and after leaving outer space and that the spacecraft carries only persons or goods originating in the State of the space carrier - could be brought under a regime like that of the Chicago Convention ('cabotage').[30]

We have stated that there is no traffic originating in outer space, eventually only cargo (space resources brought to the earth!), because 'ownership' of objects launched into outer space is not affected by their presence in outer space. However, we would like to suggest not to consider, for regulatory purposes, traffic from the earth - which is disembarked or off-loaded within outer space (for instance, on a celestial body or space station), when it is brought back to the earth after such a 'stop-over' in outer space - as traffic which still 'belongs' to the State of origin, but instead as traffic which originates in outer space and, therefore, 'belongs' to all States.

Also, it is suggested further that there should be a general right of States and their nationals to 'free access' from outer space to any suitable area on earth, subject only to safety, security and environmental and, possibly, traffic rights (for instance, if carrying payloads from third States) conditions.

In summing up the basic principles, as we would like to see them adopted by all States with respect to launchings and space transportation, we may emphasize the following requisites:

- harmonization of spacecraft certification and space carrier and crew licensing in accordance with Article VI of the Outer Space Treaty;
- free access for all licensed space carriers to foreign launching sites for launchings of own payloads and payloads of third States;
- free access to traffic within outer space and traffic originating in outer space;

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and other components of a space transportation system, together with related equipment, devices, components and parts. This definition was not satisfactory and was not applied in the 'Freedom' Space Station Agreement, which made all 'flight elements' registrable, thereby making them different space objects. Of course, jurisdiction had to be and was arranged separately. *See* René Oosterlinck, *Private Law Concepts in Space Law, in* LEGAL ASPECTS OF SPACE COMMERCIALISATION (K. Tatsuzawa ed., 1992).

30 *Cf.* Art. 7 of the Chicago Convention of 1944. There should be a right of innocent passage through foreign airspace for such 'space-cabotage' agreed upon.

- free access to any suitable landing site on earth for spacecraft coming from outer space with own payloads or payloads from third States on board (possibly, subject to traffic rights conditions) or originating in outer space;

- application of air traffic rules and air transportation law to the activities of spacecraft and space carriers in the earth's air space; and

- application of space law to activities of spacecraft and space carriers in outer space.[31]

V. International Responsibility and Liability Law[32]

1. International Responsibility

'*National* activities *in* outer space, referred to in Article VI of the Outer Space Treaty, could be defined as:

- 'any activity carried out from the territory of a State,' but then only 'as far as the effect of that activity *in* outer space, or by it, *from* outer space on the earth or in the air space is concerned'; and

- 'any activity *in* outer space of any spacecraft, registered by the State in its name (the State thereby establishing its jurisdiction and control and thus its international responsibility), *or as far as launch and space transportation is concerned';*

- 'any activity of a space carrier, incorporated under the laws of the State and having its main operational basis in the State, for the purpose of the technical/operational as well as the *economic* regulation thereof.'

The national law of the State, when authorizing national space activities, should lay down *internationally agreed standard conditions* by which such activities may be carried out under its authority and supervision and also from its territory and under its registration.

The 'launching State' or 'launching authority' should be defined as the State or organization actually launching the space object or the State from whose territory or facility the object is launched, while the State of registry should be the 'State procuring the launching.' Thus States 'procuring the launching' would include the State actually launching and the State authorizing a *national* activity in outer space. For, we like to argue that by authorizing an activity in outer space the 'appropriate' State becomes a launching State, as it 'procures' the launching wherever that may take place.[33]

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31 For a brief overview of "Launches, Launchings and Launchers", see Annex I, *below,* and for the six "launch freedoms" which should be provided for in a multilateral Launch Services Agreement, see Annex II, *below.*

32 Space News and Aviation Week & Space Technology are the main sources of the factual information used in this article.

33 Art. VII of the Outer Space Treaty and art. 1 of the Liability Convention.

The 'appropriate State' of Article VI of the Outer Space Treaty authorizing and supervising the 'national' activity in outer space, because it is required to assume international responsibility for national space activities, may best be identified with the State of registry, as the registration creates a legal link between the space object/spacecraft and the State of registry.[34] The authorization of national activities, therefore, should always be conditioned on the registration of the space object(s) to be used in the authorizing State, inasmuch as the activities (as its *national* activities) come under that State's supervision. Furthermore, I believe that only a State 'procuring the launching' (including the State actually launching and the 'appropriate State') of a space object should be obligated to register it. The appropriate State should be obligated to register all space objects (spacecraft) used in national space activities.

2. International Liability

The space carrier should be internationally *liable* for the damage caused by its spacecraft next to, or in addition to or instead of, the State which is a launching State.[35]

In my opinion, the 'launching State' or 'launching authority' should no longer always be the internationally absolutely liable party for damage caused by space objects actually launched by it or from its territory or its facility. Once the space object and certainly the spacecraft is separated from the launching vehicle within outer space, the international liability should attach to the 'procurer of the launching,' that is the State or the private owner/operator of the spacecraft that procures the launching.

The (private) owner or operator (incl. the space carrier) of the space object (spacecraft) when procuring a launching, should be the internationally liable party for damage caused by the space object on the basis of 'proximate cause'. Recourse by the owner, *etc.*, against the State, organization or company that actually launched its space object, must be available if the owner can prove that the cause of the damage can be traced back to the launching.[36]

If the liability of the State or agency or company that actually launches a space object, is restricted internationally to only the launching activity, and the 'appropriate State' is obligated to be the State of registration of the space object used under its authorization and supervision for private national activities *in* outer space, and if such

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34 In The Netherlands 'appropriate' has been translated as 'concerned', 'proper', 'relevant'.

35 Note that the launching authority can itself be a space carrier and as such be internationally liable, both as an operator and a carrier.

36 As noted before, the launching authority can itself be a space carrier and as such be internationally liable, both as an operator and a carrier.

authorization becomes based on standardized conditions of authorization, and if the State of registration (as 'procuring' the launching by authorizing the activities *in* outer space) also becomes liable for damage caused by such object(s), - the commercial use of outer space by private enterprise may thereby be promoted.[37]

The aforementioned changes may become desirable to the extent that national sovereignty will be invading outer space as a result of the increasing feasibility of profitable exploitation of the natural resources of outer space and the growing public interest in space activities.

3. Government Liability and Limits of Liability

To promote private activities, a limitation of liability is in order. Already now, the US government assumes liability up to $1.5 billion for claims in excess of $500.000.000. Arianespace sells or requires insurance up to Ffrs.400.000.000, as the rest will be paid by the French government.[38]

The US Commercial Space Launch Act (CSLA) of 1984 was amended in 1988, when it was made mandatory to include inter-party liability waivers in launch contracts, and each party had to assume its own risks.[39] By such cross-waivers, claims on the basis of any theory of tort liability law are excluded and, as a rule (in the US), in case of damage, the launch exculpatory and waiver provisions will be enforced between the parties to a commercial launch contract under the Commercial Space Launch Act as amended in 1988.

An *international* regime of limited private liability should replace the contract law now being used (by NASA and ESA/Arianespace) which places the risk of losing a satellite during launching on the client and excludes action against the launching authority for satellite damages or loss. This must be changed and insurers who compensate the owner must have recourse against the private launcher. Changing the international responsibility and liability rules should promote international

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37 In France, Arianespace and SPOT-Image are private companies, without France having enacted national legislation in accordance with article VI of the Outer Space Treaty.

Intospace, a German private entity conducting micro-gravity experiments, also operates without specific authorization under national German legislation. Arianespace activities come under a 'Declaration' concerning the ESA program, while a special Committee considers launches for non-ESA countries.

38 *See* I.I. Kuskuvelis, *The Space Risk and Commercial Space Insurance*, 9 SPACE POL'Y 109*ff* (NO. 2, 1993).

39 Commercial Space Launch Act Amendments of 1988, 49 U.S.C. app. 2601 (1989).

cooperation and the privatization and internationalization of space activities.

New legal regimes will be necessary in the form of a special launching and space transportation law embodying a clear responsibility system and acceptable governmental and private liability regime for the 'space carrier.'

The private launch industry is still an infant industry in need of (financial) protection. This was one of the objectives of the 1988 amendments to the Commercial Space Launch Act.[40] However. this protection must be internationalized. The accident risk of one's own property (the launch vehicle, the payload) must be insurable. Also, there should be contractual liability. Launching contracts should no longer normally exclude action against the launching authority for satellite loss or damage, and the possibility of recourse action by the insurer should not be foreclosed. At the same time, 'third party liability,' which is unpredictable in terms of the amount to which it may rise, must be made insurable internationally and this can only be done effectively with the assistance of governments. Also, private space activities may be helped if the manufacturers of the space object are required to assume certain risks, for instance, until delivery of the object into outer space.

VI. Fair Competition

Internationally, should fair price competition be established between launchings in different countries? The US fears, particularly, cheap Russian and Chinese launch competition and only allows launchings of US-made satellites under certain conditions.[41]

The price for a Russian 'Proton' launching (*i.e.* of an Inmarsat 3 satellite in 1995) is $36 million, which is 1/3 of the US price and 40% of

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40 Tanja L. Masson-Zwaan in *The Martin Marietta Case or How to Safeguard Private Commercial Space Activities*, 35 PROC. COLLOQ. L. OUTER SPACE 239 (1993) favors waivers of all tort claims, including those for gross negligence. The Commercial Space Launch Act of the US could serve as a model, parties agreeing on risk allocation provisions and insurance of possible losses. Contractual cross waivers of liability, resulting in shared risk, each party bearing its own risk, will keep insurance costs and litigation costs low. *See* 9 SPACE POL'Y 165-66 (No. 2, 1993). For a brief discussion of the Martin Marietta v. Intelsat case, see Annex III, *below*.

41 Licences involving exports of over $14 million require approval of the US Congress. The U.S.-Peoples Republic of China Memorandum of Agreement Regarding International Trade in Commercial Launch Services of Jan 26, 1989, allowed the launch of nine satellites containing U.S. technology through 1994, on Long March rockets: to begin with the Aussat, delivered by Hughes, the Arabsat, and the Asiasat. There should be no technology transfer, no longer any unfair Chinese launch pricing, no silkworm missiles to Iran and China should be liable (?).

the price of an Ariane launching. However, there may be additional costs for Inmarsat in connection with necessary adjustments.[42]

A solution that has been suggested is to bridge the differences in pricing between launchings in the international competition by having the public sector pay more for launchings than the private sector or to agree on quota for States having launching capability.

ESA adopted a Resolution on launchings on October 23, 1992, wishing to ensure an autonomous, reliable and economical access to outer space for Europe by the utilization of the Ariane launcher programs and through the use of the launch base in Guiana. This will only be possible if Ariane has a guaranteed access to the international commercial market under fair competitive conditions.

ESA member States pledged to give preference to the utilization of the Ariane launcher, unless its use would be unreasonably disadvantageous with regard to cost, reliability or mission compatibility. CNES has a veto power in ESA and Eumetsat (16 nations) in order to promote the exclusivity of the Ariane programs.

Inmarsat (67 nations) and the European Telecom Satellite Organization of Paris (36 nations) consider the use of the Proton or a Ukrainian launcher.

But not only fair pricing is necessary to create a fair competitive environment with respect to space transportation activities; in air law, it is 'equal opportunity' for all States, the latter being sovereign in their air space and, therefore, over the access to their traffic market. There are big and small States so there is not an equal opportunity without a great measure of freedom. The question is how to create an equal opportunity, a 'level playing field,' for all States and their nationals with respect to outer space activities.

There is a great difference between States as to their position, power and financial strength to reach and be active in outer space. In view of this, space law emphasizes international co-operation. The form of such cooperation needs to be filled in by law. For one thing, the space powers must allow foreigners from non-space powers the possibility to use their territory for space activities. Non-discrimination and assistance are required here.

However, space law is different from air law. States cannot control (part of) outer space as their own. So the 'legitimate' share of each State with respect to space activities and the benefits thereof, is undefined and legally depends on a State's actual control of the activities in outer space, which still is legally undetermined. The forces of the market place may in

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42 The tentative US-Russia capacity and pricing agreement for launchings of May 6, 1993, intends to limit Russian access to the geostationary orbit-launch-market, by specifying the number of US-built satellites which will be given an export license by the US.

fact do that, unless eventually, it would be 'legally' determined by sheer space power.

VII. Conclusion

In dealing with international private commercial space transportation activites, one of the key question is whether there should be a separate international 'Launching Law' as a branch of space transportation law. Some of my reasons for advocating a UN-sponsored international negotiation of a new legal instrument governing more specifically launching activities, as a form of space transportation may be summarized as follows:

(a) Launching activities, for an important part, take place in the air space of the earth, where international and national 'rules of the air' apply;

(b) Space activities should gradually be left more and more to private enterprise. This should certainly be the case where they concern activities that can yield a profit, such as space transportation and, particularly, launch transportation;

(c) In order effectively to implement Article 1 of the Outer Space Treaty of 1967, an equal opportunity should be created for non-space powers to participate in space activities by agreeing to the provision of a 'level playing field' for private enterprise of all countries. This is essential given the fact that outer space is free and States on earth have very different situations insofar as their possibilities to reach outer space are concerned. There are differences in their size, geographic location, technological development, economic strength, *etc.*

(d) An assumed, or even a generally recognized, right of existemce of free innocent passage of space objects through foreign airspace as a corollary to the freedom of exploration and use of outer space, does not help in most cases in creating a level playing field;

(e) A functionalist approach to space transportation upsets the safety, security and environment of air space as regulated by aviation law. The use of air space must come under a single, universal legal system, and that is today the Chicago regime of aviation law;

(f) The economic side of space transportation, especially of launch transportation, requires universal agreement to ensure the possibility of general participation by all States under conditions of fair competition;

(g) The possibility to make money with space activities should not be left exclusively to States, even less solely to the present space powers. Commercial activities should be made possible for all nationalities, by a universal international agreement which obligates States under their national laws to authorize private enterprise, regardless of nationality. Such an agreement should allow for international (multinational) private financing, ownership and control of commercial space activities, subject to safety and security requirements;

(h) To promote private enterprise in space activities, universal agreement should be reached on limiting the risks for private enterprise. Such an agreement may arrange for an international fund to compensate

victims of exceptional damage caused by space activities of private enterprise;

(i) National laws should provide for very strict requirements governing activities of private enterprise in outer space, including *inter alia:* financial prerequesites; the prospects of profitability of their proposed activities (*cf.* Iridium Inc.); guarantees of safety, security and environment; compliance with the State's international obligations, *etc.*

(j) Launching sites for reaching the geo-orbit, GTO's, LEO's and Polar orbits should be made available, as 'spaceports' to private space carriers. Even the possibility to construct one's own launching site in another country should be considered as a conditional right (for instance, if no other reasonable way is available) of all States and their nationals to engage in and obtain benefits from space activities;

(k) States and their nationals should have non-discriminatory opportunities to exploit ELV's, re-usable launchers, air-based launchers (*e.g.* Pegasus), sea-based launchers, converted ballistic missiles (*e.g.* SS-N-23) and space planes;

(l) The freedom of outer space implies that the latter is a free destination for transportation to and from outer space from/to any suitable place on the earth (*cf.* outer space as the 'province of mankind' and *cf.* the third and fourth freedom of the air). Only for reasons of national security and fair competition may a State impose conditions on the use of its territory and its air space by foreign space carriers or the use of 'its' or foreign payloads by a foreign space carrier;

(m) Space carriers and spacecraft should be distinguished and identifiad by registration and receive a 'home State' designation by registration, *i.e.*, have the nationality of the State of registration for regulatory purposes.

Postscript

There may come a time that the earth no longer can sustain human life at the rate it multiplies or that nature is affected by modern industrial development to a point that the environment no longer is friendly to human life in society and/or that nuclear wars threaten to destroy man and the environment. In such an event, man may decide to emigrate to outer space or another planet(s). Man is already searching with radiotelescopic means to determine whether life elsewhere is possible or perhaps already exists in outer space.

By the time that the earth runs out of capabilities to accommodate human life, space transportation by launch vehicles becomes the necessary escape. Today the road to outer space is by a launch rocket (ELV), Shuttle (re-usable vehicle) or missile and, tomorrow, it will be by a space plane. To promote access to outer space launch capabiliies should be shared between all States in exchange for a pledge not to use the launch technology for (aggressive) military purposes or for ballistic missiles capable of carrying

nuclear warheads.[45] Also, making launch sites available to other States or their nationals should only be done if these sites are used exclusively for peaceful purposes.[46]

For low-cost access to space, small launchers are the answer, at least insofar as access with small satellites/payloads is concerned.[47]

Annex I

Launches, Launchings and Launchers

A launch can take place from a fixed or mobile launching site on the ground, from the water and from the air. Launchings from celestial bodies, space stations, or space objects, when in outer space, are not included here. In each case of launching, the destination of the payload being transported is outer space; the return transportation is either to a suitable place in the State from where the payload was launched, in the State of the space carrier, in a third State, or in a place outside the jurisdiction of any State.

Passenger traffic has outer space as its origin and destination, if the passenger makes a stop-over in outer space (taking a different spacecraft for the return journey, or does not intend to return at all). Cargo traffic (payloads) has outer space as its destination, if it is off-loaded from the spacecraft bringing it to outer space and has outer space as its origin, if it has been off-loaded in outer space or has been part of the natural resources of outer space.

A 'launch site' is to be operated as an international airport, launching facilities being made available to national and foreign private space carriers or allowing them to build their own launching pads at the site. As States enjoy the rights of the 'Multilateral Launch Transport Services Agreement,' they may designate private space carriers that are incorporated under their national laws and have their main operational basis within their country, to actually exercise these rights. These private space carriers have to qualify under the new 'Multilateral Launch Transport Services Agreement,' which refers to internationally harmonized national safety, security, environmental, financial, etc. conditions. Private space carriers operate with own or leased spacecraft. They may be national, international or multinational space carriers, depending on their

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45 *Cf.* the 23 nations 'Missile Technology Control Regime' (MTCR) Agreement of 1987 to curb the proliferation of ballistic missiles by prohibiting the signatories to sell certain types of launch technologies and components. *See* Space News, Aug. 16-22, 1993.

Nuclear capabilities are shared in exchange for a pledge not to develop nuclear weapons *Cf.* Treaty on the Non-proliferation of Nuclear Weapons, July 1, 1968, 21 U.S.T. 483;T.I.A.S. 6839; 729 U.N.T.S. 161.

46 *Cf.* the USAF awarding Spaceport Florida a $2.15 million grant to modify a missile complex at the Cape Canaveral AF station to accommodate small launch vehicles on the basis of launch-site contracts. *See* Space News. Aug. 16-22, 1993.

47 Commercial space transportation by private enterprise should be promoted, for instance, by enabling air carriers to buy or lease launch vehicles, like the Delta Clipper of McDonnell Douglas, and to build or lease a launch site in Florida or California and become commercial space carriers as well.

ownership while their effective control is in national hands or in the hands of two or respectively more than two nationalities.

Launchings were made possible originally by military research to deliver weapons of mass destruction into outer space. Space activities were and still are in most cases State activities. State-aids will be needed for private infant space industries, and indeed are still normal.[48]

ELV's (expendable launch vehicles) and re-usable launchers are, among others, the following:

United States

'Pegasus' XL launcher of Orbital Science Corporation of Fairfax, Va. and Hercules Inc. to be air-launched from the wing of a Boeing-52 bomber aircraft, which can boost a satellite into LEO or in a transfer orbit (to be re-boosted into the geo-orbit)[49] or a Polar orbit.

Taurus' launcher for heavier payloads (3000 lbs. in LEO; 950 lbs. in GEO), sponsored by Defense Advanced Projects Research Agency (DARPA).

Aquila of the American Rocket Company.

'Atlas-1 and 2A' of General Dynamics, can boost a satellite into LEO or Polar orbit; 'Atlas 2 with its Centaur upper stage,' with the extended range interceptor technology, can reach the geo-orbit.

'Delta 2,' MLV (medium launch vehicle) of McDonnell Douglas, which can reach the geo-orbit; the DC-X, the Delta Clipper Experimental reusable single stage to orbit (SSTO) rocket (the DC-Y is the working model) is meant to replace the Shuttle, which is far too expensive for military 30-tons launchings to LEO's. The DC-X is funded by the SDIO, and expected in a commercial version by 1996. It lands vertically.

Lockheed SR-71, XB "Aurora," unmanned vehicle (high speed large aircraft) to launch small payloads into orbit (two stage to orbit system, TSTO) and the coming LLV1 launch vehicle. Unmanned ELV's are used for weather forecasts, navigation, reconnaissance, resource management and commercial telecommunications satellites.

Titan 2, of Martin Marietta for the US Air Force, can reach a Polar orbit; Titan 3 can reach a transfer orbit; Titan 3 with an inertial upper stage (IUS) can reach the geo-orbit (without the IUS, it reaches the Polar orbit); Titan 4, also for US Air Force (with Shuttle capacity) can reach all orbits.

The bottom line is the cost per pound payload delivered to orbit. The US Shuttle lifts 24 tons at $6.800.- per pound; Titan 4 lifts 20 tons at $5.000.- per pound; Delta 2 lifts 6 tons at $3.275.- per pound.[50]

The US Commercial Space Transportation Committee (COMSTAC) and the White House National Space Council are working on an (advanced) National Launch System (NLS) to find a replacement for the Shuttle which is too expensive. It may be the 'Spacelifter' ($5 billion). A new system would primarily be for Defense Department needs.

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48 Note that the US government will pay the excess, if the damage from a launch exceeds the amount of private insurance held by the company.

49 A transfer orbit is an elliptical orbit, the apogee of which touches the geo-stationary orbit. When the space object is at that point, an apogee kick motor puts the satellite into a circular orbit.

50 The Guiana launch site on the equator makes it possible to lift more weight per amount of rocket fuel than, for instance, from the US launch sites.

The USAF/NASA/National Launch System was cancelled by Congress in 1992 in favor of the development of the 'Spacelifter', which, however, is a rival to the NASP program in the budget.[51]

The NASP, the national aerospace plane, manned hypersonic flight (SSTO: X-30) was cancelled in favor of ICBM's for payloads to be boosted atop the missiles. Still efforts are being made to revive the X-30 program for a hypersonic manned STTS demonstrator with horizontal take-off and landing capabilities in the year 2000.[52]

Boeing, General Dynamics, Lockheed, Martin Marietta and Rockwell together are studying a common commercial approach for a new launcher, also in view of future markets, such as space advertising, debris clean-up in LEO, space tourism (?), etc.[53]

The DoT's Office of Commercial Space Transportation (OCST) is responsible for the regulation of the commercial launch industry. The first commercial license for a re-entry vehicle was issued by the DoT in 1993, for the Commercial Experiment Transporter (COMET) program of Space Industries. The Comet offers a launch and retrieve service, *e.g.*, to put materials processing experiments into space for microgravity research.[54] The DoT/OCST-license requires an accurate and reliable vehicle to perform as promised. The vehicle gives a temporary sonic boom on re-entry. The program is expensive and still raises environmental concerns but may be indispensable to microgravity experiments.

ESA (13 nations)

Ariane-5 of Arianespace, in late 1995, powered by liquid oxygen and liquid hydrogen, can boost seven tons into geo-orbit and 22 tons into LEO. Existing Ariane launchers can boost satellites into the geo-transfer orbit. Ariane 5 will face competition from the CIS countries, with their low ruble value and dumping rates. The competition centers around the price of launchings, the lift-capacity and, of course, the reliability.

The CNES has veto-power in ESA by which it can prevent use of launchers other than Ariane, and it presses ESA and Eumetsat to only use Ariane rockets.

ESA, the European Telecom Satellite Organization of Paris (36 nations), Eumetsat (16 nations) and Inmarsat (67 nations), all may prefer the cheaper Proton launcher. Ariane, however, has a long list of launchings, such as Hispasat 1B; Insat 2B; Thaicom 1; Telstar 4; Meteosat-7, MOP 3; Palapa C (HS01 built by Hughes) series; and, for 1994: Eutelsat; Turksat; Intelsat 7 (or by Long March ?); Panamsat; Brasilsat; Telecom and M-sat.

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51 The Spacelifter, capable of lifting 20.000 lb. payload into LEO, is not fully supported by the US Military, though. *See* Av. Week & Space Tech., June 28, 1993.

52 *See* Av. Week & Space Tech., June 14, 1993, p. 32 and July 5, 1993.

53 *See also* Peter van Fenema, *Cooperation and Competition in Space Transportation,* Speech delivered at the Tokyo Air & Space Conference, June 2-5, 1993. (Proceedings of the Tokyo Conference are expected to be published in 1994).

54 Until the mid-eighties, there were no licenses issued in the US for private launchings. In June 1993 legislation was proposed not to issue licenses to any payload that contains advertising visible from the earth.

Arianespace comes under French law and the Declaration of October 15, 1981 of European governments and the ESA-Arianespace Convention of August 28, 1981.

CIS.: Russia(Plesetsk)/Kazakhstan(Baikonour)

Under a US-Russia agreement, initialled in June 1993, Russia may conclude eight launch contracts through the end of the year 2000 (not more than two per year) for the launch of satellites built in the US or containing US components. The launch prices are not to be more than 7.5% lower than those of Western competitors.[55] Russia's 'Proton', made by Krunichev Enterprise of Moscow and offered (subject to technology transfer safeguards to be worked out between the Russian and US governments) by the joint venture 'Lockheed & Krunichev (& NPO Energia of Kaliningrad) Enterprise', lifts 20 tons at $750.- per pound.[56] It can lift 2.600 kilograms from Baikonour into geo-orbit and 4.200 kilograms from Cape Canaveral. It may be used for Inmarsat-3, the 4th satellite from Baikonour for $36 million. The first three will be launched on an Ariane by Arianespace. Proton has been successful since 1965.

Russia's 'Energia' lifts 100 tons at $300 per pound; 21 tons into geo-orbit, and can be compared with the US 'Saturn' rocket. Other Russian launchers are Vostok, Molniya, Soyuz (all to be replaced by commercialized ICBM boosters), and Tsyklon, Cosmos, Vostok and the Ukrainian-built Zenit rockets.

The Russian missiles SS-18/19/24/25 (SS-25, now called START-1, is a three-staged solid fueled ICBM with a 10.500 kms. range to be used anywhere) and the US Minuteman II, Trident and Poseidon - left overs of the Cold War after the first Strategic Arms Reduction Treaty of July, 1991 between the US and the former USSR - can be used as cheap, low orbit boosters (for 'defense' space missions, telecom of Iridium Corp. (?) and micro-gravity experiments).[57]

Japan

The Japanese heavy-lift rocket H-2, fueled with oxygen-hydrogen, to be developed by NASDA, will operate from Tanegashima Space Centre, can lift 4000 kgs. in LEO and 2.200 kgs. in Geo-orbit and will compete for reliability with Ariane 4, and also with Proton and Atlas Centaur. The Centre is off Kyushu and is criticized by fishermen. The small launchers N-1, N-2 and H-1 have been successful since 1975.

China

China's 'Long March-3' costs $35 million per launching; US $65-95 million per launching; Russia $35 million (plus adjustment costs?) per launching.

Brazil

Brazil may have its own launching capability in 1994, instead of having to use the Pegasus of Orbital Science Corporation for $13.5 million for placing an environmental satellite in a 466 miles circular orbit.

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55 *See* Space News, July 26-Aug.1, 1993.

56 Note that Krunichev wants to invest in Iridium Corp. to obtain three Proton launches each carrying seven Itridium satellites into LEO.

57 Makeyev's SLBM's, like the SS-N-20 and 23 (submarine launched ballistic missiles) may be offered as sea-launch services for LEO on a joint venture basis with the USA. *See* Av. Week & Space Tech., May 3, 1993.

Annex II

A Multilateral Launch Transport Services Agreement.
The six 'launching freedoms'[58]

Tentatively and theoretically, we may make the following distinctions with respect to international (private) launch transportation activities for possible future international regulatory purposes, to be agreed upon in a 'Multilateral Launch Transport Services Agreement.'

It should be noted that, contrary to public air law, launching (and space transportation) law might distinguish between freedoms (rights or 'privileges' to be granted by States) also based on the criterion of the 'nationality' of the traffic that is carried and not only on the criteria of origin and destination of the traffic, in the sense 'from where' to 'where' traffic is carried by a designated air carrier.[59]

We may distinguish the following launching freedoms (rights or privileges), all of which should be freely available in international commercial (private) launch transportation (apart from 'cabotage', which is the launch from a launch site of a State, of a national payload, by a national space carrier, to outer space, using only the national and/or free airspace):

(1) transportation of payloads to/from outer space through *foreign* air space (*cf.* the first freedom of the air);

(2) transportation to outer space by a *foreign* space carrier of a payload *from the foreign space carrier's own State*, using not only the national air space of the State from which the payload is being launched and/or free air space and/or the air space of the State of the space carrier, but also the air space of *a third State* (*cf.* the second freedom of the air);

(3) transportation to outer space of a *foreign* payload from a launch site of a State by a private *national* space carrier, using not only the own air space of the State from which the payload is being launched and/or free air space and/or the air space of the State of the payload, but also the air space *of a third State;* (*cf.* the third freedom of the air);

(4) transportation of payloads *originating in outer space* from outer space to any place on the earth, by *any authorized space carrier*, using the air space of any foreign State, and any suitable landing site for disembarkation or off-loading its payload (*cf.* the fourth freedom of the air);

(5) transportation to outer space of a *national* payload from a launch site of a State by a *foreign* space carrier, using not only the national air space of the State from which the payload is being launched and/or free air space, but also the air space of a third State; (*cf.* the fifth freedom of the air);

(6) transportation to outer space of a payload *from a third State* from a launch site of a State by a *foreign* space carrier, using not only the national air space of the State from which the payload is being launched and/or free air space and/or the air space of the State of the payload, but also the air space of another third State (*cf.* the sixth freedom of the air).

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58 For the freedoms of the air, *see* art. 1, section 1 of the International Air Transport Agreement of Dec. 7, 1944, annexed to the Chicago Convention of 1944.

59 It is true that some States did distinguish air traffic according to its so called 'true' origin and 'true' destination, in order to treat sixth freedom traffic (traffic carried between foreign States via the homeland of the carrier) as fifth freedom traffic (traffic carried between foreign States as intermediate points on a route).

ANNEX III

The Martin Marietta v. Intelsat Case[60]

When, on March 14, 1990, the launch of an Intelsat VI satellite by a Titan III rocket of Martin Marietta (MM) failed to make the satellite reach the geo-orbit, Intelsat suffered $400 million damage ($145 million for the unserviceable satellite; $115 million for the launch and $140 million for loss of revenue, the lease of transponder capacity and the anticipated cost to have the satellite re-boosted into the geo-orbit by the Shuttle).

The Commercial Launch Services Contract for two launches, each to bring an Intelsat-VI satellite into geo-orbit for $220 million by Titan III launchers, was concluded on August 10, 1987.

MM accepted the blame for the failure of the first launch and carried out the second launch with full success on June 23, 1990. Then, on the third of July 1990, Intelsat (now 126 nations) sued MM for $400 million damages, allegedly caused by MM's 'gross negligence'. MM claimed that the limitations of liability provided for in the contract barred Intelsat from suing MM, as MM could not be held liable for tort in view of the 1988 amendments to the Space Launch Act. MM argued that a cross-waiver should be read into the contract, even if it was not expressly so written in the contract.

Intelsat based its counter claims on both bases provided in the contract: (a) MM's gross negligence (a tort-based claim); and (b) on breach of contract (a contract-based claim).

Note that a tort-based claim was limited in the contract to the price of the launch, paid by Intelsat to Martin Marietta; while a contract-based claim knew two 'exclusive' remedies as alternatives: (a) a cash refund to Intelsat or a guaranteed reflight paid by MM, if Intelsat purchased a reflight/refund option before the launch; or (b) MM will exercise its *'best efforts'* to secure a replacement launch within twelve months against payment by Intelsat.

Intelsat had not exercised the options under (a), so (b) applied. MM based its case on the cross-waiver and the exclusivity, mentioned in the contract, of the remedy under (b). To sue in tort for purely economic loss under a contract is only possible (in the US) in case a 'duty of care' exists, separate from the other contractual obligations of the party concerned.

The US district court in Baltimore, in November 1991, dismissed the Intelsat counter claims and ruled that any claim in tort was barred by the cross-waiver required by the amendment of 1988, even a claim on the basis of gross-negligence. Congressional intent, when adopting the 1988 amendment, clearly was to protect the private launch industry. (The appeals court, however, found that Congressional intent was not to protect the parties from liability for their own gross negligence.)

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60 For a discussions of this case, *see especially* Tanja L.Masson-Zwaan, *The Martin Marietta Case or How to Safeguard Private Commercial Space Activities,* 35 PROC. COLLOQ. L. OUTER SPACE 239 (1993), also published in 18 AIR & SPACE LAW (No. 1, 1993). *See also* Rachel B. Trinder, *Legal Aspects of Commercial Space Activities; US Space Law - Develoments in Case Law,* paper presented at the International Conference on Air Transport and Space Applications in a New World, Tokyo, June 2-5, 1993; as well as PAMELA L. MEREDITH & GEORGE S. ROBINSON: SPACE LAW - A CASE STUDY FOR THE PRACTITIONER 325*ff.* (1992).[As noted before, the Proceedings of the Tokyo Conference are expected to be published in 1994].

The lower court did not confirm, however, that the cross-waiver should be 'read into' a contract.[61] As to the contract-based counter claim, MM had argued that a breach of contract, setting aside the exclusive remedies provided for in the contract, could only be the abandonment of the contract. According to MM, this clearly was not the case, as the second launch took place before the start of the litigation. Clearly MM had not abandoned the contract. The court concluded that the limitations (of the damages) in the contract and the remedies in the contract in case of a breach of contract were enforceable.

Intelsat appealed and the US Court of Appeals in Richmond, Va., on October 21, 1992, ordered the lower court to reconsider the case as the contract between MM and Intelsat was entered into before the CSLA amendments of 1988. Thus Intelsat's counter claim that MM is liable for gross negligence will again be considered. In the meantime, the lost Intelsat VI was rescued by the Shuttle 'Endeavor' for $140.000.000 and boosted into the Geo-orbit in mid-May 1992.

The resulting situation is highly unsatisfactory as no certainty exists for private launch companies: different courts may give completely different rulings. And indeed in practice, Intelsat now wants assurances in the launch contracts it makes, that the launch company will be liable for damages if the launch fails due to avoidable errors on the part of the rocket company. At the same time, companies like Arianespace, negotiating for instance with Intelsat on the launch of two or three Intelsat VIII satellites, in return, will want assurances that it will not be sued (*in casu* by Intelsat) for negligence. (For US launch companies such assurances as required by Intelsat, will entail the necessity to take out expensive insurance at least against '*gross* negligence' suits, as it is improbable that US law offers legal protection to launchers from liability for their own gross negligence).[62]

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61 Martin Marietta v. Intelsat, 763 F. Supp. 1327 (D. Md 1991). Ms. Trinder stresses the critical nature of commercial agreement documentation as 'the written agreement between the parties must be clear, also unambiguous, and must address the many eventualities that are likely-- and possibly those that are unlikely-- to occur.' The parties', she states 'will not be rescued by the courts should the contract not provide adequate protection.' *Op. cit., supra* note 60.

62 *See* Space News, December 14-20, 1992.